



TO CONSOLIDATE OR COORDINATE?

Status of the Formation of Groundwater Sustainability Agencies in California

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
BBAT	Basin Boundary Assessment Tool
CASGEM	California Statewide Groundwater Elevation Monitoring
CCP	Center for Collaborative Policy
CCR	California Code of Regulations
CWD	Central Water District
DWR	California Department of Water Resources
GBA	Eastern San Joaquin County Groundwater Basin Authority
GPAC	Groundwater Pumpers Advisory Committee
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
IRWM	Integrated Regional Water Management
JPA	Joint Powers Agreement
KRCD	Kings River Conservation District
LIA	Local Implementing Agency
MGA	Santa Cruz Mid-County Groundwater Agency
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding (same meaning as MOA)
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SqCWD	Soquel Creek Water District
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TCFCWCD	Tehama County Flood Control and Water Conservation District
VRWC	Ventura River Watershed Council
WRA	Water Resources Association of Yolo County
YCFCWCD	Yolo County Flood Control and Water Conservation District

EXECUTIVE SUMMARY

The passage of the Sustainable Groundwater Management Act (SGMA) in 2014 has launched an unprecedented, locally driven process to form hundreds of new public agencies that will play a critical role in managing the state's groundwater resources for decades to come. Under this landmark legislation, new Groundwater Sustainability Agencies (GSAs) must develop Groundwater Sustainability Plans (GSPs) and achieve sustainable management of the state's most critical groundwater resources within 20 years of plan implementation.

Across the state, thousands of local agencies and other stakeholders involved in managing water and land use have been working to form GSAs before June 30, 2017 in order to avoid state intervention. In doing so, they face a critical choice: to consolidate their efforts by forming a single GSA for a groundwater basin, or to establish separate GSAs that will coordinate with one another to develop a single or multiple GSPs. In developing multiple GSPs, SGMA requires that sustainability goals be defined and measured at the basin scale, and that one set of data and methodologies be used for water budgets, sustainable yield and other key parameters. In some basins, consolidation may be the most efficient and effective way to achieve these goals. However, given California's long history of local control over water and the diversity of conditions, creating a single entity to manage some basins may not be practical or politically feasible.

As the June 2017 deadline for GSA formation approaches, this report provides a preliminary look at whether local agencies are pursuing consolidated (single GSA) or coordinated (multiple GSA) approaches to managing groundwater basins, and why. It draws upon GSA formation notices submitted to the California Department of Water Resources through October 31, 2016, and eight case studies of GSA formation processes underway in groundwater basins across the state.

Our analysis of GSA formation notices suggests that most high- and medium-priority basins are likely to have multiple GSAs. Of the 51 high- and medium-priority basins in which local agencies had submitted GSA notices as of October 31, 2016, 13 are completely covered by a single GSA. Only one of these GSAs involved the creation of a new entity with a governing body composed of multiple agencies to manage an entire basin. Indeed, the vast majority of GSA notices have been submitted by individual agencies rather than collaborations among multiple entities. These patterns may change as more GSAs are formed in the coming months. However, this degree of fragmentation, while allowable under SGMA, points to the need for significant investment in coordination among GSAs in order to develop coherent goals and management strategies at the basin scale.

Given the diverse settings for groundwater management across the state, no single governance structure, whether consolidated or coordinated, will work everywhere. Drawing upon eight case studies of GSA processes across the state, we identify a set of seven interrelated factors that appear to have played a role in decisions about the scale of GSAs and whether to pursue consolidated or coordinated approaches to basin governance. These factors include 1) basin size 2) degree of heterogeneity in basin conditions 3) concerns about autonomy and representation 4) needs for financing GSA activities 5) existing capacity to serve as a GSA 6) prior collaborative experience and 7) the presence of trusted basinwide leadership. The last two factors – prior collaborative experience and basinwide leadership – appear to play a key, positive role in supporting the development of either consolidated or coordinated governance forms.

Drawing upon these case studies, this report identifies several lessons for agencies and stakeholders as they grapple with decisions over consolidated or coordinated approaches to basin management:

- The presence of a convening entity – whether a county government, a water district, or a water users’ association – can prove helpful to bring stakeholders together for basinwide discussions.
- Creating an inclusive, basinwide process can help stakeholders become aware of the range of governance options under SGMA, better understand their own and others’ interests, and assess resource needs.
- Whether multiple GSAs within a basin choose to develop one or multiple GSPs, mechanisms will be needed to coordinate among GSAs. It is useful to begin thinking sooner rather than later about these mechanisms.
- It is important to leave room for learning, recognizing that needs will evolve as SGMA implementation proceeds, and GSA arrangements can be changed over time to address them.

The simultaneous creation of hundreds of new public agencies with significant and long-term resource management responsibilities has little precedent in California or elsewhere in the United States. Once GSAs have been formed and begin to exercise their new roles in managing groundwater resources, it will be critical to establish processes to learn from early experiences in governance. Further research will be needed to understand the factors that shape governance decisions effectiveness of consolidated and coordinated governance in groundwater basins across the state. Additionally, state government agencies should work closely with GSAs to create opportunities to identify and share lessons learned, such as by sponsoring workshops and funding pilot studies of innovative policies. Overall, learning and adapting as SGMA’s implementation proceeds will be critical to achieving the vital improvements in groundwater management that the law intends.

1. INTRODUCTION

The Sustainable Groundwater Management Act of 2014 (SGMA) – California’s first ever statewide framework for managing groundwater – aims to achieve “sustainable” management of the state’s high and medium-priority groundwater basins¹ by the year 2040 or 2042, depending on the basin.² Groundwater is a critical resource, accounting for nearly 40 percent of the state’s water supply in average years, and up to 60 percent in drought years (DWR, 2013). Many groundwater basins have experienced decades of decline in groundwater levels and associated impacts, and ameliorating these conditions will present substantial technical and financial hurdles. Yet, the challenge of creating the governance structures needed to accomplish this is equally significant.

California’s groundwater has long been governed in a decentralized manner, with over 2,000 local agencies having some form of responsibility for groundwater management (Nelson, 2012). State-level requirements have been minimal, and although many local agencies have managed groundwater through local-level plans and ordinances, these have often been limited in scope. SGMA changes this situation dramatically (see Box 1). First, it provides for the creation of Groundwater Sustainability Agencies (GSAs). These new public agencies are responsible for defining sustainability goals and indicators and for developing and implementing plans to achieve those goals. Yet, prior to SGMA, very few water management agencies existed at the groundwater basin scale. Second, it requires that a “sustainability goal” be defined and measured at the scale of each groundwater basin to avoid or reverse the negative impacts of groundwater overdraft.

Since January 2015, local agencies and other stakeholders across the state have engaged in the unprecedented and complex process of forming GSAs, a task they must complete by June 30, 2017 in order to avoid state intervention. In doing so, they face a critical choice: to consolidate their efforts by forming a single GSA for a groundwater basin, or to establish separate GSAs that will coordinate with one another to manage the basin. In some basins, managing through a single GSA may be the most efficient and effective way to develop coherent and integrated management strategies and limit overlapping functions and personnel needs. However, California has a long history of local control, and there are many interests at play in each groundwater basin (Blomquist, 1992). In this context, consolidating basin management under a single entity may be neither practical nor politically feasible. At the same time, if multiple GSAs have a hand in managing a basin, under SGMA’s requirements they must either work together to develop a single Groundwater Sustainability Plan (GSP) for the entire basin or develop multiple GSPs that use the same “data and methodologies.” In either case, multiple GSAs must invest significantly in coordinating with one another.

As the June 2017 deadline for GSA formation approaches, this report provides a preliminary look at whether local agencies are pursuing “consolidated” (single GSA) or “coordinated” (multiple GSA) approaches to basin-scale governance, and why. Drawing upon an analysis of GSA notices filed through October 31, 2016, and interviews and observations in eight case studies of the process of GSA formation in basins across the state, we address the following questions:

- To what degree is the GSA formation process leading to consolidated versus coordinated approaches to governing groundwater basins?
- What factors are affecting local agencies’ decisions regarding whether to follow a consolidated or a coordinated approach?

1 Throughout this report, “groundwater basins” refers to basins and subbasins as defined in Bulletin 118 (DWR, 2003). Prior to revisions made to basin boundaries in 2016, 127 of 515 groundwater basins were ranked as high- or medium-priority, and they accounted for over 90 percent of groundwater pumped from alluvial groundwater basins (DWR, 2014). Basins will be reprioritized in 2017, and this number may change. See Section 3 for a description of basin prioritization and boundary modifications.

2 Twenty-one basins designated as “critically overdrafted” must achieve sustainability by 2040.

Box 1. Key elements of the Sustainable Groundwater Management Act

Enacted in 2014, the Sustainable Groundwater Management Act (SGMA) provides local agencies with the authority to manage groundwater resources and allows the State Water Resources Control Board (SWRCB) to intervene if requirements and timelines to reach sustainable management are not met. This box provides a brief overview of key SGMA provisions. For further information, see California Department of Water Resources' (DWR's) [SGMA web site](#) and SWRCB's [SGMA web site](#).

Sustainable groundwater management is defined in terms of avoiding “significant and unreasonable” levels of six undesirable results, which include 1) chronic lowering of groundwater levels, 2) reduction of groundwater storage, 3) seawater intrusion, 4) degraded water quality, 5) land subsidence, and 6) depletions of interconnected surface water.

Most of SGMA's requirements apply to **high- and medium-priority groundwater basins**. The DWR determines basin priority based on multiple factors such as population, amount of pumping and reliance on groundwater as a primary water source. In addition, 21 basins are designated as “critically overdrafted.” Areas where groundwater rights were adjudicated prior to SGMA are exempt from most requirements.

SGMA provides for the creation of **Groundwater Sustainability Agencies (GSAs)**, which are granted significant authorities to manage groundwater. These include authorities to limit groundwater extractions, charge fees, require measurement and reporting of groundwater use except for de minimus extractors, and regulate well spacing, among others. The process for forming a GSA is described in Section 3.1 of this report.

GSAs in high- and medium-priority basins must develop **Groundwater Sustainability Plans (GSPs)** by 2022 (by 2020 in critically overdrafted basins). GSPs must comply with [regulations](#) (California Code of Regulations, Title 23, §350 et seq.) established by DWR, and DWR will evaluate GSPs within two years of their completion. SGMA allows for a single GSP to be developed for an entire basin, or, if there are multiple GSAs within a basin, multiple GSPs may be developed if the same data and methodologies are used and GSAs sign a coordination agreement (see Box 3). The sustainability goals of GSPs must be achieved by 2042 (by 2040 in critically overdrafted basins).

SGMA authorizes SWRCB to intervene to manage a basin under certain circumstances, including if 1) a high- or medium-priority basin is not completely covered by GSAs by June 30, 2017, 2) one or more GSPs has not been prepared within the specified timeframe or 3) DWR determines that a GSP is inadequate or its implementation is unlikely to achieve its sustainability goal.

This report is intended for several audiences. First, for most local agencies and other stakeholders involved in forming GSAs, this process represents uncharted territory. Understanding how others are approaching these difficult choices can be helpful in making decisions about governance. Second, for agency officials carrying out the state's role in SGMA implementation, this overview of experiences to date may help to assess needs for technical assistance moving forward. Finally, the simultaneous creation of hundreds of new government agencies with substantial new authorities has little precedent in California or elsewhere, and numerous researchers are following SGMA's implementation with keen interest. As Kiparsky et al. (2016, p. 9) describes it, the GSA formation process is a “grand experiment in the design of institutions for groundwater governance.” This report offers an early glimpse at how that experiment is unfolding.

This report is organized into the following sections. Readers who are already familiar with the GSA formation process may wish to skip Section 3. Those interested in learning more about how GSA formation has proceeded in specific cases should refer to the case study summaries in Appendix C.

- **Section 2** describes consolidated and coordinated approaches to the governance of groundwater basins in the context of research on common pool resources governance.
- **Section 3** provides an overview of SGMA's requirements for forming GSAs and revising groundwater basin boundaries.
- **Section 4** summarizes the methods used for this study.
- **Section 5** presents an analysis of GSA formation notices submitted as of October 31, 2016, focusing on the types of agencies submitting GSA notices and the degree to which high- and medium-priority basins are covered by GSA notices.
- **Section 6** summarizes key features of eight case studies of the process of GSA formation in basins across the state.
- **Section 7** discusses seven factors, summarized in Table 4, that appear to have played a role in decisions to follow a consolidated or a coordinated approach.
- **Section 8** summarizes key conclusions, identifies strategies for supporting GSA formation based on the eight case studies and highlights the need to support ongoing learning during SGMA implementation.
- **Appendices A and B** include additional information about multiagency GSAs and GSAs that completely covered high- and medium-priority basins as of October 31.
- **Appendix C** includes summaries of the GSA formation process to date in each of the eight case studies.

2. GOVERNING GROUNDWATER AS A COMMON POOL RESOURCE: TO CONSOLIDATE OR COORDINATE?

Research over the past several decades has shown that to effectively manage a common pool resource, a governing arrangement should ideally encompass the whole resource (Ostrom, 1990; Young, 2002). Some scholars have urged that single governing organizations be created at biophysical scales (i.e., watersheds or groundwater basins) to ensure that the entire resource is managed in a coherent way (Montgomery et al., 1995). Indeed, the formation of GSAs at such scales seems logical. Kiparsky et al. (2016) indicate, “GSA boundaries should correspond to the physical boundaries of the groundwater basins or subbasins they are meant to manage,” (p. 21). In this report, we refer to this as a “consolidated” approach, with a single GSA governing the entire basin (see Box 2).

Box 2. Defining consolidated and coordinated governance

Consolidated governance refers to situations in which only one GSA is formed to cover an entire groundwater basin. This GSA may consist of a single agency that existed prior to SGMA (referred to as a “single-agency” GSA) or a collaboration among multiple agencies that come together to form a GSA (a “multiagency” GSA). This GSA will develop a single GSP for the basin.

Coordinated governance refers to basins in which multiple GSAs are formed. These GSAs may represent either single or multiple agencies, and may decide to jointly develop a single GSP or to develop multiple GSPs. SGMA only requires a “coordination agreement” if multiple GSPs are developed (see Box 3). However, this report describes any basin with multiple GSAs as an example of coordinated governance. Whether they prepare one or more GSPs, multiple GSAs in a basin will need to develop a mechanism to coordinate their activities during GSP development. This might be accomplished through signing a Memorandum of Understanding (MOU), or through the creation of a Joint Powers Agreement (JPA) composed of GSAs, specifying how responsibilities and costs will be shared. These arrangements do not need to be finalized before June 30, 2017. Section 6.2 of this report discusses anticipated coordination mechanisms in several basins with multiple GSAs.

However, SGMA does not require that groundwater basins be managed by a single GSA. This approach was initially contemplated by drafters of the legislation, but local agencies argued that they should be granted flexibility to determine the scale and composition of GSAs within a basin (Cannon-Leahy, 2015). As a compromise, SGMA allows for the formation of multiple GSAs within a single basin but requires these entities to work together, either to develop a single GSP or multiple GSPs that use common assumptions and methodologies for water budgets, sustainable yield and other key parameters at the basin scale. Box 3 summarizes SGMA’s requirements regarding coordination in the development of GSPs.

In this report, the formation of multiple GSAs is referred to as a “coordinated” basin governance (see Box 2). This approach is similar to what researchers have described as “polycentric” governance, in which existing entities collaborate with one another to achieve particular purposes while retaining their existing identities (Heikkila et al., 2011). Such an approach may lead to more durable governing arrangements since political boundaries are a crucial source of identity and meaning. Relationships and policy frameworks already exist at these scales, and thus these arrangements may be viewed as more legitimate (Blomquist and Schlager, 2005; Meadowcroft, 2002). However, the effectiveness of this approach to managing a shared natural resource depends upon

robust coordination among multiple actors, who often have diverse interests. Effectively coordinating across these differences can involve significant transaction costs in terms of time, relationships and money and can limit transparency (Huitema et al., 2009).

This report seeks to improve our understanding of common pool resource governance by assessing the extent to which GSAs are forming at the scale of groundwater basins (Section 5), and discussing specific factors that may help explain why actors in some basins are pursuing coordinated versus consolidated approaches (Sections 6 and 7). The analysis presented here is not intended to be comprehensive. Critical topics related to GSA formation, such the extent to which the governance structures of GSAs enable representation and participation on the part of diverse interested parties, should be examined in much greater depth. Instead, this report aims to highlight key trends as the June 2017 deadline approaches and lay the groundwork for further study.

Box 3. The need for coordination in the development of Groundwater Sustainability Plans

SGMA seeks to ensure that GSPs are developed to achieve a single sustainability goal for a groundwater basin, and are based upon a common set of assumptions about basin conditions. Regulations issued by DWR in June 2016 (California Code of Regulations §350 et seq.) lay out the requirements for the development of GSPs, including the use of hydrogeologic conceptual models, water budgets, monitoring protocols, sustainability indicators and measurable objectives for each of the six undesirable results, and more. For details, see DWR's [GSP Regulations Guide](#).

If multiple GSAs are formed in a basin, these GSAs may either work together to develop multiple GSPs or a single GSP for the whole basin. Multiple GSPs within a basin must be based upon the same “data and methodologies” with regard to groundwater and extraction data, surface water supply, total water use, change in groundwater storage, water budget and sustainable yield (CWC §10727.6). If multiple GSPs are prepared, each GSA in the basin must sign a coordination agreement that describes how they have addressed this requirement, outlines responsibilities and procedures for exchanging information and resolving conflicts, describes a coordinated data management system, and meets several other criteria (CCR §357.4). Multiple GSAs that develop a single GSP do not have to sign a coordination agreement. However, they must nonetheless work together and come to agreement upon all elements of the GSP.

If one GSA is created to cover an entire groundwater basin, participants in that GSA will work together to prepare a single GSP. To account for diverse conditions within a basin, the GSP regulations allow for the definition of “**management areas**,” for which different minimum thresholds and measurable objectives regarding undesirable results may be defined (CCR §354.20). This can enable agencies participating in a single GSP to undertake different monitoring and management actions, as appropriate to local conditions. However, activities in management areas must be coordinated so as to achieve the basin's overall sustainability goal.

3. THE GSA FORMATION AND BASIN BOUNDARY MODIFICATION PROCESSES

One of SGMA's most significant implications is that it establishes a new regulatory meaning for groundwater basin boundaries. The boundaries of California's 515 alluvial groundwater basins and subbasins are defined by DWR in Bulletin 118 (DWR, 2003). Boundaries are largely based upon available geologic and hydrologic data and, in some cases, political jurisdictions. These basins have been prioritized based upon multiple factors, such as overlying population, irrigated acreage, reliance on groundwater as a primary water source, and the presence of overdraft and other impacts. Prior to modifications made to basin boundaries in 2016 (described below), 127 basins were designated as high- and medium-priority and accounted for an estimated 96 percent of groundwater pumped from the state's alluvial basins (DWR, 2014).³

Prior to SGMA, with the exception of a few adjudicated basins and special act districts, agencies governing groundwater and holding enforceable groundwater management authorities did not exist at the scale of basins defined in Bulletin 118. However, under SGMA, GSPs must be developed and implemented in high- and medium-priority basins, following Bulletin 118 boundaries. Local agencies that wish to have a role in groundwater management must work with others within their basin boundaries to form GSAs and prepare one or more GSPs to achieve sustainability within 20 years. Agencies whose service areas cross basin boundaries are faced with the prospect of participating in the governance and management of more than one basin.

In order to build the institutional infrastructure to manage groundwater at the basin scale, SGMA established a process of GSA formation by June 30, 2017 in high- and medium-priority basins. It also created the Basin Boundary Modification process, whereby local agencies have a periodic opportunity to propose changes to basin boundaries. This section provides a brief summary of both processes.

3.1 The GSA formation process

Under SGMA, GSAs serve as the primary entities responsible for achieving sustainable groundwater management within 20 years of GSP implementation. GSAs are granted significant authority to achieve this goal, including the ability to assess fees, restrict groundwater pumping and regulate well spacing, among others, as described in California Water Code (CWC) §10725 and §10730 et seq. Thus, the stakes are high for the many different agencies, landowners, communities, businesses, environmental interests and others who rely upon groundwater (collectively referred to in SGMA as "beneficial users"). In a given basin, hundreds – or even thousands – of stakeholders may have an interest in the formation of GSAs, making this process extremely complex and varied throughout the state.

³ Undertaken as part of the California Statewide Groundwater Elevation Monitoring (CASGEM) program, this prioritization was based upon the following factors: the overlying population; projected population growth; public supply wells; total wells, overlying irrigated acreage; reliance on groundwater as a primary water source; impacts on groundwater including the presence of overdraft, subsidence, saltwater intrusion and other groundwater quality impacts; and other factors as determined by DWR (see DWR's [CASGEM web page](#)). Following recent basin boundary modifications, DWR expects to complete a reprioritization of all basins in 2017, as required by SGMA (CWC §10722.4 (c)).

3.1.1 Requirements for GSA formation

All areas of high- and medium-priority basins must be completely covered by GSAs by June 30, 2017, unless they fall within an adjudicated area specified in SGMA or are completely covered by an alternative plan.⁴ If this does not occur, the State Water Resources Control Board (SWRCB) can intervene to manage all or a portion of a basin. The GSA formation process is locally driven; local agencies decide whether to serve as GSAs, and the state does not have the authority to approve or deny specific requests. However, SGMA and subsequent cleanup legislation set forth some basic requirements, including the following⁵:

- GSAs are to be formed by local agencies, which are defined as local public agencies with water supply, water management or land use responsibilities within a groundwater basin. A water corporation regulated by the California Public Utilities Commission or a mutual water company may participate but only if local agencies agree to this.
- GSAs may be formed by single agencies or by groups of agencies operating under a Joint Powers Agreement (JPA), Memorandum of Agreement (MOA) or other legal agreement.⁶
- In their formation and ongoing activities, GSAs must consider the interests of beneficial uses and users of groundwater, including private pumpers, disadvantaged communities, California Native American tribes, environmental groundwater users and others.
- Counties play a special role. For areas of a basin not covered by another GSA, the county is the presumed GSA as long as it submits a GSA notice to that effect.
- Fifteen special act districts with existing groundwater management responsibilities have the exclusive right to form a GSA within their statutory boundaries.
- The process for determining GSAs involves a local agency submitting a notification to DWR. After reviewing the notification for completeness, DWR posts notices on its [website](#). If no other GSA notice is submitted for that area after 90 days, the GSA is considered exclusive, and additional GSAs cannot be declared in that area.⁷
- If two or more agencies submit GSA notices with overlapping boundaries within a basin, these overlaps must be resolved before a GSA is formed.

During the remaining months prior to June 30, 2017, many more GSA notices will be submitted, and some existing GSA notices will change. Some local agencies decided to submit notices relatively early to hold their places on the GSA map until they could discuss potential collaboration with other entities. In some basins, this triggered overlapping submissions on the part of other agencies within the 90-day period in order to necessitate discussions over GSA formation. As those discussions evolve, these notices will need to be either revised or withdrawn.

While the formal requirements for becoming a GSA are minimal, the tasks that a GSA must be prepared to undertake are substantial. As already noted, GSAs are granted significant powers, including the power to establish fees and restrict pumping, which were not previously available to many local agencies. In addition, SGMA sets a high bar for considering the interests of beneficial uses and the larger community (Dobbin et al., 2015). For example, GSAs must “encourage the active involvement of

4 SGMA exempts 26 previously adjudicated areas, as well as several additional areas where adjudication proceedings were underway when SGMA was enacted, from requirements to form a GSA and submit GSPs (CWC §10720.8). However, Bulletin 118 basin boundaries do not always correspond with adjudicated areas. GSAs must still be formed in parts of a basin that fall outside of an adjudicated area. Alternative plans must meet requirements described in CWC §10733.6.

5 See CWC §10723 and DWR's [web page on GSAs](#) for further details.

6 A MOA is equivalent to a Memorandum of Understanding (MOU). SGMA refers to MOAs, but this report uses the term MOU, which is more common in GSA notices.

7 GSAs are only exclusive within their service area boundaries (CWC §10723.8(d)).

diverse social, cultural, and economic elements of the population within the groundwater basin,” both prior to the development of a GSP and during its implementation (CWC §10727.8 (a)). Finally, if multiple GSAs are formed, SGMA requires considerable coordination among GSAs within a groundwater basin, as described in Box 3. Accomplishing this is likely to involve significant staff time and funding. While the details of coordination mechanisms will continue to evolve beyond June 30, 2017, decisions made now about GSA formation – particularly regarding how many GSAs will be within a basin – will play a significant role in determining how difficult it will be to meet these requirements.

3.1.2 State funding and technical assistance for GSA formation

In many basins, the GSA formation process has involved extensive discussions among GSA-eligible agencies, private pumpers and other interested parties, as well as the general public. Recognizing the importance of robust engagement, DWR and SWRCB have contracted with several organizations (including co-authors of this report, the Center for Collaborative Policy [CCP]), to provide facilitation services at the request of local agencies. To date, DWR and SWRCB have collectively provided over \$1 million for facilitation services to over 20 groups covering all or part of 34 basins statewide. Facilitators serve as a neutral presence and help to organize forums for discussing and deciding on the composition and governance structures of GSAs. In addition, staff in DWR’s four regional offices are available to provide technical assistance to local agencies, answer questions regarding the GSA formation process and help groups to apply for facilitation support services.

DWR’s Sustainable Groundwater Planning Grant Program offers competitive grant funding to support local efforts to achieve sustainable groundwater management. Proposition 1, approved by California voters in 2014, allocated \$100 million to this program. To date, DWR has awarded \$6.7 million to 21 counties through Counties with Stressed Basins grants. These funds are assisting counties to undertake technical studies, and some have also supported activities related to GSA formation. DWR anticipates that a round of grant funding to support the GSP development process will take place in the summer of 2017.

3.2 Basin Boundary modification process

Recognizing the new implications of basin boundaries, SGMA established a process for local agencies to periodically request revisions to basin boundaries (CWC §10722.2). In the spring of 2016, the first phase of the [Basin Boundary Modification Process](#) took place. During this process, local agencies submitted 54 requests to DWR to modify boundaries based upon either scientific or jurisdictional reasons or a combination thereof. DWR evaluated these requests with respect to their potential contributions to sustainable management, effects on the management of neighboring basins and whether the proposed basin had a history of sustainable management of groundwater levels (DWR, 2016a). In October 2016, DWR approved 39 of the 54 requested changes. These revised basin boundaries, along with administrative edits made by DWR to correct inconsistencies, are being incorporated into an updated Bulletin 118, which will be available by January 1, 2017. DWR anticipates that the next opportunity for local agencies to request boundary modifications will be in 2018.

Several local agencies and emerging GSAs have used the Basin Boundary Modification process to request changes to basin boundaries in order to simplify management arrangements. For example, in the Soquel-Aptos area, local leaders successfully petitioned to modify basin boundaries so the service area of the new GSA, called the Santa Cruz Mid-County Groundwater Agency, would correspond to a single basin rather than parts of four basins and subbasins. In Yolo County, the Yolo County Flood Control and Water Conservation District received approval for its request to combine portions of four subbasins into a single subbasin that covers much of the county, which may be covered by a single GSA. Detailed summaries of these two cases are included in Appendix C.

4. METHODS

Our analysis of the GSA formation process and of factors affecting the scale of GSAs is based on a review of GSA notifications submitted to DWR prior to October 31, 2016, as well as eight case studies of GSA formation. In addition, two co-authors affiliated with CCP have contributed knowledge gained through their facilitation efforts with basins beyond the cases described here. This section briefly summarizes the analysis of GSA notices, the selection of case studies and limitations of this study.

The 125 GSA formation notices posted on DWR's website on or before October 31, 2016 were reviewed to determine the number of separate GSAs formed, the types of agencies represented and governance arrangements established.⁸ DWR's list of [Groundwater Management Plans](#) was consulted to determine whether these agencies had adopted voluntary plans prior to SGMA, and whether these plans covered approximately the same area as the proposed GSA. It is important to emphasize that the GSA formation process is ongoing, and substantial changes will be occurring before the June 2017 deadline. While the notices provide an indication of anticipated patterns in GSA formation, they should not be viewed as providing complete information about the current status of GSA formation.

To determine the number of local agencies submitting GSA notices within each basin, and to assess whether these basins were completely or partially covered by GSA notices, maps in GSA notices, DWR's [Interactive GSA Map](#), DWR's [Basin Boundary Assessment Tool \(BBAT\)](#) and requests submitted through the [Basin Boundary Modification Request System](#) were consulted. This analysis utilizes the revised 2016 basin boundaries as shown in BBAT. However, at the time this analysis was conducted, maps in GSA notices and DWR's Interactive GSA Map used 2003 Bulletin 118 boundaries. The count of GSAs and assessment of the degree of coverage within the new basin boundaries were performed through visual inspection in comparison with the BBAT. Thus, the basin count should be considered approximate due to possible inaccuracies introduced while comparing these maps. In addition, this report was completed before DWR completed its reprioritization of the revised basins. If any part of a revised basin fell within a previous basin of high or medium priority, this priority was retained for that basin for the purposes of counting GSAs within high- and medium-priority basins.

To understand how consolidated and coordinated basin governance approaches look in practice and to identify factors that influence decisions about the scale of GSAs, information was gathered about GSA formation experiences in eight case studies. The cases include four examples of consolidated and four of coordinated basin governance. Potential case studies were identified through conversations with facilitators who are working to support the GSA formation process. The cases were selected based on whether the GSA process was advanced enough to discuss the evolving approach and to achieve balance in terms of geography and groundwater basin conditions. These cases are not representative of all basins in the state or of the basins in which GSA notices have been filed so far. Instead, they represent early actors that may serve as examples for GSA-eligible agencies in other basins to consider, and the factors that have affected consolidated versus coordinated GSA formation should be instructive.

For each case study, in addition to reviewing available documents, on-the-ground perspectives were obtained through one or two phone interviews with facilitators and key stakeholders, attending several GSA formation meetings, or both. Given these limited data, this analysis is intended as a preliminary identification of factors relevant to GSA formation processes as they continue to unfold. More in-depth interviews and observations would be needed to gain a more robust understanding of the factors contributing to the choice of governance structures.

⁸ One hundred twenty-six notices had been submitted to DWR by October 31, 2016, but one was deemed incomplete and had not been posted by DWR. This notice was not included in this analysis.

5. CURRENT STATUS OF GSA FORMATION AND BASIN COVERAGE

This section presents an analysis of the GSA notices submitted to DWR as of October 31, 2016. Key findings include

- As of October 31, a total of 106 entities had submitted notices to serve as GSAs, covering all or part of 81 basins. The vast majority of these notices came from single agencies rather than collaborations between multiple agencies, and over a third had voluntary groundwater management plans in place prior to SGMA.
- Local agencies had submitted GSA notices to cover all or part of 51 high- and medium-priority basins, ranging from one to 14 prospective GSAs per basin.
- Of these 51 basins, 13 were completely covered by a single GSA, 10 were covered by multiple GSAs that were overlapping or not yet exclusive and 28 had incomplete coverage.
- Only one basin – the Santa Cruz Mid-County basin – is being governed by a newly created governance structure involving multiple agencies.

The 81 basins in which GSA notices had been submitted by October 31 included 51 high- and medium-priority basins and 30 low- and very low-priority basins. The analysis of the number and type of agencies forming GSAs (Section 5.1) includes GSA notices in all basins. The analysis of basin coverage (Sections 5.2 and 5.3) focuses only on high- and medium-priority basins, where GSAs must be formed by June 30, 2017, in order to avoid state intervention.⁹

Since the GSA process is ongoing, the figures discussed here will change significantly prior to June 2017 and are likely to evolve even further after this deadline. However, the existing notices do provide some indication of future patterns, in particular suggesting that numerous basins are likely to be managed by multiple GSAs.

5.1 Number and types of agencies submitting GSA notices

As of October 31, 2016, 106 local agencies (or groups of local agencies) had submitted notices to become GSAs.¹⁰ Of these, 30 were “exclusive” GSAs, meaning that the 90-day posting period had passed and no overlaps existed. Sixty-five had at least a partial overlap with another proposed GSA as of October 31, and the status of 11 GSAs was “pending” during the 90-day posting period for at least part of the proposed GSA area.

⁹ GSA formation is not required in low- and medium-priority basins by June 30, 2017 in order to avoid state intervention. In some cases, these basins were included within a GSA notice submitted by an agency that also seeks to manage high- and/or medium-priority basins. In other cases, agencies submitted GSA notices to cover only low- or very low-priority basins. By voluntarily forming GSAs and developing one or more GSPs in low- or very low-priority basins, these agencies will gain the authorities of a GSA for the purposes of managing these basins. If a basin’s priority changes from low or very low to medium or high during reprioritization, GSAs will need to be formed in that basin, although agencies will have two years to do so.

¹⁰ Note that the number of entities submitting GSA notices (106) is different from the number of notices posted by DWR (125). As of October 31, 10 agencies had submitted multiple GSA notices, either to indicate their intention to cover portions of multiple basins or to revise the area covered by the GSA.

5.1.1 Single agencies submitting GSA notices

As shown in Table 1, of the 106 entities submitting GSA notices, 91 (86 percent) are single agencies, including water districts, cities, counties, irrigation districts and other types of special districts. Over one-third of these single agencies were already exercising some form of groundwater management. Thirty-three agencies had a voluntary groundwater management plan under Assembly Bill (AB) 3030 or Senate Bill (SB) 1938 prior to SGMA, and six agencies are special act districts with existing authority to manage groundwater (four of these also have AB 3030 or SB 1938 plans).¹¹

Table 1. Number and types of entities that had submitted GSA notices as of October 31, 2016

	Agency Type	No. of GSAs
Single agencies submitting GSA notices	Water district*	34
	City**	16
	Irrigation district	12
	County***	9
	Special act district	6
	Multi-purpose public utility/water agency****	4
	Reclamation district	4
	Resource Conservation District	2
	Community Services District	3
	Educational Institution	1
	Total	91
Multiple agencies submitting GSA notices	JPA (pre-existing)	3
	JPA (established to serve as a GSA)	5
	MOU (established to serve as a GSA)	6
	MOU with intent to establish Special Act District	1
	Total	15
Total GSAs noticed (as of October 31, 2016)		106

* Includes water districts whose primary responsibility is water delivery (agricultural or domestic). Also includes a Water Conservation District, a Water Storage District, and a Water & Power Agency whose primary missions are water delivery.

** Includes two Water Authorities that are managed by city councils.

*** Includes Tehama County Flood Control and Water Conservation District, which is governed by the Tehama County Board of Supervisors.

**** Includes three public utilities and a water agency that provide services in addition to water supply.

11 AB 3030 (1992) and SB 1938 (2002) provided guidelines for local agencies to develop voluntary groundwater management plans. See Section 6 for more details.

5.1.2 Multiple agencies submitting GSA notices

Fifteen multiagency partnerships had submitted GSA notices by October 31, 2016, using three different avenues for creating multiagency GSAs. Eight have formed via a JPA and seven have formed through a MOU, including one that will be re-formed as a special act district. Box 4 briefly defines each of these governance structures. In eight out of these 15 partnerships, the area covered by the proposed GSA is substantially the same as that included under an AB 3030 or SB 1938 groundwater management plan prior to SGMA.

Box 4. Avenues for forming GSAs that involve multiple agencies

SGMA identifies two specific avenues for creating a GSA involving multiple agencies:

- A **Memorandum of Understanding (MOU)**, also referred to as a **Memorandum of Agreement (MOA)**, is a contract between two or more parties. MOUs typically do not create a separate entity, and authority is exercised by signatories. MOUs may include both public and nonpublic entities.
- A **Joint Powers Agreement (JPA)** is an agreement, pursuant to California Government Code 6500 et seq., made among member agencies to exercise joint powers. Most JPAs involve the creation of a separate public entity, providing some protection for member agencies against liabilities, unlike MOUs. Only public agencies can be members of JPAs, although it is possible for member agencies to appoint nonpublic entities to the board of directors.

MOUs and JPAs are also being used as mechanisms for coordination among multiple GSAs within a basin (see Section 6.2). For more information on the use of MOUs and JPAs in the context of GSA formation, see the publication [Know Your Options](#) by Kincaid and Stager (2015).

A third approach involves the creation of a **special act district**. In the context of SGMA, this refers to a public agency created through state legislation to undertake specific responsibilities related to groundwater management (Langridge et al., 2016). SGMA includes a list of 15 special act districts with existing groundwater authorities and grants these agencies the exclusive right to serve as GSAs within their statutory boundaries unless they opt out (CWC §10723 (c)). Although a special act district is itself a single agency, existing agencies often work together to create them, and their boards can include representatives of these agencies as well as individuals representing specific interests (i.e., landowners engaged in agriculture). In September 2016, Governor Brown signed legislation to authorize the creation of two new special act districts that will serve as GSAs in the Kings subbasin. For further information, see the Kings subbasin case study in Appendix C.

So far, multiagency GSAs represent only 14 percent of all entities submitting GSA notices. In the remaining months before June 2017, we may see a higher proportion of GSA notices from multiagency GSAs, since it often takes longer to develop agreements between multiple agencies around GSA governance.

Of the eight JPAs, five were explicitly created to serve as a GSA under SGMA and three are pre-existing JPAs that intend to take on the role of a GSA. The membership of these JPAs ranges from two to five public agencies, and in five cases, the board of directors also includes representatives of nonpublic entities such as private water companies or individual groundwater pumpers. Only one of these JPAs – the Santa Cruz Mid-County Groundwater Agency – completely covers a groundwater basin. A list of these JPAs is presented in Table A1 in Appendix A.

The seven MOUs involve between two to 15 agencies each, and most establish a governing body involving all member agencies. However, in the cases of the South Tahoe Public Utility District and the City of La Habra, these agencies' existing governing bodies

are authorized to lead the GSA, and the MOU establishes how they will work with a cooperating party outside their service area. The 15 agencies that signed the Kings River East MOU have since been successful in advocating for state legislation to create a special act district.¹² This group can be expected to resubmit a GSA notice as a special act district. One GSA involving an MOU – the South Tahoe Public Utility District – covers an entire basin. A list of these MOUs is available in Table A2 in Appendix A. This list includes only those GSAs that have used an MOU to define the overall governance of a GSA. Many others may use MOUs to memorialize agreements with other GSAs and local agencies to work together as SGMA implementation proceeds.

5.2 Agencies submitting GSA notices in high- and medium-priority basins

As of October 31, GSA notices had been submitted in 51 high- or medium-priority basins.¹³ These GSA notices cover less than half of the land area that must be covered by GSAs by June 30, 2017 in order to avoid state intervention.¹⁴

Figure 1 shows the number of local agencies that had submitted GSA notices within each of these basins, ranging from one to 14 agencies per basin. GSA formation processes are still underway in many of these basins, and these numbers will change. However, this indicates that many basins will likely end up with at least two GSAs, and in some cases many more.

5.3 Coverage of high- and medium-priority basins by single GSAs

Figure 2 shows the status of coverage for high- and medium-priority basins across the state as of October 31, 2016. Of the 51 basins in which GSA notices have been submitted, 13 were completely covered by eight GSAs (some GSAs cover more than one basin).¹⁵ In most cases, the agencies forming these GSAs were engaged in groundwater management at these scales prior to SGMA; further details are available in Appendix B. Specifically, these GSAs include

- Three special act districts that had authority to manage groundwater in that basin prior to SGMA (Monterey Peninsula Water Management District, Ojai Basin Groundwater Management Agency and Santa Clara Valley Water District);
- Three agencies that had adopted voluntary groundwater management plans for these basins prior to SGMA (South Tahoe Public Utility District, Tehama County Flood Control and Water Conservation District, and Westlands Water District);
- One county government (county of San Diego); and
- One JPA created by multiple agencies to serve as a GSA for an entire groundwater basin, building upon a previous AB 3030 plan in that area (Santa Cruz Mid-County Groundwater Agency).

Only one of these GSAs – Santa Cruz Mid-County Groundwater Agency – involved the creation of a new governing body for an entire groundwater basin. The case studies discussed in Section 6 include two additional examples of new multiagency governing bodies at the scale of a groundwater basin (Yolo subbasin and Upper Ventura River basin), for which GSA notices had not yet been filed as of October 31. We can expect that more new basinwide governing arrangements will be created before June 30, 2017. However, trends so far indicate that this will be relatively rare.

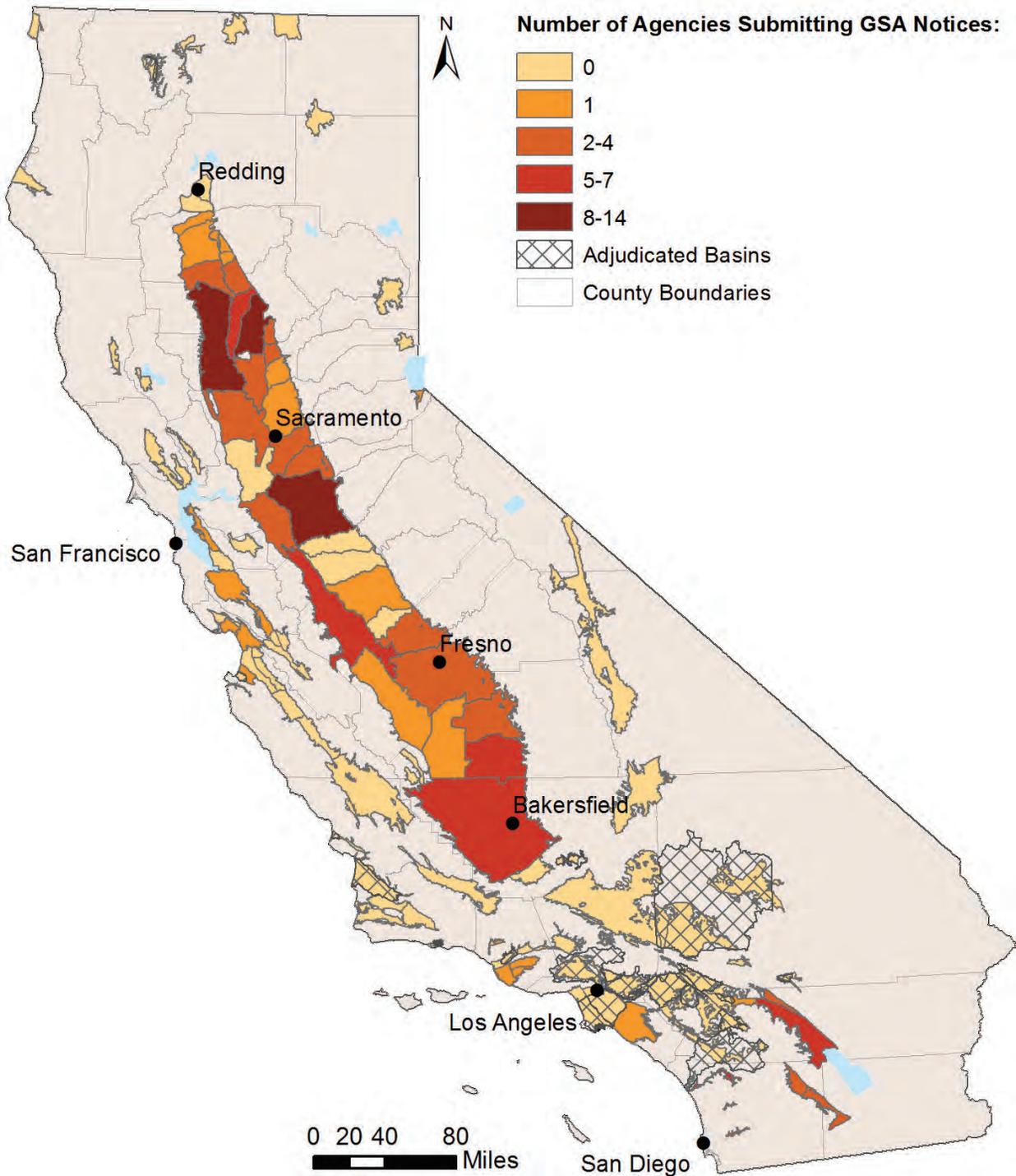
12 SB 37 (Vidak) created the Kings River East Groundwater Sustainability Agency. In addition, SB 564 (Cannella) created a second special act district called the North Fork Kings Groundwater Sustainability Agency.

13 This analysis uses the revised basin boundaries approved in October 2016. Most GSA notices analyzed in this report were submitted prior to this. The revised boundaries altered the number of local agencies with GSA notices within certain basins. At the time of writing, DWR was working with local agencies with GSA notices that are affected to confirm the area they intend to manage.

14 This estimate is based upon information from DWR indicating that as of late September 2016, the land area covered by GSA submissions accounted for about one-third of the area in which GSAs are required by June 30, 2017 (DWR, 2016b). In October, notices were submitted for only four additional GSAs covering a limited area.

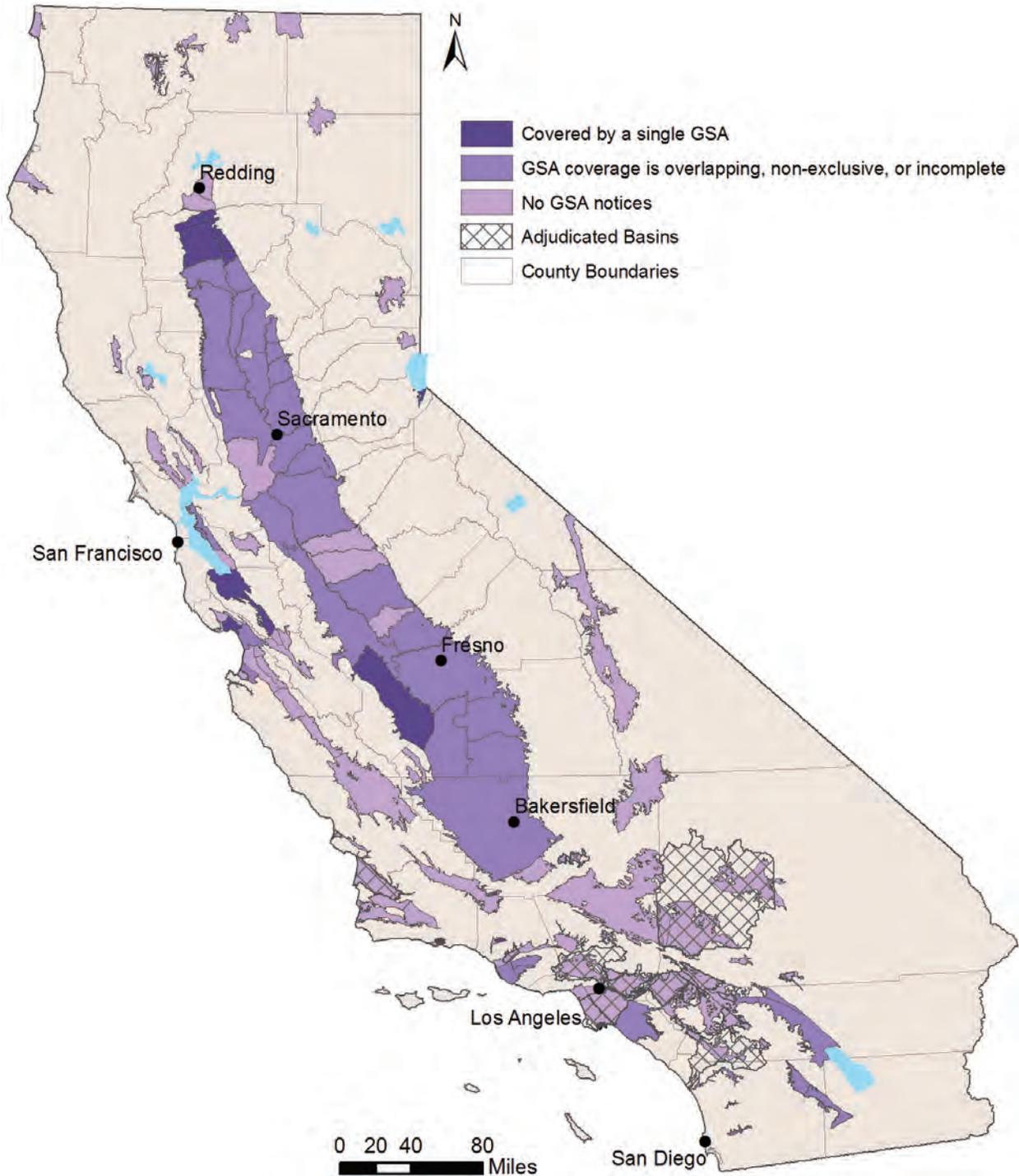
15 Two of these GSAs had not yet passed the 90-day period as of October 31. Westlands Water District became exclusive on November 1, and South Tahoe Public Utility District was partly exclusive and will be completely exclusive on December 28, 2016, if no overlapping GSA notices are submitted before then.

Figure 1. Number of agencies submitting GSA notices in high- and medium-priority basins as of October 31, 2016



Note: This map uses 2016 revised basin boundaries. Basins are included on this map if any part of the area they cover was designated as high or medium priority under the 2014 CASGEM prioritization. Low and very low priority basins are not shown. After DWR completes a reprioritization of all basins in 2017, the final list of high- and medium-priority basins may differ from those shown here.

Figure 2. Degree of coverage of high- and medium-priority basins by GSA notices submitted by October 31, 2016



Note: This map uses 2016 revised basin boundaries. Basins are included on this map if any part of the area they cover was designated as high or medium priority under the 2014 CASGEM prioritization. Low and very low priority basins are not shown here. After DWR completes a reprioritization of all basins in 2017, the final list of high- and medium-priority basins may differ from those shown here.

Figure 2 also shows 38 high- and medium-priority basins that had either non-exclusive, overlapping, or incomplete coverage by GSA notices as of October 31, 2016.

- **Non-exclusive:** one basin (Ocotillo Wells, a new subbasin created through the recent Basin Boundary Modification process), was completely covered by three nonoverlapping GSAs, of which two were exclusive as of Oct. 31 (County of Imperial and Imperial Irrigation District) and one (County of San Diego) will become exclusive on December 6, 2016, if no other competing GSA notices are submitted before then.
- **Overlapping:** nine basins were completely covered by two to 11 prospective GSAs, but overlaps remained to be resolved before finalizing these GSA arrangements.
- **Incomplete:** twenty-eight basins were partly covered by GSA notices. These basins had anywhere from one to 14 prospective GSAs, including some with overlapping notices. We do not yet know whether these basins will ultimately be covered by multiple or single GSAs by June 30, 2017. It seems likely that many will have multiple GSAs; this will be the case in the East Butte subbasin, for example, where 14 local agencies have already submitted GSA notices. On the other hand, three local agencies have submitted GSA notices in the Yolo subbasin, but the process underway there may ultimately result in a single GSA. These cases are discussed in Section 6.

Finally, as of October 31, no GSA notices had been submitted in more than half of high- and medium-priority basins.¹⁶ Adjudicated areas of these basins do not require GSAs, but GSA formation is still required in portions of these basins that fall outside of adjudicated areas. Whether these basins will follow similar patterns to those described above remains to be seen.

¹⁶ This number is not precise because DWR is in the process of reprioritizing basins after changes were made to basin boundaries in 2016. Prior to these revisions, there were 127 high- and medium-priority basins. DWR plans to release new basin priorities in 2017.

6. CASE STUDIES OF GSA FORMATION PROCESSES

The above analysis of GSA formation notices indicates that groundwater basins subject to SGMA will be governed through both consolidated (single GSA) and coordinated (multiple GSAs preparing one or more GSPs) approaches. What do these arrangements look like in practice, and what conditions appear to lead local agencies to choose one path over another? We draw upon observations and interviews in eight case studies to shed light on these questions.

Figure 3. Locations of eight case studies of consolidated and coordinated basin governance

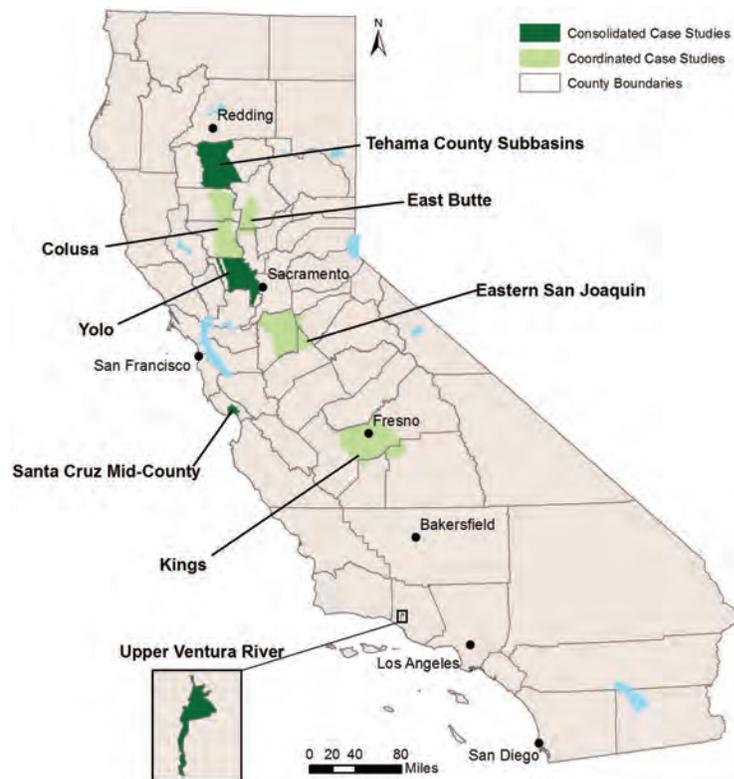


Figure 3 shows the eight case studies, which include four examples of consolidated governance and four of coordinated governance. The areas vary in size, location within the state and severity of groundwater conditions. Each case has a unique history of past efforts to manage groundwater and other water resources, including those occurring under Integrated Regional Water Management (IRWM) plans and voluntary groundwater management plans developed under Assembly Bill (AB) 3030 and Senate Bill (SB) 1938.¹⁷ Appendix C includes summaries of each case.

It is important to note that in six of the eight cases, the GSA formation is still underway and many prospective GSAs had not yet filed notices as of October 2016. Thus, the governance arrangements described here may change prior to June 2017.

¹⁷ The IRWM process, first launched in 2002, encouraged local agencies to collaborate at regional scales to develop integrated approaches to water management. There are 48 IRWM regions statewide. AB 3030 (1992) provided guidelines for local agencies to develop groundwater management plans. SB 1938 (2002) expanded upon these guidelines and required that agencies adopt such plans in order to be eligible for state grant funding related to groundwater. See DWR's [IRWM](#) and [groundwater management plans](#) web pages for further details.

6.1 Consolidated governance: Case studies of basins likely to have a single GSA

In four of our case studies, local agencies have formed or are seeking to form a single GSA for an entire groundwater basin. Table 2 summarizes some key features. Three cases – Santa Cruz Mid-County, Yolo, and Upper Ventura – involve a single basin or subbasin, while the Tehama County Flood Control and Water Conservation District (TCFCWCD) covers all of eight subbasins and portions of two more. The cases vary greatly in size, ranging from less than eight square miles to over 1,100. However, in all four cases, only one county is involved. JPAs have been developed or are being drafted in three out of the four basins. All except Tehama County have received facilitation services with support from DWR or SWRCB.

Table 2. Key features of case studies of consolidated basin governance

Basin/ subbasin(s)	Priority	Land area (sq. mi)*	No. of counties	GSA Name	Status (Oct 2016)	GSA governance structure
Eight subbasins within Tehama County**	5 medium or high, 3 low priority	1,143	1	Tehama County Flood Control and Water Conservation District (TCFCWCD)	Filed, exclusive	County Board of Supervisors, with Water Commission involving representatives of cities, districts, private pumpers
Yolo	High***	730	1	Yolo Groundwater Authority (proposed)	Not yet filed****	Anticipated JPA, with five Management Areas
Santa Cruz Mid-County	High, critically overdrafted***	56	1	Santa Cruz Mid-County Groundwater Agency	Filed, exclusive	Four-member JPA, with private pumpers represented on the Board
Upper Ventura	Medium	7.7	1	Upper Ventura River Groundwater Agency (proposed)	Not yet filed	Anticipated five-member JPA, with representatives of agriculture and environment on the Board

* Data source: DWR, 2016 basin boundaries shapefile. For Tehama, estimate provided by TCFCWCD.

** Tehama County Flood Control and Water Conservation District also serves as GSA for portions of two additional subbasins.

*** Represents the highest level of priority among basins prior to 2016 revisions. DWR will issue revised priorities in 2017.

**** Three GSAs have been filed in the Yolo subbasin. These entities may withdraw their notices if they decide to join the basin-wide GSA.

A comparison of these four cases indicates several factors that have played a role in shaping the development of these examples of consolidated basin governance, which are discussed below:

- Prior experience collaborating at the basin scale
- Smaller basin size (sometimes)
- Ability to address concerns about representation through a single governance structure
- Creation of strategies to retain autonomy and account for differences in basin conditions

In all cases, the key agencies involved had considerable experience working with one another prior to SGMA, which laid the groundwork for GSA formation. In Yolo County, water supply agencies have a history of working together at the county scale, beginning with the formation of the Water Resources Association (WRA) of Yolo County in 1993 and continuing through the development of a countywide IRWM plan in 2007. The WRA, in partnership with the Yolo County Farm Bureau, has played a lead role in convening the GSA formation process and may eventually be re-formed into a JPA in order to serve as the GSA. TCFCWCD,

whose boundaries coincide with those of Tehama County, has managed groundwater under an AB 3030 plan since 1996, guided by a Technical Advisory Committee composed of local agencies and private pumpers. The public agencies and private pumper representatives that formed the Santa Cruz Mid-County Groundwater Agency (MGA) had previously worked together through a collaborative AB 3030 plan, as well as through the Santa Cruz IRWM plan. In Upper Ventura, agencies and stakeholders have worked together for a number of years through the Ventura River Watershed Council, which has been operating since 2006 as part of the area's IRWM region, the Watersheds Coalition of Ventura County.

Basin size appears may have made it easier to come to agreement on a shared governance arrangement in the two smallest basins, Santa Cruz Mid-County and Upper Ventura. Discussions in these basins involved only four and five GSA-eligible entities, respectively. In both cases, there are also numerous private pumpers and environmental stakeholders with an interest in groundwater management, but relationships with these groups already existed. On the other hand, Yolo subbasin and Tehama County are far larger, both in size and numbers of stakeholders involved. In these basins, it appears that the strong history of collaboration, along with efforts to address concerns about autonomy and representation (discussed below), helped enable consolidation over larger areas.

Finding ways for all key beneficial users of groundwater to be involved in a common governance structure has been a critical challenge in each of these cases. In two cases, this has involved the creation of a JPA that provides for such representation. The 11-member board of the MGA is composed of two representatives of each of the four member agencies and three representatives of private pumpers, who account for approximately one-third of all groundwater use. In Upper Ventura, the draft JPA provides for a board involving one representative of each of the five public agencies involved, along with two stakeholder directors representing agricultural and environmental interests. These seats are to be filled through appointments by the JPA member agencies. In Tehama County, the County Board of Supervisors, which serves as TCFCWCD's board of directors, is the GSA's governing body. However, a water commission that includes representatives of local water districts and private pumpers will be the primary body responsible for developing GSPs, proposing new fees and permitting requirements, and deciding on enforcement matters. In each of these cases, developing these arrangements has involved extensive discussion among all parties involved; trust developed through prior collaborative processes likely helped support these outcomes.

Participants in the Yolo subbasin GSA formation process have been grappling with related concerns on the part of local agencies over retaining local autonomy and managing across heterogeneous basin conditions. In Yolo County, as in other basins across the state, water districts and private pumpers that have long operated independently are not always eager to share control over groundwater resources with cities, county governments or others. This concern is amplified when groundwater conditions vary significantly across a basin. For example, parts of Yolo County where groundwater is the only water source have experienced declining groundwater levels, whereas groundwater levels are high in areas within the Sacramento-San Joaquin Delta. Participants in the Yolo subbasin GSA formation process are seeking to develop an approach that would balance the need for local control with the benefits of consolidation. This involves using the concept of a management area, as discussed in the GSP regulations (§354.20). It also draws upon the local implementing agency (LIA) model, outlined in a white paper prepared by CCP, in which GSA governance defines certain implementation responsibilities for local agencies involved (CCP, 2016). In Yolo County, this would involve creating five management areas within the subbasin, roughly reflecting distinct groundwater uses and conditions. These areas would fall within a single GSP, but each would have different sustainability indicators. Local agencies within each management area would retain their own authority to decide upon and implement groundwater management activities, as long as they continued to meet their sustainability indicators or were implementing agreed-upon plans to reach them. Decision-making regarding fees and other requirements would take place at the management area level, while the basinwide GSA would focus on monitoring, reporting and other tasks benefiting from economies of scale. Steps have also been taken to create a committee of private pumpers to further advise on their role in governance.

6.2 Coordinated governance: Case studies of basins likely to have multiple GSAs

The Eastern San Joaquin, Kings, East Butte, and Colusa subbasins provide examples of coordinated governance. In these cases, multiple GSAs are forming, which will coordinate with one another to either develop a single GSP or multiple GSPs pursuant to a coordination agreement. Table 3 summarizes some of their key features. In contrast to the consolidated basins, each of these is relatively large (ranging from 388 to 1,430 square miles) and covers area in more than one county. The number of GSAs in each is yet to be determined but will vary significantly. In Colusa subbasin, there may be as few as two GSAs, while in Eastern San Joaquin there may be up to 20 GSAs. In the Eastern San Joaquin subbasin, there appears to be agreement among prospective GSAs to work together to create a single GSP, but decisions about this have not yet been made in the other subbasins. In three cases, discussions about mechanisms for coordinating GSP development among GSAs are leaning toward the use of MOUs, while in Eastern San Joaquin, participants have discussed the possibility of a JPA composed of GSAs.

Table 3. Key features of case studies of coordinated basin governance

Basin/ subbasin(s)	Priority	No. of counties	Land area (sq. mi)*	Status (Oct 2016)	Anticipated no. of GSAs	Anticipated no. of GSPs	Possible coordination mechanisms
Colusa	Medium	2	1,024	Notices filed for 11 GSAs	2	Not yet determined	Under discussion (MOU is likely)
East Butte	Medium	2	388	Notices filed for 14 GSAs	10 to 15	Under discussion (potentially 2)	Under discussion (MOU is likely)
Eastern San Joaquin	High, critically overdrafted	3	1,120	Notices filed for 8 GSAs	15 to 20	1	Possible JPA including all or most GSAs in the basin
Kings	High, critically overdrafted	3	1,430	Notices filed for 2 GSAs	6	Under discussion	MOU composed of six GSAs

*Data source: DWR, 2016 basin boundaries shapefile.

An examination of these case studies reveals some of the circumstances that have influenced decisions to pursue coordinated basin governance:

- Existence of prior collaboration, but not always at the basin scale
- Differing concerns about autonomy and representation
- Concerns about financing future GSA activities
- Importance of convening entities in launching discussions about coordination

Similar to the above examples of consolidation, many agencies involved in managing these groundwater basins have worked together previously but at multiple scales that do not always coincide with those of the basins. The complexity of prior relationships may be one reason why parties found it difficult to organize around a single GSA. In the Eastern San Joaquin subbasin, the 13 members of the Eastern San Joaquin Groundwater Basin Authority (GBA) have undertaken conjunctive use and other projects since 2001 and have also developed an IRWM plan covering the same area. However, the GBA covers only the portion of the basin within San Joaquin County and did not include all relevant parties for SGMA implementation. In Kings, prior collaboration through the IRWM process at roughly the scale of the basin served as a foundation for discussing SGMA compliance, but relationships at

smaller scales have ultimately played a more important role in shaping GSA boundaries. These include collaborative AB 3030/SB 1938 plans as well as long-standing relationships among water rights holders with regard to surface water deliveries along the Kings River (critical for groundwater recharge). In East Butte, the Butte County government has a strong history of collaboration with local entities, particularly around groundwater monitoring and modeling. However, the county's AB 3030 plan does not include the area of several water districts that have been working under their own plans. While most entities plan to work with the county on a single GSP, these water districts are considering developing their own GSP. Finally, in Colusa subbasin, some degree of collaboration has occurred previously in Colusa and Glenn counties respectively, but entities within the two counties are now faced with the challenge of working together across county lines.

In cases of coordinated governance, concerns about autonomy and representation have been an important factor leading local agencies to form separate GSAs. In East Butte subbasin, parties within Butte County seem to have embraced the creation of multiple GSAs as a way to retain some autonomy over management actions within their own service areas and to ensure that each entity has a voice in overall basin management. A similar approach has evolved in Eastern San Joaquin, although here some individual entities are partnering with a few others with similar interests to form multiagency GSAs. In the Kings subbasin, five of the six emerging GSAs involve multiple agencies, each of which has chosen the legal structure they believe best meets their representation needs (a JPA, MOU or special act district). For example, working through the state legislature, two of these GSAs have succeeded in creating special act districts. They did so because they believed this structure would be more stable in comparison to a JPA or MOU, and it allowed for seats on the board to be allocated to nonpublic entities, such as representatives of agriculture.

In the Colusa subbasin, an interesting approach is evolving to address representation and autonomy concerns, which may lead to the creation of two multiagency GSAs, one in each county. This approach involves a series of incremental steps designed to build confidence that effective working relationships can be developed and a common understanding about technical issues that inform governance. Stakeholders within Colusa and Glenn counties have each worked on draft principles and commitments that would underpin governance arrangements, specifically addressing the needs and concerns of private pumpers, surface water diverters and others. Both counties have established Private Pumper Advisory Committees, which have played an active role in discussions about GSA governance. The next step involves the development of a draft plan regarding the technical studies and tasks anticipated over the next two years.

The likelihood that prospective GSAs would be successful in obtaining financing has also played a role in shaping decisions about GSA formation in these basins. The ability to introduce new or increased fees is of particular concern. For example, in the Kings subbasin, overdraft is severe and local agencies anticipate that significant funding will be needed to achieve sustainability. Many agencies were concerned that a single GSA at the scale of the entire subbasin might face difficulties in gaining voter or property owner approval of new or increased fees as required under Propositions 218 and 26.¹⁸ On the other hand, smaller-scale GSAs or GSAs led by particular agencies that are trusted by landowners might be more successful. At the same time, however, each GSA would incur separate costs for undertaking separate Proposition 218 or 26 processes.

In all these cases, the presence of a trusted entity who could convene basinwide meetings with interested parties has been crucial to launching early discussions about mechanisms for coordination. In Eastern San Joaquin, the GBA created a SGMA workgroup that meets on a monthly basis and includes entities in addition to GBA members, including Stanislaus and Calaveras counties, the San Joaquin County Farm Bureau and others. The Kings River Conservation District (KRCD) has convened monthly meetings of local agencies representing prospective GSAs. In East Butte, these meetings have been convened by Butte County, and Colusa subbasin, Glenn and Colusa counties have convened separately and share information regularly. Facilitation services supported by DWR have played an important role in bringing all parties to the table and reinforcing the neutral convening role that each of these entities has sought to play.

¹⁸ For more information about Propositions 218 and 26, see CDSA (2013) and Hanak et al. (2014).

Decisions have not been made yet in these basins about how multiple GSAs will coordinate their activities during the GSP development process. As described earlier in Box 3, basins with multiple GSAs will ultimately have to agree upon a common set of data and methodologies to guide the development of either one or multiple GSPs. In Eastern San Joaquin, a committee of attorneys of GSA-eligible entities has drafted a JPA that would be composed of GSAs in the basin. This JPA would not establish a separate legal entity and would have the sole purpose of developing a GSP for the basin, but could be modified as needs evolve. As of October 2016 this approach was under consideration as participants discussed differences between an MOU and a JPA and effective ways to include non-GSA eligible entities, such as the Farm Bureau and private water companies. In the Kings subbasin, coordination among GSAs in GSP development seems likely to occur through a MOU. Representatives of each of the evolving GSAs have already participated in an MOU specifying their intentions to engage in dialogue about GSA formation. Once all six GSAs have been formed, a new MOU will be developed that specifies the roles of GSAs in decision-making about GSP development as well as financial contributions that GSAs would make to support the process. Within East Butte and Colusa subbasins, coordination is more likely to occur via an MOA than a JPA, but discussions about these mechanisms are still at an early stage.

7. FACTORS AFFECTING DECISIONS REGARDING CONSOLIDATED OR COORDINATED GOVERNANCE

The eight case studies discussed in the previous section illustrate the kinds of challenges local agencies are confronting and the diverse approaches they are taking to the GSA formation process. While it is too early to be conclusive, some common themes emerge regarding the factors that have shaped decisions to form one or multiple GSAs form within a basin.

This section synthesizes preliminary findings from our case studies about the conditions that may support consolidated versus coordinated basin governance, as summarized in Table 4. The listed factors are interrelated, and no single one is likely to determine the outcome in a given basin. In particular, the last two factors – prior collaborative experience and the presence of trusted basinwide leadership – appear to play a positive role in overcoming other factors and supporting the development of either consolidated or coordinated governance forms. These findings are based upon case studies that are still in progress and are not representative of all groundwater basins; more systematic analysis will be needed as SGMA implementation proceeds.

Table 4. Factors that may affect the choice of consolidated vs. coordinated basin governance, based on eight case studies

Factor	Consolidated	Coordinated
Basin size	Smaller basins may involve fewer parties Costs of convening and organizing may be lower	Large basins spanning multiple counties may involve numerous parties May face higher organizing costs
Degree of heterogeneity in basin conditions	Homogeneous conditions can make common governance easier Management areas can help account for differences	Diverse basin conditions can make it more difficult to agree upon shared GSA governance
Concerns about autonomy and representation	A basinwide (or nearly so) entity or committee already exists Parties can agree upon a governance structure that represents all interests Parties can agree upon actions that participants retain autonomy to implement	Actors have distinct interests that they feel are not represented within an existing entity at the basin scale High transaction costs of forming a single, representative governance structure
Needs for financing GSA activities	Perceived cost savings from economies of scale in working together Prior experience in gaining approval for fees or participants believe significant new fees may not be needed	Transaction costs of consolidation perceived as higher than savings Fees are likely to be needed, and gaining approval may require smaller-scale GSAs
Existing capacity to serve as a GSA	Individual agencies with limited capacity may seek to join with a county and/or larger entities	Agencies with significant capacity may see value in continuing their existing management efforts through separate GSAs
Factors that can lay the groundwork for effective consolidation or coordination		
Prior collaborative experience	Positive prior experience with collaboration at the basin scale	Prior collaboration existed at scales different from the groundwater basin
Presence of trusted basinwide leadership	Lowers transaction costs and increases ability to convene discussions among all interested parties	The ability to convene representatives of multiple GSAs can support development of coordination mechanisms

Basin size. The GSA formation process is a vastly different exercise in a less than 8-square-mile basin, such as Upper Ventura, than in Kings subbasin, which covers almost 1,500 square miles. All other things being equal, consolidated governance arrangements are likely easier to develop in a small basin than in a large one. Our case studies indicate that size alone does not determine the outcome, however. Yolo subbasin is larger than East Butte but is pursuing a consolidated approach, and the consolidated GSA formed by TCFWCWD covers over 1,100 square miles. Other factors, such as past experiences with collaboration as well as the degree of heterogeneity in the interests of actors, appear to play a role, as discussed below.

Degree of heterogeneity in basin conditions. In some basins, actors share relatively equally in their contributions to declining groundwater levels or other undesirable results. They may also experience impacts in similar ways. In other basins, beneficial users contribute to undesirable results and experience their impacts in varying ways. These differences may be due to hydrogeological conditions, historic pumping practices or both, and are not always well understood. Whether based on perception or grounded in robust analysis, these differences can affect the interests of parties involved. For example, some agencies may be reluctant to partner with others because they fear being dragged down by including an area with poor groundwater conditions within their GSA. On balance, consolidated governance may be easier to develop in a basin with relatively homogeneous conditions (and smaller basins are more likely to be homogenous). In heterogeneous basins, our cases illustrate two possible paths. One option, being pursued in the Yolo subbasin, is to form a single GSA but establish management areas to allow the use of different sustainability indicators across the basin, as provided for in the GSP regulations (CCR §354.20). Coordinated basin governance represents the other option, in which multiple GSAs form and develop either separate chapters of a single GSP or submit separate GSPs pursuant to a coordination agreement, as specified in the GSP regulations (CCR §357.4).

Concerns about autonomy and representation. SGMA represents a significant change to the status quo, granting GSAs new powers to establish fees, limit extractions and undertake other actions as needed to achieve sustainability. While many local agencies recognize that steps need to be taken to manage their respective groundwater basins, they are concerned about larger-scale entities or new actors who have little familiarity with needs and conditions in their area having a role in determining management actions. Closely linked with these concerns is the desire on the part of local agencies, communities and landowners to have their interests be adequately represented in their basin's GSA arrangements. Some of the distinct interests that have emerged in the eight case studies include the following:

- Municipal water agencies often view their interests as different from those of rural districts and private pumpers, and vice versa.
- Landowners with private wells may not feel that the county adequately represents their interests, even though SGMA presumes that the county will serve as the GSA in unmanaged areas. Landowners may also see their interests as different from those of water agencies, who may be able to finance deeper wells that could limit the landowners' access to groundwater.
- Counties may be concerned about preserving their land use authority within GSA governance arrangements.
- Small, unincorporated communities that depend solely on groundwater may also have distinct interests from those of larger cities or water districts that may have access to surface water and the resources for deeper wells.
- Entities with rights to surface water may seek to preserve their interests in this valuable resource, which is critical for groundwater recharge.

Ultimately, meeting SGMA's requirements for basin-scale sustainability will involve these parties working together to identify management strategies around which their interests align and fair ways to share the costs involved. However, some may view the creation of a separate GSA as the best way to position themselves for such negotiations, particularly when a basinwide entity they trust to represent their concerns does not yet exist. This pattern has emerged to a degree in Eastern San Joaquin and East Butte, where many individual cities and agricultural districts are forming separate GSAs or multiagency GSAs with similarly positioned agencies. In the Kings subbasin, several multiagency GSAs are emerging with relatively diverse participants, including irrigation districts, cities and unincorporated communities, some of whom have worked together previously. In Kings, the creation of separate

GSA has allowed different groups of stakeholders to use the governance structure they believe best allows for the representation of critical interests, whether a JPA, MOU or special act district.

On the other hand, in some basins it has been possible to develop avenues for meaningful representation of diverse interests within a single consolidated GSA. This is the case in the Santa Cruz Mid-County and Upper Ventura basins, where water districts, the county and private pumpers each have voting rights on the JPA board (Upper Ventura's board also includes environmental interests). Similarly, the water commission established in Tehama County as part of the TCFCWCD GSA will involve private pumpers as well as managers of small cities and water districts. In the Colusa subbasin, the creation of Private Pumpers Advisory Committees in Colusa and Glenn counties has provided an avenue for voicing the needs and concerns of private pumpers and has helped build enough trust to consider the creation of two countywide GSAs.

Ability to finance GSA activities. Many GSAs will face challenges in obtaining the financing to carry out their responsibilities. At least two types of financing considerations may affect the formation of GSAs: concerns about minimizing administrative costs of GSAs and efforts to position GSAs to successfully introduce fees when needed. With respect to administrative costs, in some basins there may be a cost savings associated with consolidation, stemming from economies of scale to undertake joint monitoring, modeling and data management. This has figured into the rationale of creating a single GSA in the Yolo subbasin and respective county discussion in the Colusa subbasin, where a single GSA would undertake monitoring and technical studies, building upon an existing entity that already conducts these activities. In other basins, perhaps particularly where large numbers of actors are involved, the costs of getting everyone to agree upon a single GSA may outweigh these savings. However, basins following a coordinated approach may still be able to organize ways to share the costs of technical studies, monitoring and data management. Steps are already underway toward this approach in Eastern San Joaquin, where the county of San Joaquin has already contracted with a consulting firm to conduct basinwide technical studies, and in the Colusa subbasin, where stakeholders are assessing early work assignments and GSP development costs.

In many basins – particularly those in which significant management actions will be needed to reach sustainability - some prospective GSAs are thinking carefully about the potential to introduce or raise fees. In some cases, forming a larger GSA may be a benefit, since a larger number of potential ratepayers would be included. However, larger-scale GSAs may not always be better when it comes to gaining voter or landowner approval for rate increases, as required in certain circumstances under Propositions 218 and 26. Local agencies in the Kings subbasin believed that smaller-scale GSAs or GSAs led by particular agencies that are trusted by landowners would have a better chance at success. On the other hand, current discussions in Yolo County suggest that each agency within the consolidated GSA would take on their own Proposition 218 processes.

Capacity to undertake the required roles of a GSA. Serving as a GSA is a significant undertaking, and not all agencies have the capacity for this. In our case studies, some small districts with limited staff and resources have decided to join with a county or neighboring district or city to form a GSA. In all these situations, the willingness of the county or other agencies to develop a meaningful way for these small entities to participate in governance has been crucial to making this possible. In Eastern San Joaquin, while some small districts will likely join the San Joaquin County's GSA due to limited capacity, larger water districts with adequate capacity to take on a GSA role are going it alone in the hope that this would allow them to retain more autonomy and to continue some of their existing management strategies.

Prior collaborative experience and joint investments in management activities. In all the basins discussed in this report, previous patterns of collaboration have strongly influenced the formation of GSAs. Prior, positive experiences with collaboration appear to be very helpful in laying the groundwork for dialogue about GSA formation. In most of our case studies, the IRWM process is one setting in which local agencies and other stakeholders developed positive working relationships with one another. Many local agencies were also involved in collaborative AB3030/SB1938 groundwater management plans. In our consolidated case studies, this collaboration has provided agencies with a base level of trust that enabled them to agree upon a common governance structure. In cases of coordinated governance, prior experience has not always been at the scale of the basin, and other factors, such as size and concerns about autonomy and representation, have played a significant role. Nonetheless, patterns of prior collaboration have

still helped lead to multiagency GSAs in these basins, even if they do not cover the entire basin. Prior collaboration has also helped these basins get an early start on developing coordination mechanisms for the development of GSPs.

This report did not include case studies with low or significantly negative experiences with prior collaboration. We cannot say as much, therefore, about how the lack of prior collaboration affects GSA formation. However, based on the positive effects of collaboration observed in our case studies, we can surmise that achieving effective consolidation or coordination without a prior history of collaboration may take longer and would involve significant investment in relationship building.

Presence of trusted leadership for convening an inclusive GSA formation process. In all eight cases discussed here, whether coordinated or consolidated, a single entity has taken a primary role in convening the GSA formation process. In some cases, this entity has been the county, while in others it has been a water district or a nonprofit water users association. These entities started out with some degree of trust among interested parties and have continued to work hard to foster this. In many cases, these convening entities have also used facilitation services funded by DWR, which has helped to reinforce the neutrality of this convening role. Similar to a positive collaborative experience, the presence of a trusted convening entity or individual can play a significant role in supporting the development of either a consolidated approach with meaningful participation from key interests or multiple GSAs with a strong foundation for coordination. As was the case with prior collaborative experience, our case studies cannot tell us much about how GSA formation proceeds without a convening entity. Further study of this would be valuable after the GSA formation process is complete.

8. CONCLUSIONS AND RECOMMENDATIONS

As the deadline for GSA formation under SGMA nears, this report provides a snapshot of how local agencies and other stakeholders have been approaching the complex task of creating the new public agencies that will play a central role in managing California's groundwater in the years ahead. As might be expected in a state with such high climatic, hydrologic and socioeconomic diversity, a wide array of governance arrangements is emerging.

Based on our analysis of GSA formation notices submitted so far, most high- and medium- priority basins will likely be governed through coordination among multiple GSAs. As of October 31, 2016, of 51 high- and medium-priority basins in which local agencies had submitted GSA notices, only 13 were completely covered by a single GSA. Of the eight GSAs covering these basins, only one involved the creation of a new entity with a governing body that includes multiple agencies. Indeed, the vast majority of GSA notices have been submitted by individual agencies rather than by multiagency collaborations. Although this is far from the final picture, these findings point to the need to dedicate significant time and investment to coordination among GSAs in order to develop coherent goals and management strategies at the basin scale.

Given the diverse settings across the state, no single governance structure, whether consolidated or coordinated, will work everywhere. Section 7 discusses seven interrelated factors that have played into decisions to consolidate or coordinate in eight case studies, summarized in Table 4. Of these, prior experience with collaboration and the presence of a trusted convening entity appear to play a particularly important role in supporting the development of either consolidated or coordinated governance forms. As SGMA implementation proceeds, further study will be needed to gain a more thorough understanding of why one approach is chosen over another, the resources needed to support them and their effectiveness in different settings.

8.1 Strategies for supporting GSA formation

While each of the case studies discussed in this report involves unique circumstances, they may serve as useful reference points for those involved in forming GSAs in other basins. These cases suggest several strategies that may be helpful for others involved in GSA formation.

- 1. Identify a convening entity.** It is important to have an entity, or a tightly coordinated group of entities, that convenes a basinwide process to discuss GSA formation. This could be a county government, a water district, an association of water users or another type of agency. In our case studies, the convening entity had an initial level of trust and worked to foster this throughout the process. They have not sought to control the outcome but rather to provide a neutral forum for discussion, often with the support of a professional facilitator.
- 2. Establish a process to consider governance options.** Our case studies suggest that ideally this process should involve all relevant stakeholders within a basin and help them to
 - *Understand potential roles and governance models for GSP development.* This includes understanding the responsibilities of a GSA and the level of coordination that is likely to be needed among multiple GSAs to develop one or more GSPs. It may be helpful to compare the option of using management areas under a single GSA with that of forming multiple GSAs and creating a single GSP with a chapter for each GSA. Experience in several case studies suggests that it is helpful for parties to understand what kinds of decisions a GSA is likely to face, at least in the near term, as part of the GSP development process (see Colusa subbasin, for example).
 - *Provide a constructive forum to discuss representation.* In each of our case studies of consolidated governance, a willingness to find ways for all key stakeholders to participate in a shared governance structure has been critical. In basins following a coordinated approach, representation issues are equally important. In addition to ensuring appropriate representation of interests within each GSA, multiple GSAs must agree upon who will participate in the process of developing one or more GSPs for the basin.

- *Identify the resources and capacity that will be required.* While it is not possible to anticipate all future resource needs, several of our case studies illustrate how expectations regarding capacity and financing can affect decisions about GSA formation. It is helpful to have a preliminary sense of what technical expertise, data and funding the GSP development process will involve and the type and scale of management actions that might be needed to address undesirable results in the basin.
 - *Discuss potential coordination mechanisms in basins with multiple GSAs.* Whether these GSAs intend to develop one or multiple GSPs, mechanisms for coordination among GSAs will be needed. These coordination structures need not be finalized by June 30, 2017. However, this has been an important topic of discussion during the GSA formation process (see Eastern San Joaquin subbasin, for example). Coming to an agreement on an overall approach will make it easier to move forward with GSP development, including accessing grant funding. Key issues include whether a JPA or a MOU is more appropriate and how responsibilities and costs would be distributed.
3. **Leave room for learning.** The GSA formation process involves unprecedented challenges. It is likely that no matter what approach to GSA governance is chosen in a particular basin by June 30, 2017, it will need to be modified at some stage during SGMA implementation. Several people interviewed for this report commented on the need to avoid trying to agree upon every detail of governance in advance, recognizing that governance arrangements can be changed after the June 30, 2017, deadline. Instead, it is important to agree upon core principles and create clear avenues for amending governance structures once they are formed.

8.2 Learning and adapting during SGMA implementation

The emerging diversity of governance approaches, combined with the unprecedented nature of the GSA formation process, creates an imperative for learning as SGMA's implementation proceeds. GSAs will need to learn from each other's experiences – over the long term – with respect to governance, stakeholder participation and policy implementation. Lessons from early experience in governance will also be critical to inform any future revisions to regulations and state law. Currently, local agencies are sharing their experiences through existing connections with neighboring basins. However, more formal learning forums, accompanied by research, will be needed to ensure SGMA's success.

State agencies should support the development of learning platforms that enable a broad range of GSAs and stakeholders to participate, such as through regional workshops, pilot studies to test innovative approaches and online learning resources. The creation of a separate entity with a mandate to promote learning could be an effective way to accomplish this. In keeping with the emphasis SGMA places upon local control, GSAs should be involved in designing and implementing learning platforms. DWR has largely taken this approach in the context of the IRWM program, where it has provided funding to support a biannual conference of IRWM regions, the launch of the Sierra Water Work Group (a network of 12 IRWM regions) and pilot studies regarding disadvantaged-community needs. DWR and SWRCB could draw upon this experience in the context of SGMA implementation. Additional funding will likely be needed to support these efforts.

Researchers can also play an important role in helping to understand and assess the performance of specific governance arrangements under SGMA. By partnering with GSAs, state agencies and other key stakeholders, researchers may be better able to design projects that help inform how GSA governance structures evolve over time to meet SGMA's goals. Finally, the simultaneous creation of hundreds of new public agencies with significant, long-term management responsibilities has little precedent in California or elsewhere in the United States. Researchers can help draw lessons from SGMA implementation to inform the development of resilient governance of common pool resources in other resource management contexts.

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APPENDIX A. SUMMARY INFORMATION REGARDING MULTIAGENCY GSAS

As discussed in Section 5.1.2, 15 of the 106 entities submitting GSA notices by October 31, 2016, involved multiple agencies working together through a Joint Powers Agreement (JPA), Memorandum of Understanding (MOU) or an intent to form a special act district. The tables below summarize information gathered from these GSA notices. A detailed analysis of the JPAs or MOUs included in these notices was not conducted as part of this study. Such an analysis would be valuable for understanding the range of ways in which these agreements balance efficiency with inclusiveness in forming governing boards, how challenges related to involving nonpublic agencies such as private pumpers, water companies, nonprofit organizations and other nonpublic agencies have been resolved, and more.

Table A1. Overview of notices of multiagency GSAs operating under a JPA

GSA Name	Basin or subbasin(s)	Signatories to Joint Powers Agreement	Formed specifically as a GSA?	Non-public entities on board?	Does GSA cover entire basin?
Santa Cruz Mid-County Groundwater Agency	Santa Cruz Mid-County	Central Water District City of Santa Cruz County of Santa Cruz Soquel Creek Water District	Yes	Yes	Yes
Mid-Kaweah Groundwater Subbasin Joint Powers Authority	Kaweah	Visalia City Tulare City Tulare Irrigation District	Yes	No	No
Greater Kaweah Groundwater Sustainability Agency JPA	Kaweah	County of Tulare Kaweah Water Conservation District Kings County Water District Lakeside Irrigation Water District St. Johns Water District	Yes	Yes	No
Provident Irrigation District and Princeton-Codora-Glenn ID*	Colusa	Provident Irrigation District Princeton-Codora-Glenn Irrigation District	Yes	No	No
Tri-county Water Authority	Tule	Angiola Water District Deer Creek Stormwater District	Yes	No	No
Sacramento Groundwater Authority	North American	Sacramento County City of Sacramento City of Folsom City of Citrus Heights	No (formed in 1998)	Yes	No
Sacramento Central Groundwater Authority	South American	City of Elk Grove City of Folsom City of Rancho Cordova City of Sacramento County of Sacramento	No (formed in 2006)	Yes	No
San Joaquin River Exchange Contractors Water Authority	Delta-Mendota	Central California Irrigation District Firebaugh Canal Water District	No (formed in 1993)	Yes	No

* Current discussions indicate that the members of this JPA will revise their notice and join with others to form a GSA covering all of Colusa County.

Table A2. Overview of notices submitted by multiple agencies operating under a MOU

GSA Name	Basin/Subbasin(s)	MOU Members	Does GSA cover entire basin?	Composition of governing body
Alpaugh Groundwater Sustainability Agency	Tule	Alpaugh Irrigation District Atwell Island Water District Alpaugh Community Services District	No	Member agencies
Kern River Groundwater Sustainability Agency	Kern County	East Niles Community Service District North of the River Municipal Water District City of Bakersfield Kern Delta Water District Kern County Water Agency Improvement District No. 4	No	Member agencies
James Irrigation District	Kings	James Irrigation District Reclamation District 1606	No	Member agencies
Imperial Irrigation District - County of Imperial	Borrego Valley Basin Ocotillo-Clark Valley Coyote Wells Valley Imperial Valley East Salton Sea Amos Valley Ogilby Valley	Imperial Irrigation District Imperial County	Yes (3 basins)*	Member agencies
Kings River East (will be become a special act district)**	Kings	Tulare County Fresno County City of Dinuba City of Reedley City of Orange Cove Alta Irrigation District Orange Cove Irrigation District Hills Valley Irrigation District Tri-Valley Water District Kings River Water District Orosi Public Utility District Cutler Public Utility District London Community Services District East Orosi Community Services District Sultana Community Services District	No	Member agencies (with certain members sharing seats), plus a representative of agricultural interests appointed by other members
City of La Habra	Coastal Plain of Orange County	City of La Habra and City of Brea	No	La Habra City Council (requires City of Brea's approval for fees and enforcement)
South Tahoe Public Utility District	Tahoe Valley South	South Tahoe Public Utility District and El Dorado County Water Agency	Yes	Board of STPUD, with cooperation from El Dorado County Water Agency for areas outside of its service area

* This MOU applies to basins that fall at least partly within IID's jurisdiction. The County of Imperial serves as the exclusive GSA for basins within the County that fall outside of IID, and is counted as a separate, single-agency GSA for those basins.

** The Kings River East Groundwater Sustainability Agency Act (SB 37, Vidak) was approved by the Governor in Sept. 2016. Participants in this MOU will re-form into a special act district.

APPENDIX B.

GSAS THAT COVER ONE OR MORE HIGH- OR MEDIUM-PRIORITY BASINS

The table below lists the eight agencies that, as of October 31, 2016, had submitted GSA notices entirely covering one or more high- or medium-priority basins. The 13 basins covered by these GSAs are examples of consolidated basin governance. Each has some prior history of groundwater management, as indicated in the table.

Table B1. GSAs completely covering one or more high- or medium-priority groundwater basins.

GSA	Status as of Oct. 31	Agency type	High- or medium-priority basins covered	Previous groundwater management efforts?
County of San Diego	Pending until 12/6/2016	County	San Pasqual Valley	County groundwater ordinance
Monterey Peninsula Water Management District	Exclusive	Special act district	Carmel Valley	Authority to manage groundwater since creation in 1978
Ojai Basin Groundwater Management Agency	Exclusive	Special act district	Ojai Valley	Authority to manage groundwater since creation in 1991
Santa Clara Valley Water District	Exclusive	Special act district	Santa Clara and Llagas	Authority to manage groundwater since creation in 1929
Santa Cruz Mid-County Groundwater Agency	Exclusive	JPA formed to serve as a GSA	Santa Cruz Mid-County	Two water districts first adopted an AB 3030 GWMP covering most of basin in 1996
South Tahoe Public Utility Water District	Exclusive over part of area, pending until 12/28/16 in remaining area	STPUD governs GSA pursuant to MOU with El Dorado County Water Agency	Tahoe Valley South	STPUD first adopted an AB 3030 GWMP covering the basin in 2000
Tehama County Flood Control and Water Conservation District	Exclusive	Water district governed by County Board of Supervisors	Antelope, Bowman, Dye Creek, Los Molinos, Red Bluff	TCFCWCD first adopted an AB 3030 GWMP covering these basins in 1996
Westlands Water District	Pending (exclusive on 11/1/2016)	Water district	Westside	WWD first adopted an AB 3030 GWMP covering this basin in 1996

GSA notices have also been submitted in 30 low and very low priority basins. Eleven of these are completely covered by four GSAs that were exclusive as of October 31, 2016 (some of these GSAs also cover portions of additional basins):

- **Tehama County Flood Control and Water Conservation District:** completely covers three very low priority basins
- **San Francisco Public Utilities Commission:** completely covers four very low priority basins
- **County of Imperial/Imperial Irrigation District MOU:** completely covers three very low priority basins
- **County of Imperial:** completely covers one very low priority basin

APPENDIX C.

CASE STUDY SUMMARIES

The following case study summaries are based upon a review of available written materials (i.e., draft governance documents, meeting notes and websites), one or two interviews with representatives of agencies involved and/or facilitators assisting in these processes, and meeting observations in three cases (Eastern San Joaquin, Yolo and Colusa). Drafts of these summaries were shared with interviewees to confirm their accuracy. Figure 3 in Section 6 shows the locations of these case studies.

These summaries reflect the status of these GSA formation processes as of October 2016. Since GSA formation is not complete in many of these basins and subbasins, changes may occur in their approaches prior to the June 30, 2017 deadline.

Examples of Consolidated Basin Governance

Santa Cruz Mid-County Basin

The newly formed Santa Cruz Mid-County basin is composed of portions of four previous groundwater basins or subbasins underlying part of Santa Cruz County. This region receives no imported water and depends heavily upon groundwater for both urban and agricultural uses. Private well owners account for approximately one-third of groundwater use. Despite significant conservation efforts, the basin is in overdraft and is subject to seawater intrusion.

Collaboration to manage groundwater has been underway for several decades. In 1995, the two main water districts reliant on groundwater, Soquel Creek Water District (SqCWD) and the Central Water District (CWD), developed an AB3030 Groundwater Management Plan and entered into a JPA to implement it. The city and county of Santa Cruz, representatives of Pajaro Valley Water Management Agency and private pumpers served on an advisory committee to the JPA. With the advent of SGMA, SqCWD and CWD took the lead to establish and convene the Soquel-Aptos Groundwater Management Committee. This group, which included representatives of SqCWD, CWD, the city and county of Santa Cruz and private pumpers, received support from SWRCB for facilitation services to work toward forming a GSA.

The committee ultimately decided that the region would be best served through the creation of a single GSA representing all interests at the table. Formed as a JPA, the newly created Santa Cruz Mid-County Groundwater Agency (MGA) is led by an 11-member board composed of two representatives from each of the four public agencies and three appointed representatives of private pumpers, with each board member holding one vote. The MGA covers roughly the same area as the previous AB3030 plan. However, according to Bulletin 118 boundaries, that area fell within four different basins or subbasins, which would have meant that the new JPA would have to participate in developing multiple GSPs. The committee successfully requested modifications to these boundaries based upon an updated understanding of the region's hydrogeology as well as jurisdictional reasons and coordination with neighboring water agencies/GSAs. This resulted in the creation of the Santa Cruz Mid-County basin with boundaries matching those of the new GSA.

A key factor that enabled the creation of this consolidated governance arrangement at the basin scale appears to have been the high level of familiarity among partner agencies, developed through long-standing experience in working with one another. In addition, the fact that the basin covers a relatively small area and there are only four partner agencies involved may have made it easier to reach agreement. Finally, partner agencies have been very proactive about engaging the broader community through workshops and public meetings, which helped build support for the eventual creation of a governance arrangement that included private pumpers.

Yolo Subbasin

Recently modified through the Basin Boundary Modification process, the Yolo subbasin encompasses approximately 730 square miles within Yolo County. While the county depends heavily upon groundwater for both agricultural and domestic purposes, conjunctive management efforts have resulted in reasonably stable groundwater conditions to date. However, certain areas of the county without access to surface water supplies have experienced declining groundwater levels. Additionally, permanent tree crop acreage has been increasing rapidly in recent years, hardening demand for groundwater in the future.

Cities and water districts have worked together in Yolo County for more than 20 years through the Water Resources Association (WRA) of Yolo County. The WRA has undertaken critical groundwater and subsidence monitoring activities over the years. These so-called foundational actions emerged through the WRA's preparation of an IRWM plan for Yolo County in 2007.¹⁹ In partnership with the Yolo County Farm Bureau and with support from DWR for facilitation services, the WRA has been playing a lead role in convening a series of public meetings as well as smaller discussions among 26 GSA-eligible agencies. Even prior to SGMA's enactment, leadership within the WRA, particularly the Yolo County Flood Control and Water Conservation District (YCFWCWD), has conducted outreach to local entities and individual groundwater pumpers across the county through small meetings and presentations. This helped to establish mutual understanding around each party's interests and confidence in working together. Building upon this foundation, YCFWCWD was able to submit a successful request to consolidate portions of several neighboring subbasins that fell within Yolo County into the Yolo subbasin. Although several local agencies submitted early GSA notifications, these entities have been participating, along with other GSA-eligible agencies, in discussions that aim to create a single GSA for the basin.

The GSA structure being explored in Yolo County attempts to balance the need for local control with the benefits of coordination at a larger scale. This approach draws upon both the management area concept in the GSP regulations (§354.20), and the local implementing agency (LIA) model described in a white paper produced by CCP (CCP, 2016). In order to ensure that local agencies are able to retain as much autonomy as possible with regard to how they manage groundwater, a single GSA would be created but five management areas would be defined, generally reflecting areas with distinct groundwater uses and conditions. These areas would fall under a single GSP, but each would have different sustainability indicators. Local agencies within each management area would exercise authority to decide upon and implement groundwater management activities, including fees, as long as they are meeting their sustainability requirements or are implementing agreed-upon plans to reach them. Along with other necessary information to demonstrate sustainability, water budgets would be developed at three scales: the GSA as a whole, the five management areas, and individual agencies. It is anticipated that agencies within each management area would work together to identify joint management actions, and collaborations could also occur across management areas.

The overall GSA would take on monitoring, reporting and other tasks benefitting from economies of scale. Because the WRA already plays a well-established convening role and conducts monitoring activities, it is currently anticipated that the WRA would be re-formed as a JPA so that it could serve as a GSA (as a nonprofit entity, the WRA currently does not meet SGMA's local agency requirements). The JPA board would be composed of GSA-eligible agencies, and methods are being discussed for nonpublic agencies, including private pumpers and a private water company, to be represented in the GSA. A tribal government is also likely to participate.

¹⁹ The WRA now represents Yolo County in the larger Westside Sacramento IRWM region but continues to update and use its own IRWM plan at the Yolo County scale.

Upper Ventura River Basin

Located in western Ventura County adjacent to the Ojai Valley, this 7.7 square mile, medium-priority subbasin is a critical source of water for agricultural, municipal and environmental uses in the Ventura River watershed. This area is entirely supported by local water sources, and groundwater represents about half of all water use. Pumping from private wells for agricultural use accounts for a significant amount of groundwater use. The interconnection between groundwater and surface and subsurface water in the Ventura River is an important consideration in managing this subbasin, particularly concerning the preservation of steelhead habitat in the Ventura River.

Beginning in the fall of 2014, the Ventura River Water District took the lead to create a GSA Formation Committee, which included the three other water purveyors in the area – Meiners Oaks Water District, the city of San Buenaventura, and Casitas Municipal Water District – along with the county of Ventura. Representatives of agricultural groundwater pumpers as well as environmental nonprofit organizations attended stakeholder meetings and GSA formation meetings held throughout the GSA formation process. While each of the public agencies and stakeholders involved have strong interests and sometimes competing needs with regard to the management of this region's limited water resources, they have considerable experience in working with one another, particularly through the Ventura River Watershed Council (VRWC). Formed in 2006, the VRWC is one of three watershed committees that make up the Watersheds Coalition of Ventura County, which serves as the IRWM region for Ventura County.

The five-member GSA Formation Committee includes all of the public agencies with an interest in being actively involved in managing this small subbasin. The committee decided relatively early on to work toward forming a JPA that would serve as a single GSA for the subbasin, and the committee members signed an MOU to that effect in May 2015. The committee took a number of steps to ensure that the process was as inclusive as possible, including seeking facilitation support from DWR, provided through the Center for Collaborative Policy (CCP), and hiring an attorney to work on behalf of the group. The committee also submitted a successful Basin Boundary Modification request that updated the subbasin's boundaries to match the latest scientific knowledge. This provided landowners with greater certainty about whether they would be inside or outside the subbasin as the GSP process was being launched.

One significant question the committee faced was how to include representatives of agricultural and environmental interests in the governance structure. The committee decided that their inclusion was important to the ultimate success of the GSP process, and the draft JPA, which is currently under discussion, includes two stakeholder directors, appointed by the public agency members. The agricultural stakeholder director would be appointed based on nominations by the Farm Bureau of Ventura County, while environmental nonprofit organizations in the area would submit nominations for an environmental stakeholder director. The voting rights of these directors would be largely the same as others except for actions, such as the addition of new members of the JPA, that can only be taken by public agency members. The JPA provides for consensus voting. If that is not possible, simple majority will rule, except for major issues that will require super majorities.

Subbasins within Tehama County

Groundwater basins in Tehama County cover approximately 1,140 square miles, including all of eight subbasins and portions of two more. Of these, seven subbasins are subject to SGMA (six of medium priority and one of high priority). Tehama County Flood Control and Water Conservation District (TCFCWCD), for which the Tehama County Board of Supervisors serves as the governing body, has long played a role in groundwater management. It prepared its first countywide groundwater management plan in 1996; a Technical Advisory Committee (TAC) composed of representatives of local agencies and private pumpers was also established at that time. The plan was most recently updated in 2012, and the TAC continues to meet on a quarterly basis.

Given this history, the TCFCWCD announced its intent to serve as a countywide GSA. During public meetings, representatives of cities and water districts expressed an interest in participating in the governance of the GSA. TCFCWCD held further meetings with GSA-eligible entities and developed the concept of a water commission that would play an important role in decision-making.

Based upon the county's existing planning commission, the water commission will be composed of six representatives of major cities and water districts, as well as one appointed representative from each of the county's five supervisorial districts to represent surface water agencies, private pumpers and one "at-large" representative. Although the County Board of Supervisors serves as the governing body, the commission will be responsible for developing a GSP, proposing any new fees or permitting requirements and deciding on enforcement matters, with appeal to the Board of Supervisors. This consolidated approach was accepted in part because small cities and water districts, which otherwise would not have had the capacity to serve as GSAs themselves, now have a voice in decision-making.

As of October 2016 the Groundwater Commission has been formed, and the TCFCWCD anticipates that the existing TAC for the AB3030 plan will continue to provide technical input to the process. Tehama County participates in the North Sacramento Valley IRWM process, which involves six counties in the Sacramento Valley. The IRWM process has provided a forum for dialogue and collaboration among staff in the six counties working on SGMA implementation. For example, several of the counties worked together to advocate that DWR provide funding for a new, multicounty land subsidence survey that will inform GSP development.

Examples of Coordinated Basin Governance

Eastern San Joaquin Subbasin

Encompassing over 1,100 square miles, this subbasin covers portions of San Joaquin, Stanislaus and Calaveras counties and is designated as both high priority and in critical overdraft. Since 2001, the Eastern San Joaquin Groundwater Basin Authority (GBA), a 13-member JPA, has undertaken management activities in the portion of the Eastern San Joaquin basin located within San Joaquin County, pursuant to a groundwater management plan adopted in 2004. Since 2007, the GBA has also served as the regional water management group responsible for IRWM planning. The GSA formation process has built upon this foundation but has included a broader range of partners. In 2015, the GBA created the SGMA workgroup, which is charged with developing an approach to complying with SGMA in the subbasin. The workgroup includes GBA members as well as at least 10 other GSA-eligible agencies and the Farm Bureau. San Joaquin County, which has been providing staff support to the GBA, convenes the workgroup and has invested significantly in supporting the GSA formation process overall. The workgroup has been meeting on a monthly basis for over a year, and DWR has provided funding for facilitation services to support this process.

While a strong history of collaboration and investment in groundwater management exists within this basin, many agencies have decided to form separate GSAs. At present, this subbasin is likely to have 15–20 GSAs. Most of these will be individual cities, water districts and irrigation districts, but a few will be formed through MOUs involving multiple agencies. San Joaquin County will serve as a GSA for unmanaged areas within its jurisdiction, as well as for several small districts that have limited capacity to serve as their own GSAs. Stanislaus and Calaveras counties are likely to join with Calaveras County Water District to form one GSA covering the eastern portion of the subbasin. Interest in establishing separate GSAs appears to be driven by a desire to ensure adequate representation of agency and/or landowner interests in the development of a GSP, distinctions between rural and urban interests, and a desire to maintain existing working relationships and management efforts.

Although the large number of GSAs suggests a fragmented approach, the monthly SGMA workgroup meetings and considerable resources invested by San Joaquin County to promote dialogue appear to be yielding a strong foundation for coordination among GSAs. The county has hired an attorney to work on behalf of the whole effort in collaboration with an attorney workgroup composed of the attorneys of GSA-eligible agencies. The county has also appointed an ombudsperson, who is tasked with understanding each agency's interests and serving as a neutral sounding board.

Participants in the SGMA workgroup have all agreed to work toward developing a single GSP for the basin. As the mechanism to accomplish this, workgroup members have been exploring the possibility of creating a JPA that includes all GSAs in the subbasin. The draft JPA prepared by the attorney workgroup would not establish a separate legal entity, and would have the sole purpose of

developing a GSP for the basin, but could be modified as needs evolve. As of October 2016, this approach was under consideration as participants discussed differences between an MOU and a JPA and ways to include non-GSA eligible entities, such as the Farm Bureau and private water companies. Another topic of discussion is the potential overlap in roles of this new JPA with the existing GBA, which has been leading groundwater management efforts but whose membership does not include all prospective GSAs.

Kings Subbasin

This subbasin encompasses almost 1,500 square miles and covers portions of Fresno, Kings, and Tulare counties. Kings has experienced significant groundwater level declines for decades and is designated as high priority and in critical overdraft. Numerous agencies in this subbasin have worked together through the Kings Basin IRWM process since it was initiated here in 2001. The Kings River Conservation District (KRCD), a multipurpose agency that has actively worked with surface and groundwater users and environmental interests for decades, served as a convening entity in the IRWM process. KRCD has played a similar role in the GSA formation process. Key agencies signed an MOU in May 2015 to engage in dialogue about how best to organize GSA formation for the whole subbasin and have participated in monthly coordinating meetings hosted by KRCD.

Although the boundaries of the Kings Basin IRWM region encompass much of the groundwater basin and the IRWM process helped to establish working relationships among many key players, local agencies decided not to form a single GSA at the scale of the basin. Instead, there will likely be six GSAs, including five that involve multiple agencies and one formed by an irrigation district that plans to coordinate through side agreements with neighboring cities. The multiagency GSAs will take diverse forms; several will operate under either an MOU or JPA, and two (Kings River East and North Fork Kings) have created new special act districts pursuant to legislation approved by Governor Brown in September 2016.²⁰ One reason why some local agencies decided to create special act districts was that in the face of contention – a likely scenario in such a severely overdrafted basin – a special act district would not be subject to severability in the same manner as a JPA. Another was that a special act district allows for positions on the board of the directors for representatives of nonpublic entities, such as representatives of agricultural interests. While a JPA can be structured to allow for such representation through public agencies' appointing board members, participants in the Kings River East GSA process felt these arrangements would be more subject to challenge than would a legislated arrangement.

The boundaries of some of these GSAs are similar to those of existing AB3030/SB1938 Groundwater Management Plans. For example, the North Kings and Kings River East GSAs cover a similar area and involve many of the same partners as previous AB3030 plans. The Consolidated Irrigation District, which is serving as its own GSA, had also had its own groundwater management plan. The GSA boundaries also reflect some long-standing relationships, particularly among certain member agencies (units) of the Kings River Water Association who have coordinated surface water deliveries along the Kings River for many years. Their ability to coordinate access to surface water – a critical resource for undertaking groundwater recharge – was one reason these GSA groupings made sense.

Another factor that agencies considered was their collective ability to raise funds to implement the management activities needed to reach sustainability, recognizing that introducing or raising rates for groundwater use may trigger requirements to gain voter or property owner approval under Propositions 218 and 26. Some local entities felt their chances of success in raising rates would be improved by working in collaboration with particular agencies that have close relationships with landowners or by creating new governance structures, such as a special act district with a representative board.

Moving forward, KRCD will continue to play a coordinating role as these GSAs are finalized and declared through notices to DWR. KRCD continues to host monthly meetings of representatives of each emerging GSA and has submitted a request for facilitation services to support this continued dialogue. A new MOU to guide coordination among the six GSAs is being developed and will

²⁰ SB 37 (Vidak) created the Kings River East Groundwater Sustainability Agency, and SB 564 (Cannella) created the North Fork Kings Groundwater Sustainability Agency.

likely be finalized after each GSA has been formed and noticed to DWR. The new MOU will specify how each GSA will participate in decision-making and share costs during the GSP development process. At this time, no decision has been reached about whether the six GSAs will work together on a single GSP or prepare separate GSPs subject to a coordination agreement.

East Butte Subbasin

This medium-priority subbasin of the Sacramento Valley groundwater basin covers 388 square miles, falling largely within Butte County but also including the northern portion of Sutter County. Several water districts in Butte County have their own AB 3030 or SB 1938 groundwater management plans, and the county has a separate plan for the areas outside of these districts. These water districts, cities and Butte County have been working together on groundwater issues, particularly since the county has undertaken significant groundwater modeling and monitoring activities in cooperation with local agencies. In addition, the county's water commission, which includes private pumpers as members, has provided an important forum for discussion.

The county began early, even prior to SGMA's passage, to conduct public meetings regarding the law's potential implications and has encouraged local agencies to consider their options and file a GSA notice if they wished to do so (Kearns & West/Hydrometrics, 2016). As of October 2016, 11 entities within Butte County had filed GSA notices within the East Butte basin, including four cities, five water and irrigation districts, a local college, and the county. Another three have filed within Sutter County for a total of 14 declared GSAs in the basin. Within Butte County, all GSAs currently have overlaps to resolve. County staff anticipate that many of the declared GSAs will ultimately decide to retain their GSA status as the June 2017 GSA formation deadline approaches. Although parties are aware they will have to work together at a basin scale, local agencies have pursued separate GSAs primarily to retain some degree of autonomy over their management actions.

The county, with facilitation support from DWR, has hosted regular meetings with GSA-eligible agencies to discuss how GSAs will work together at a basin scale. The Butte County Board of Supervisors has established a Groundwater Pumpers Advisory Committee (GPAC) that will advise the county on SGMA related issues. The GPAC is composed of two groundwater pumpers each from East Butte and the other three subbasins within Butte County and an environmental representative. Preference will be given to an environmental representative that has scientific credentials and/or is a groundwater pumper. GPAC members cannot be served by a water district.

Initially, all participants in the GSA formation process had indicated a willingness to work with one another on a single GSP for the basin, with Butte County taking the lead on modeling, monitoring and community engagement activities across the basin. This coordination would likely occur in the context of an MOU, which participants seem to prefer over a JPA. However, as of October 2016, the water districts, which had their own groundwater management plans prior to SGMA, have expressed interest in developing their own GSPs. As SGMA requires, GSAs developing these separate GSPs would need to enter into a coordination agreement to ensure that the respective GSPs rely on common data and methodologies. These discussions are still underway, and it is not yet clear whether this multiple GSP approach will ultimately be agreed upon.

Colusa Subbasin

The Colusa subbasin has unique circumstances in that it is, spatially and organizationally, one of the largest subbasins in the state (over 1000 square miles), and it is almost equally divided between two counties, Colusa and Glenn. Further, together with the Delta-Mendota Subbasin in the San Joaquin Valley and the Owens Valley Basin, the Colusa subbasin has one of the longest boundaries associated with a major California tributary – the Sacramento River.

Each county has noticed itself as a GSA, along with 15 other local agencies that have also noticed themselves. This has created several layers of overlap that must be reconciled for the subbasin to be compliant by June 2017. Through facilitation support provided by DWR, each county has convened governance workgroups of local agencies, private pumpers, mutual water companies and other interested beneficial users to establish their respective approaches for governance. These workgroups have established

similar draft of common principles as guidance for what they seek to achieve in their governance, and each group is clearly aware that they are required to integrate governance across the entire subbasin to ensure compliance. Similarly, all the surface water diverters and Sacramento River settlement contract holders have prepared specific principles that they advocate be achieved regarding their unique interests. Likewise, each county has prepared principles to protect the interests of their broad constituencies.

Notwithstanding several agencies and potential new water districts that express an interest to potentially be independent GSAs, a large group of stakeholders in each county have expressed an initial commitment to create a county-specific multiagency GSA (including the counties as governing partners). That said, there are compelling differences between the several surface water diverter agencies that are also groundwater users, other agencies that are groundwater dependent, and private and unaffiliated private pumpers that make up a large proportion of groundwater use in the subbasin. Both counties have established Private Pumper Advisory Committees that have played or will play an active role in discussions about GSA governance. Stakeholders in each county currently support developing management areas within their respective multiagency GSAs as a means to acknowledge and ultimately resolve undesirable results that differ throughout each county and across the entire subbasin.

As part of a good-faith effort to create multiagency GSAs, stakeholders in each county have recently committed to a series of steps that will build incremental confidence among these diverse stakeholders and address technical questions that inform governance structure. These steps include

- Creating a memorandum of agreement (MOA) reconciling and memorializing the aforementioned principles and commitments by all engaged local agencies regarding shared and unique responsibilities and the role of private pumpers, mutual water companies and associated other tenants to ensure mutual good faith and protections.
- Preparing a draft work plan of necessary and desired studies, work assignments and associated costs that respective GSAs will have to address in the first two years after their enactment.
- Confirming the intent to identify management areas in the future as a means to manage diverse hydrogeological conditions but not defining these areas until adequate physical characterization has been conducted for the subbasin.
- Confirming through a formal letter and a date-certain response period (implemented by each county) that eligible GSAs are committed to participate in governance and will be signatories to the MOA or conversely are prepared to waive their local agency authorities and be incorporated into lands managed by the respective counties.

While the Colusa subbasin remains a work in progress and there is no commitment that these multiagency GSAs will prevail, these steps are a thoughtful and stakeholder-supported approach to build trust and associated governance structures that will successfully implement SGMA.

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