December 2021

Groundwater Sustainability Plan Executive Summary

for the Cosumnes Subbasin

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Groundwater Sustainability Plan

For the Cosumnes Subbasin

FINAL | December 2021

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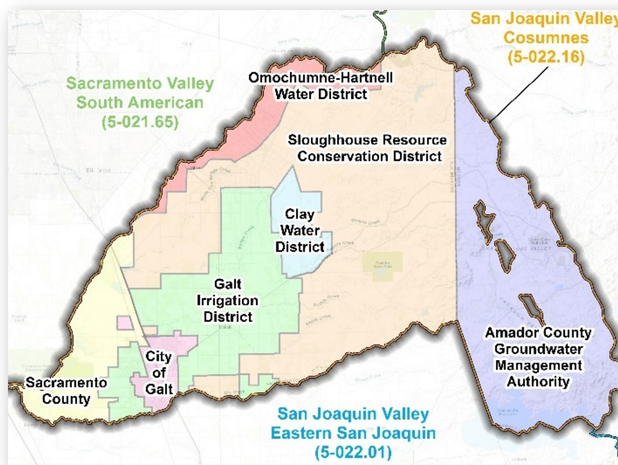
EXECUTIVE SUMMARY

§ 354.4. Each Plan shall include the following general information:
(a) An executive summary written in plain language that provides an overview of the Plan and description of groundwater conditions in the basin.

ES.1. Introduction

On 16 September 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably pursuant to one or more Groundwater Sustainability Plans (GSPs). The Cosumnes Subbasin (also referred to herein as "the Basin"), California Department of Water Resources (DWR) Basin No. 5-022.16, is located at the northern end of the San Joaquin Valley (within Sacramento and Amador Counties) and is classified by DWR as a medium priority basin.

Seven GSAs have been established within the Basin, each acting as the exclusive GSA in their respective areas. The seven GSAs form the Cosumnes Subbasin SGMA Working Group (Working Group): Amador County Groundwater Management Authority (ACGMA), City of Galt, Clay Water District, Galt Irrigation District (GID), Omochumne-Hartnell Water District (OHWD), Sacramento County, and Sloughhouse Resource Conservation District (SRCD). The Working Group developed this single coordinated GSP to meet SGMA regulatory requirements, reflect stakeholder values, and preserve local control over management of the groundwater resource.



Cosumnes Subbasin GSAs

Under SGMA, GSPs are required to contain certain elements, the most significant of which include: a Sustainability Goal; a description of the area covered by the GSP ("Plan Area"); a description of the Basin Setting, including the hydrogeologic conceptual model, historical and current groundwater conditions, and a water budget; locally-defined sustainability criteria; networks and protocols for monitoring sustainability indicators; and a description of projects and/or management actions that will be implemented to achieve or maintain sustainability. SGMA also requires a significant element of stakeholder outreach to ensure that beneficial uses and users of groundwater are given the opportunity to provide input into the GSP development and implementation process. This GSP developed by the Working Group provides a path to maintain and document sustainable groundwater management within 20 years following GSP adoption. The Basin GSAs adopted a joint exercise of powers agreement (JPA) in November 2021 that establishes the Cosumnes Groundwater Authority (CGA) for the purpose of implementing the GSP.The CGA JPA is included as **Appendix B**.

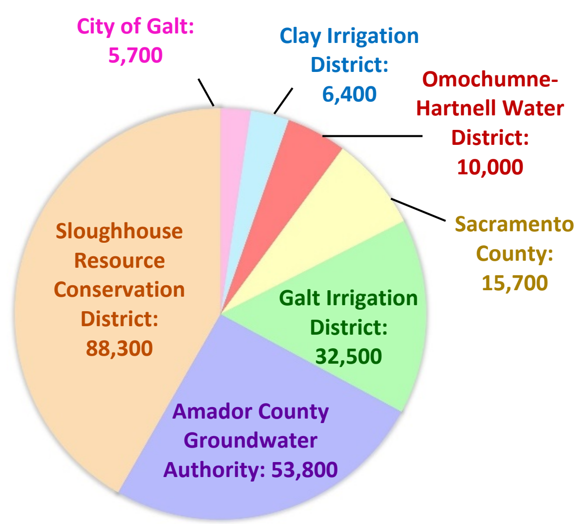
ES.2. Sustainability Goal

The Working Group adopted the following Sustainability Goal:

The Sustainability Goal of the Cosumnes Subbasin (Basin) is to ensure that groundwater in the Basin continues to be a long-term resource for beneficial users and uses including urban, domestic, agricultural, industrial, environmental and others. This goal will be achieved by managing groundwater within the Basin's sustainable yield, as defined by sustainable groundwater conditions and the absence of undesirable results.

ES.3. Plan Area

The Basin encompasses approximately 210,300 acres in the northern region of the San Joaquin Valley Basin, within Amador and Sacramento Counties. Adjacent subbasins include the South American Subbasin (SASb), which lies to the north and west, and the Eastern San Joaquin (ESJ) Subbasin, which lies to the south. The eastern boundary of the Basin is defined by non-alluvial bedrock of the Sierra Nevada foothills.



Cosumnes Subbasin GSA Acreages

In the western portion of the Basin, agriculture is the dominant land use, and higher concentrations of vegetation on undeveloped land areas predominate moving eastward. Approximately two-thirds of the Basin is covered by undeveloped lands supporting naturally occurring vegetation or riparian vegetation, and one-quarter by irrigated agriculture. The most abundant agricultural land uses are vineyards, pasture, and grain. Urban areas, which include cities, communities, Ag-Res, and Industrial uses, totaling approximately 18,000 acres, constitute just under 9% of the total Basin area.

Approximately 16,850 acres of California Protected Areas and public lands lie within the Basin, including areas managed at the Federal, State, and local levels, and 26,770 acres of California Conservation Easement areas which limit land uses to maintain open spaces (e.g., farmed, grazed, forested, nature reserves). The Nature Conservancy (TNC) owns 3,510 acres of land along the western reaches of the Cosumnes River which form the Cosumnes River Preserve. Three Native American tribal communities are directly present within the Basin, and each relies on a combination of surface water from the Cosumnes River and/or groundwater to support their needs. Various other tribes utilize or have some interest in the Basin and are present within Amador and Sacramento Counties but are not necessarily located directly within the Basin boundaries.

Approximately 9% of the Basin (18,236 acres) is covered by DWR-designated disadvantaged communities (DACs) or severely disadvantaged communities (SDACs), including 8,263 residents of the City of Galt (U.S.

Census Bureau 2018). Of these 8,263 Galt residents, approximately 5,133 are designated as DACs and approximately 3,130 are designated as SDACs. The additional DACs occur within farmlands, non-irrigated lands, and small rural residential areas in the western portion of the Basin.

The seven GSAs have water management responsibilities established through SGMA. Other entities within the Basin have water management responsibilities established through other means, including: Cities (City of Galt and City of Ione), Counties (Amador and Sacramento counties), Water/Irrigation Districts (Clay, Galt, OHWD, Jackson Valley, and Amador Water Agency), Utility Districts (East Bay Municipal Utility District and Sacramento Municipal Utility District), and Joint Power Authorities (Amador County Groundwater Management Authority and Southeast Sacramento County Agricultural Water Authority). Additionally, there are over 20 public water systems (PWS) within the Basin.

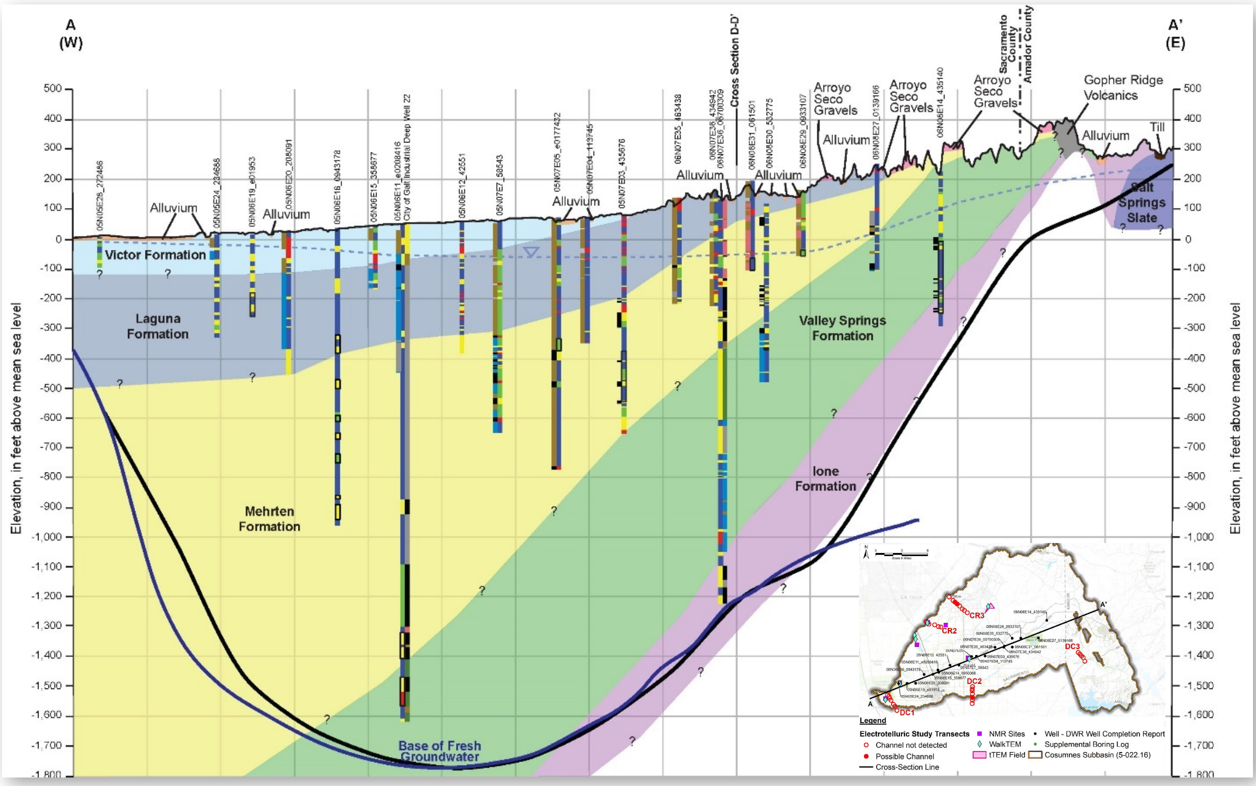
ES.4. Stakeholder Outreach Efforts

The GSA adopted a Communication and Engagement (C&E) Plan in June 2018 that fulfilled SGMA notice and communications requirements and documented the GSAs' efforts to encourage input from beneficial groundwater users throughout GSP development. The C&E Plan identified key stakeholders, interests, and issues and was updated throughout GSP development to reflect outreach efforts and stakeholder communications. The C&E Plan will continue to be updated during GSP implementation.

Working Group and individual GSA Board meetings, stakeholder workshops, and direct outreach strategies including outreach to Native American Tribes located within the Basin and stakeholder surveys sent to all landowners within the Basin, have been and will continue to be implemented in order to engage the public in the GSP process. Materials from the Working Group meetings and links to the individual GSA's websites, where materials from the individual GSA board meetings can be found are available at the Basin's SGMA website: http://cosumnes.waterforum.org/sustainable-groundwater-management-act-sgma. This website also contains meeting materials and the schedule for past and planned meetings and workshops that are open to the public.

ES.5. Hydrogeologic Conceptual Model

The Basin hydrogeology can be generalized into two physiographic subareas: the "Basin Plain" in the western and central areas and the "Basin Foothills" in the eastern area. The Basin is bounded by surface water features to the north, south, and west, which contain no known impediments to groundwater flow; the eastern Basin boundary is formed by low permeability metamorphic rocks in the Sierra Nevada foothills region that are known to impede groundwater flow. For the purposes of SGMA, the bottom of the Basin is defined as either: (a) the bottom of the Ione Formation or (b) the base of fresh groundwater, whichever is highest in elevation at a particular location. Six hydraulically connected sedimentary formations comprise the unconfined to semi-confined Principal Aquifer within the Basin and include younger alluvium, Victor, Laguna, Mehrten, Valley Springs, and Ione formations.



Cross Section A-A'

Approximately 50% of all known production wells in the Basin are 400 feet deep or less in depth, and 90% of all production wells are less than 900 feet deep. The deepest well in the Basin is 1,720 feet deep.

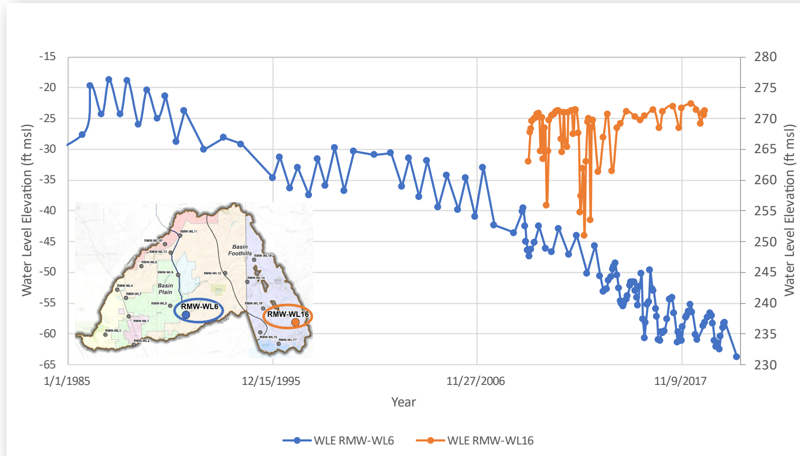
Inflows to the groundwater system include rainfall infiltration, leakage from surface water, percolation of surface water that originates outside the Basin, and subsurface flows from adjacent basins. Outflows from the groundwater system include seepage to surface water, subsurface flows to adjacent basins, evapotranspiration, and consumption of groundwater extracted by wells.

ES.6. Existing Groundwater Conditions

Information on the Basin's current groundwater conditions with respect to the six "Sustainability Indicators" defined under SGMA are presented in this GSP and include the following:

- Chronic Lowering of Groundwater Levels
- Reduction in Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Water Levels: During the historical averaging period (Water Year [WY] 1999-2018), measured groundwater levels in the Basin have generally declined. The statistically significant downward trends, based on a ten-year period having the greatest number of wells with data (2009-2018), range from -0.1 to -1.5 feet per year. Most of the observed declines are reported in the western portion of the Basin (i.e., the Basin Plain). Groundwater elevations in this portion of the Basin generally appear to be correlated with climatic conditions, with storage increases occurring during or after wet years and storage decreases occurring during or after dry years. In the Basin Foothills subarea, trend directions are both upward and downward suggesting that overall groundwater levels in that subarea have remained stable.



Long-Term Groundwater Level Trends

Groundwater Storage: The change in groundwater storage during the period WY 1999-2018 was calculated from the difference in groundwater levels, as measured in wells. In the Basin Plain, the declining water levels correspond to an approximate 10,000 acre-feet per year (AFY) average annual decline in storage. In contrast, in the Basin Foothills, the average annual storage decrease is assumed to be small because water levels have been relatively stable. Annual groundwater storage changes calculated by the numerical groundwater model developed for the Basin range from 54,500 AFY to -49,400 AFY, with an estimated average annual change in storage of -10,600 AFY. The depletion of Basin storage indicates that groundwater consumption has exceeded groundwater recharge on average by about 10,000 AFY during the 20-year period, which is supported by the long-term hydrographs that show declining water levels for several decades.

Water Quality: Within the Basin, potential constituents of concern (COCs; e.g., arsenic and nitrate) are identified by well water samples having constituent concentrations that exceed their Primary Maximum Contaminant Level (MCL). While total dissolved solids (TDS) is not generally considered a constituent affecting human health, it can serve as an indication of general water quality, specifically aesthetic characteristics, and therefore it is included as a COC for the purposes of this GSP.

Active point-source contamination sites within the Basin include three Leaking Underground Storage Tank (LUST) projects, a Cleanup Program project, and several Department of Toxic Substances Control (DTSC) projects. The LUST sites are located within the City of Galt, and the Cleanup Program site is located near the City of Ione. Two of the LUST sites have mapped plumes, and these plumes will be considered if GSP projects or management actions alter recharge and pumping patterns in the vicinity of these sites.

Subsidence: Land surface elevation changes within the Basin have been measured since July 2006 by a global positioning system (GPS) station located near the deepest groundwater depths in the Basin and suggest a long-term subsidence rate of 0.008 feet per year. However, this change in land surface elevation is within the uncertainty of the measurements. Measurements using other technology in and near the Basin (GPS surveying and remote sensing) confirm subsidence rates are negligible. Land subsidence is therefore of low concern in the Basin.

Seawater Intrusion: The Basin is not directly connected to the Pacific Ocean, but its western boundary is adjacent to the Sacramento-San Joaquin Delta, which is influenced by the Pacific Ocean. However, surface water management methods have been in place for many decades that prevent seawater from reaching far into the Delta. Groundwater with relatively high chloride concentrations does exist in the Basin but are associated with brines located at and below the bottom of the Principal Aquifer. Hence, the Basin is at little to no risk of seawater intrusion.

Interconnected Surface Water: The two most prominent surface water bodies are the Cosumnes River and Dry Creek, which form the north and portions of the southern Basin boundaries, respectively. Comparisons between available data from streamflow gauges (stage), estimated channel bottom elevation, and groundwater levels measured in shallow wells indicate that Cosumnes River flows are disconnected from the Principal Aquifer beneath most of its reach within the Basin. Similar data are not available for Dry Creek or other surface water drainages in the Basin, but measured groundwater depths in the Principal Aquifer are typically at depths substantially greater than 30 feet below ground surface (ft bgs), suggesting the surface water flows and groundwater are likely disconnected across most of the Basin. West of its confluence with Deer Creek, the Cosumnes River may be interconnected for part of the year (one or more months), but not in all years, and further down river and west of Highway 99 the river is understood to be more regularly interconnected. The actual relationships between surface water and the underlying Principal Aquifer near the Cosumnes River is complex and additional monitoring will be conducted as part of GSP implementation to better understand the system dynamics.

Groundwater Dependent Ecosystems (GDEs): DWR and TNC developed a map of "Natural Communities Commonly Associated with Groundwater" (NCCAG) data set, which was studied in detail as part of a GDE verification effort conducted by the Basin GSAs. The verification effort included review of the NCCAG and other datasets and classified the vegetated areas as: (1) GDEs, either confirmed by all criteria or assumed when some criteria were incomplete, (2) disconnected from the Principal Aquifer and therefore not considered GDEs, or (3) unknown as a result of one or more significant data gaps (absence of shallow well data). Within the Basin, the NCCAG data set shows 6,960 acres of potential GDEs while the desktop evaluation that took place as part of the verification effort showed almost 19,700 acres of potential GDE areas. The outcome of the subsequent field verification study identified 990 acres of confirmed GDE areas and 820 assumed-confirmed GDE areas in the westernmost part of the Basin, west of Highway 99, in an area where groundwater and surface water are likely interconnected. An additional 4,020 acres of potential GDEs that have unknown GDE status were identified in the eastern part of the Basin (i.e., in the Basin Foothills Subarea where groundwater level data are sparse and highly variable). The total area of GDEs in the Basin is therefore conservatively assumed to be 5,830 acres. Because of the often co-located nature of GDEs and potential reaches of interconnected surface water, perched groundwater, or other shallow water sources, for the purposes of this GSP, GDEs are grouped with the Interconnected Surface Water Sustainability Indicator.

ES.7. Water Budget

To generate a water budget for the Basin, a numerical groundwater flow model was developed that utilized the DWR-supported Integrated Water Flow Model (IWFM). The IWFM application is called the Cosumnes-South American-North American (CoSANA) model (Numerical Model). It is a three-dimensional, finite element model, which integrates groundwater and surface water dynamics to simulate natural and anthropogenic processes relevant to calculating groundwater elevation changes and the groundwater budget.

Results from the numerical model are presented for the historical water budget period (WY 1999-2014), the current water budget period (WY 2015-2018), and the 20-year long-term model evaluation period (WY 1999-2018). Results from the 20-year long-term model-calculated water budget allocated groundwater inflows to the Basin as follows: 73% from percolation, 24% from stream leakage, and 3% from subsurface flows from adjacent watershed. Outflows from the Basin over the same period are quantified as follows: 85% from groundwater extraction, 11% as seepage to streamflow from groundwater, and 4% as subsurface flow to adjacent basins. Within the category of groundwater pumping, approximately 75% of the Basin’s outflows were used for agriculture and 10% supported uses in developed areas including urban, domestic (Ag-Res), and industrial water uses (includes aquaculture).

During the 20-year long-term model evaluation period, the Basin lost approximately -213,500 AF of storage, with the average annual change in storage calculated at -10,600 AFY. A comparison with DWR’s San Joaquin Valley Water Year Hydrologic Classification Index demonstrates a clear relationship between Water Year type and change in groundwater storage, with storage increases during wetter years and storage declines during drier years. The current water budget (WY 2015-2018) calculated using the Numerical Model shows an average annual decrease in storage of 7,400 AFY.

Sustainable Yield (SY) refers to the amount of groundwater that can be pumped annually from the Principal Aquifer within a Basin without causing Undesirable Results pursuant to SGMA’s six Sustainability Indicators. Applying the methodology articulated in the Best Management Practices (BMPs) developed by DWR, the SY range for the Basin is calculated to fall between 119,000 AFY and 125,700 AFY.

Uncertainty in model input data results in uncertainty in model-calculated output and the calculation of SY under future conditions. For example, uncertainty related to future climatic conditions (e.g., rainfall and evapotranspiration) can contribute to uncertainty in the estimated SY volume. Similarly, changes in land use and groundwater consumption can also effect the estimated SY volume. The projected water budgets for the Basin calculated by the model included several scenarios used to represent model uncertainty due to potential climate change and land use (current and projected land use conditions). Application of these scenarios suggest that the SY of the Basin in the future could range from 125,700 AFY to 134,900 AFY.

ES.8. Sustainable Management Criteria

SGMA introduces several terms to measure sustainability, including:

Sustainability Indicators – Sustainability indicators refer to adverse effects caused by groundwater conditions occurring throughout the Basin that, when significant and unreasonable, cause undesirable results. DWR identifies six Sustainability Indicators:

- Chronic Lowering of Groundwater Levels
- Reduction in Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletions of Interconnected Surface Water

Undesirable Results – Undesirable Results (URs) are the significant and unreasonable impacts that adversely affect groundwater conditions in the Basin.

Minimum Thresholds – Minimum Thresholds (MTs) are the numeric criteria for each Sustainability Indicator that, if exceeded, may cause Undesirable Results. Where appropriate, the Minimum Thresholds for the Sustainability Indicators have been set using groundwater levels as a proxy.

Measurable Objectives – Measurable Objectives (MOs) are a specific set of quantifiable goals for the maintenance or improvement of groundwater conditions.

Interim Milestones – Interim Milestones (IMs) are a set of target values representing measurable groundwater conditions in increments of five years.

Collectively, the Sustainability Goal, IMs, MOs, and MTs are referred to as Sustainable Management Criteria (SMC). Chronic Lowering of Groundwater Levels is arguably the most fundamental Sustainability Indicator, as it influences several other key Sustainability Indicators including Reduction of Groundwater Storage, Land Subsidence, and potentially Depletions of Interconnected Surface Water and Land Subsidence. The SMCs for the Basin were developed using a combination of measured and model-calculated data and considering applicable beneficial uses and users of groundwater in the Basin and conditions in adjacent basins.

The SMCs for Chronic Lowering of Groundwater Levels were based on consideration of model-calculated historical trends in groundwater levels in the Basin (as represented by 19 Representative Monitoring Wells [RMW-WLs]), historical low groundwater levels, water year types, projected water use in the Basin, the relationships to other Sustainability Indicators and beneficial users in the Basin, and the SMCs in the adjacent basins. The MTs are based on the projected long-term, water level trends or historical low groundwater levels at the RMW-WLs. The MOs are set at Fall 2015 groundwater levels.

Groundwater storage is closely linked to groundwater levels; therefore, the SMCs set for Chronic Lowering of Groundwater Levels are used as a direct proxy for Reduction of Groundwater Storage. Land Subsidence in the Basin is also assessed using Chronic Lowering of Groundwater Levels as a proxy.

The SMCs for Degraded Water Quality were set using data from 14 water quality monitoring wells (RMW-WQ). Arsenic and nitrate have been identified as COCs in the Basin groundwater and MTs were established as the Primary MCLs as set by the United States Environmental Protection Agency (USEPA) and established by the California State Water Resources Control Board's (SWRCB) Division of Drinking Water The MO for arsenic is set at 80% of the MCL, the MO for nitrate is set at 80% of the MCL, which is also the Irrigated Lands Regulatory Program (ILRP) monitoring trigger. Additionally, TDS has been identified as COC, as it can serve as an indication of general water quality. The MT for TDS was established as the "upper limit" Secondary MCL, and the MO for TDS is set at the "recommended" Secondary MCL.

The SMCs for Depletions of Interconnected Surface Water have been preliminarily defined, as the interconnectedness of the lower reaches of the Cosumnes River and the mapped GDE areas to the Principal Aquifer remains a significant source of uncertainty. The MTs are established at nine monitoring wells (RMW-ISW) based on a combination of measured and model-calculated values. Two additional stream gauges have been installed and new monitoring well sites identified to provide more complete data in the future. These data are needed to better understand the relationship (if any) between GSA management of the Principal Aquifer and the Basin's surface water bodies and GDE areas. The SMCs may be modified in the future accordingly.

Seawater Intrusion is not considered an issue within the Basin due to its current isolation from the Pacific Ocean and marine tidal influences and SMCs were not developed.

In summary, for the Basin, Sustainable Management Criteria are defined as follows:

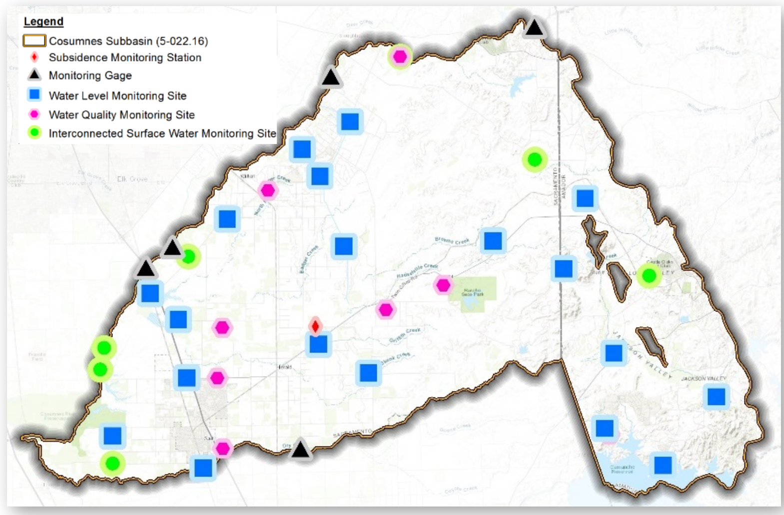
Sustainability Indicator	Undesirable Results Definition	Undesirable Result Criteria	Minimum Threshold	Measurable Objective
Chronic Lowering of Groundwater Levels	Undesirable Results would be experienced when a chronic decline in groundwater levels in the Principal Aquifer negatively affects the long-term viable access to groundwater for urban, domestic, agricultural, industrial, and other beneficial users and uses within the Basin. (Note that environmental beneficial users [GDEs] are addressed in URs for Depletions of Interconnected Surface Water).	URs occur when MTs are exceeded in 25% or more of the RMW-WLs (5 out of 19) for two (2) consecutive years.	For RMW-WLs with historical groundwater levels showing long-term negative trends: - MT set at projected future water level based on a 20-year extension of the historical trend. For all other RMW-WLs: - MT set at the historical low groundwater level.	Fall 2015 groundwater level.

Sustainability Indicator	Undesirable Results Definition	Undesirable Result Criteria	Minimum Threshold	Measurable Objective
Reduction of Groundwater Storage	Undesirable Results would be experienced when a reduction in storage in the Principal Aquifer negatively affects the long-term viable access to groundwater for the urban, domestic, agricultural, industrial, and other beneficial users and uses within the Basin.	URs occur when MTs are exceeded in 25% or more of the RMW-WLs (5 out of 19) for two (2) consecutive years.	MTs for Chronic Lowering of Groundwater Levels are used as a proxy.	MOs for Chronic Lowering of Groundwater Levels are used as a proxy.
Seawater Intrusion	Groundwater conditions in the Basin show that Seawater Intrusion does not occur and is not anticipated to occur in the future. This Sustainability Indicator is therefore not applicable to the Basin.			
Degraded Water Quality	Undesirable Results for Degraded Water Quality would be experienced in the Basin when water quality conditions in the Principal Aquifer are degraded such that they negatively impact the long-term viability of the groundwater resource for beneficial users and uses.	URs occur when MTs for a constituent of concern are exceeded in 25% or more of the RMW-WQ (4 of 14) for two (2) consecutive years.	<u>Arsenic:</u> 10 ug/L <u>Nitrate as N</u>: 10 mg/L <u>TDS</u>: 1,000 mg/L	<u>Arsenic:</u> 8.0 ug/L <u>Nitrate as N:</u> 8.0 mg/L <u>TDS:</u> 500 mg/L
Land Subsidence	Undesirable Results would be experienced when land subsidence due to groundwater level declines in the Principal Aquifer negatively affects the ability to use existing critical or non-critical infrastructure within the Basin.	The criteria established for Chronic Lowering of Groundwater Levels are deemed to be protective against UR for Land Subsidence.	MTs for Chronic Lowering of Groundwater levels are used as a proxy.	MOs for Chronic Lowering of Groundwater Levels are used as a proxy.
Depletions of Interconnected Surface Water	Undesirable Results would be experienced in the Basin when surface water depletions negatively impact the urban, domestic, agricultural, industrial, environmental, and other beneficial users and uses of surface water.	URs occur when MTs are exceeded in one or more RMW- ISW (1 of 9) for two (2) consecutive years.	<u>Disconnected</u>: Projected future water level based on a 20-year extension of the historical trend or the historical low for wells with upward trends. <u>Interconnected:</u> Highest seasonal low elevation during a below normal WY from the start of monitoring through 2015. <u>Assumed GDE:</u> 20 ft bgs	<u>Disconnected</u>: Fall 2015 ground water level. <u>Interconnected:</u> Range in measured seasonal-low elevations over the period of record through 2015 added to the MT. <u>Assumed GDE:</u> Fall 2015 water level.

ES.9. Monitoring Network

The objectives of the Basin Monitoring Network are to: (1) collect sufficient data for the assessment of the Sustainability Indicators relevant to the Basin, including those for which SMCs have been established and those for which additional data are needed, (2) evaluate potential impacts to the beneficial uses and users of groundwater, and (3) assess the effectiveness of Projects and/or Management Actions (PMAs) intended to promote sustainable conditions.

The Monitoring Network for SGMA compliance consists of representative monitoring sites for each sustainability indicator. For each Representative Monitoring Site (RMS), the SMCs are established and data are routinely collected for comparison to the criteria. Additionally, the Monitoring Network relies upon supplemental sites, where SMCs are not established but data are collected to confirm the representativeness of each RMS and to support the wider understanding of the Basin hydrology and response to PMAs.



SGMA Monitoring Networks

For the Chronic Lowering of Groundwater Levels and Reduction of Groundwater Storage Sustainability Indicators, 19 RMW-WLs have been identified, with a spatial density of approximately six wells per 100 square miles (mi^2). Information for these wells (e.g., location, construction, use, and responsible GSA) is provided in **Table MN-2**.

For the Degraded Water Quality Sustainability Indicator, 14 RMW-WQs have been identified, with a spatial density of approximately four wells per 100 mi^2. Information for these wells (e.g., location, construction, use, and responsible GSA) is provided in **Table MN-3**.

For the Land Subsidence Sustainability Indicator, one University NAVSTAR Consortium (UNAVCO) Global Positioning System (GPS) station has been identified to monitor groundwater surface elevation changes along with the 19 RMW-WLs, for a total of 20 RMS. Because the number of sites for Land Subsidence is determined by proximity to critical infrastructure, spatial density across the entire Basin is not a relevant metric.

For the Depletions of Interconnected Surface Water Sustainability Indicator, nine RMW-ISWs and five stream gauges (one currently inactive) have been identified, for a total of 14 RMS. Because the number of sites measuring interconnectedness of surface water is determined by local hydrogeologic conditions, spatial density across the entire Basin is not a relevant metric. Information on these wells (e.g., location, construction, use, responsible GSA, etc.) is provided in **Table MN-4**.

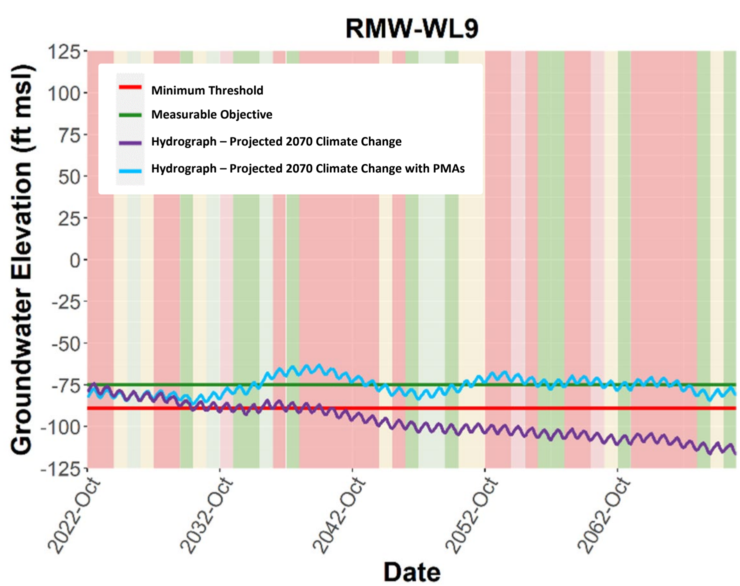
Data collected from the SGMA Monitoring Network will be reviewed and uploaded to the Data Management System (DMS) maintained for the Basin and reported to the DWR in accordance with the Monitoring Protocols developed for the Basin. Additional data collected by other entities as part of other regular monitoring programs may also be used for annual reporting and five-year updates. For example, various information including climate, groundwater levels, satellite imagery, and surface water flow data will be considered to assess GDE health and evaluate possible triggers as part of the five-year update.

ES.10. Projects and Management Actions

Achieving and maintaining sustainability will require the implementation of PMAs, which will be used to address conditions that may lead to Undesirable Results. The GSAs have identified the following six PMAs for potential implementation within the Basin:

1. OHWD Agricultural Flood Managed Aquifer Recharge (Flood-MAR).
2. Sacramento Area Flood Control Agency (SAFCA) Flood-MAR.
3. OHWD Cosumnes River Flow Augmentation.
4. City of Galt Recycled Water Project.
5. Voluntary Land Repurposing.
6. Groundwater Banking and Sale.

The main objective for PMAs #1-#4 is water supply and promoting long-term sustainability. Model-calculated water levels under projected future Basin conditions indicate the PMAs effectively mitigate against continued water level declines. Under assumed climate change conditions, without the PMAs the projected water levels in most wells decrease below the MTs, indicating Undesirable Results, whereas with the PMAs the water levels in many of the wells are maintained near the MOs that define the Sustainability Goal for the Basin. The objective for PMA #5 and #6 is generating revenue to financially support GSP implementation through the sale of some portion of stored/banked groundwater. One of the first steps for PMA implementation will be to identify a willing urban water supplier or other entity interested in purchasing the stored/banked water as supplemental dry year supply.



Groundwater Levels at the RMW-WLs are Projected to Remain Above MOs

Table PMA-1 and **Table PMA-2** provide a summary of each PMA along with expected costs, benefits (on an average annual basis), timelines, and other relevant details specific to each PMA. PMA #1 (OHWD Agricultural Flood-MAR project) is projected to provide an almost 700 AFY augmentation to Basin storage. PMA #2 (SAFCA Flood-MAR) is projected to augment water supply between 4,000 and 6,000 AFY when complete. PMA #3 (OHWD Cosumnes River Flow Augmentation) is expected to augment water supply by 100 AFY. PMA #4 (City of Galt Recycled Water Project) is projected to augment water supply by 300 AFY. The purpose for PMAs #5 (Voluntary Land Repurposing) and #6 (Groundwater Banking and Sale) are primarily to generate revenue to support GSP implementation, though these actions will also provide a groundwater storage benefit from the planned water leave-behind component whereby groundwater recovery will be limited to 90% of the water stored.

Supplementary PMAs are also under consideration, such as: expanded land repurposing (e.g., expanded voluntary land fallowing); water use and efficiency projects; increased recharge with multi-benefit projects that include off stream impoundment of floodwater, reconnecting drainages to their floodplains combined with habitat preservation; local recharge projects as part of stormwater management on private lands; low impact development requirements; conservation efforts; participation in regional water banking projects (e.g., in adjacent basins); and others summarized in Section 18.2.4 *Other PMAs* The available information on these conceptual projects is insufficient to estimate implementation costs and benefits at this time.

ES.11. GSP Implementation

Key GSP implementation activities to be undertaken by the GSAs over the next five years include:

- Monitoring and Data Collection, including semi-annual water level measurement, annual water quality sampling, and additional data collected at variable frequencies. Data will be included in the DMS and required reporting;
- Data Gap Filling Efforts;
- Intra-Basin Coordination and Inter-Basin Coordination with adjacent basins;
- Stakeholder Engagement and Outreach;
- PMA Implementation;
- Annual Reporting;
- Enforcement and Response Actions, if necessary; and,
- Periodic GSP Evaluation and Updates.

SGMA requires achievement of the Sustainability Goal within 20 years of GSP adoption, which means by 2042. Annual Reports that track GSP progress are due on April 1 of every year following GSP submission, with the first report due April 1, 2022, for the Water Year ending on September 30, 2021 (this first report will also include WYs 2015 to 2021). Periodic evaluations are required at least every five years, meaning this GSP will be first updated no later than January 31, 2027.

ES.12. GSP Implementation Costs and Funding

Costs to implement this GSP are divided into several categories as follows.

- Groundwater monitoring and data collection;
- Data gap filling;
- Intra-Basin and Inter-Basin coordination;
- Stakeholder engagement;
- Annual reporting;
- Periodic GSP evaluations and updates;
- Other administration activities such as legal, financial audits, applying for grants and other funding; and,
- Implementation of PMAs, including feasibility studies, environmental analysis, capital/one-time costs and ongoing operating/maintenance costs.

A high-level estimate of the annual program costs for the above groups over the first five-year period (i.e., Fiscal Year 2021-2025) range between approximately $407,500 to $525,000 per year, not including GSA staff time or costs for PMA implementation. The estimated annual costs for PMAs are subject to change, pending specific PMA implementation, and range from $330,000 to $685,000 per year. The combined annual cost over the next five years ranges from $740,000 to $1,200,000 per year. The estimated costs will likely be met using a combination of user fees, parcel fees, SAFCA contribution, Department of Conservation (DoC) Grant, DWR Sustainable Groundwater Management Grant Program, and SGMA Technical Support Services and Facilitation Grants.

ES.13. Conclusion

The passage of SGMA in 2014 ushered in a new era of groundwater management in California. The law and regulations emphasize the use of best available science, local control and decision-making, and active engagement of affected stakeholders. Because of the breadth and scope of the groundwater sustainability problem in California and the legislative and regulatory response to this declining resource, SGMA presents significant challenges both for local implementing agencies and groundwater users alike. Achieving and maintaining sustainability in the face of uncertain future water supply conditions while addressing and balancing the needs of all beneficial uses and groundwater users will require significant effort, creative solutions, and unprecedented collaboration. The Basin GSAs recognize the importance of maintaining groundwater sustainability for the Basin. Therefore, as the implementing agencies, the CGA and its member GSAs are committed to facing these challenges in a manner that upholds the interests of local landowners and constituents within the Basin.

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