

# **FINAL REPORT**

*Bowman Subbasin*

**Sustainable Groundwater  
Management Act**

## **Groundwater Sustainability Plan (Chapter 5 – Plan Implementation)**

**January 2022**

**Prepared For:**

Tehama County Flood Control and Water Conservation District

**Prepared By:**

Luhdorff & Scalmanini

## TABLE OF CONTENTS

5.	PLAN IMPLEMENTATION (REG. § 354.6)	5-1
5.1	Estimate of GSP Implementation Costs	5-1
5.1.1	GSA Administration, Management, Operations, and Other Costs	5-1
5.1.2	Monitoring	5-2
5.1.3	GSP Implementation and Updates	5-3
5.1.4	Project and Management Actions Development and Implementation Costs	5-4
5.1.5	Total Costs	5-4
5.1.6	Funding Sources	5-6
5.2	Schedule for Implementation	5-6
5.3	Annual Reporting	5-7
5.3.1	General Information (§356.4(a))	5-7
5.3.2	Subbasin Conditions (§356.4(b))	5-7
5.3.3	Plan Implementation Progress (§356.4(c))	5-8
5.4	Periodic Evaluations and Reporting	5-8
5.4.1	Sustainability Evaluation (§356.4(a) - §356.4(b))	5-8
5.4.2	Monitoring Network (§356.4(e))	5-9
5.4.3	New Information (§356.4(f))	5-9
5.4.4	GSA Actions (§356.4(g))	5-9
5.4.5	Plan Amendments, Coordination, and Other Information (§356.4(i) - (§356.4(k))	5-9

## LIST OF TABLES

Table 5-1	Estimated GSA Administration, Management, and Operations Costs
Table 5-2	Estimated Annual Monitoring Costs
Table 5-3	Estimated Plan Update Costs
Table 5-4	Estimated GSP Implementation Costs through 2042

## LIST OF FIGURES

Figure 5-1	GSP Implementation Schedule
------------	-----------------------------

## LIST OF ACRONYMS & ABBREVIATIONS

DMS	Data Management System
DWR	Department of Water Resources
FTE	Full Time Equivalent
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
SGMA	Sustainable Groundwater Management Act
SWRCB	State Water Resources Control Board

## 5. PLAN IMPLEMENTATION (REG. § 354.6)

This chapter describes the approach the GSA will use to implement this GSP. This GSP will be implemented to achieve the Subbasin sustainability goal by 2042 and avoid undesirable results through 2090 as required by SGMA and GSP regulations. Implementation of this GSP includes the projects and management actions described in Chapter 4, in addition to on-going activities that will be completed by the GSA related to monitoring, management, administration, updates, reporting, and public outreach. This chapter describes the tasks necessary for GSP implementation, associated costs, and a description of the implementation schedule and annual and five-year updates to be provided to DWR.

### 5.1 Estimate of GSP Implementation Costs

GSP implementation costs include both costs specific to projects and management actions and costs for the GSA to administer and operate all other tasks associated with the GSP over the 20-year implementation period. These costs may be subject to change, as they are projections based on the time of development of this report. GSP implementation and GSA support costs are estimated on an annual basis and are described in further detail below.

#### 5.1.1 GSA Administration, Management, Operations, and Other Costs

The GSA will incur costs for administrative tasks including administrative and finance staff, insurance, meetings, reporting, record keeping, bookkeeping, legal advice, outreach, government relations, engineering services, permitting, public outreach, and miscellaneous supplies and materials. This will include continued monitoring of project and management actions for efficacy, economic feasibility, and coordination as necessary if modifications need to be made to projects and management actions. It is anticipated that administrative and management needs will be monitored and updated accordingly throughout GSP implementation, as they may be subject to change based on the implementation schedule and unforeseen needs throughout implementation. This includes:

- **Operation and Maintenance:** Purchase, maintenance, and repairs to monitoring equipment such as transducers, dataloggers, meters, etc. will occur as needed.
- **Project Management and Coordination:** Coordination between the GSA and GSAs of adjacent subbasins, stakeholders, consultants, and other interested parties will be ongoing.
- **Administrative Personnel:** One (1) full time equivalent (FTE) employee. Professionals trained in the Data Management System (DMS) will collect and process monitoring data for input into the DMS. Personnel will also complete outreach and accounting system support.
- **Engineering and Consulting:** Consulting from outside technical services will be used as needed for data management, analysis, and reporting.
- **Legal Expense:** Legal expenses may be incurred for water rights or water transfer programs and legal review.
- **Public Outreach:** The GSA will continue outreach to encourage public participation throughout GSP implementation. This will include Groundwater Commission, GSA board meetings, updating the GSA website, and public meetings.

It is expected that GSA administration costs will include efforts for administering all five (5) GSPs managed by the GSA: Antelope, Bowman, Los Molinos, Red Bluff, and Corning. Therefore, administration costs are reflective of the total cost for administering all five GSPs. The estimated annual cost for GSA administration, management, and operations is \$470,000. Costs associated with these individual tasks are included in **Table 5-1** below:

**Table 5-1. Estimated GSA Administration, Management, and Operations Costs**

DESCRIPTION	ESTIMATED ANNUAL COST
Operation and Maintenance	\$45,000
Project Management and Coordination	\$100,000
Administrative Personnel	\$240,000
Engineering and Consulting	\$20,000
Legal Expense	\$50,000
Public Outreach	\$15,000
<b>Total</b>	<b>\$470,000</b>

### 5.1.2 Monitoring

The GSA will oversee the implementation of the monitoring programs described in Chapter 3. This includes monitoring groundwater and surface water levels, groundwater storage, water quality, and land subsidence to evaluate the progress of the Subbasin in reaching the sustainability goal. Related tasks include data review and analysis, data management, maintenance of monitoring wells and monitoring equipment, deploying any necessary technology, updates to the groundwater model, and development of annual reports. The GSA will routinely monitor data to track Subbasin conditions and sustainability indicators to ensure progress is being made towards sustainability in the Subbasin. Each monitoring task can be further described as follows:

- Groundwater and Surface Water Level Monitoring:** Groundwater level data will be collected from the monitoring network as described in Chapter 3. Bi-annual measurements will be collected by trained professionals via depth to groundwater measurements manually or by transducers. Surface water will also be monitored through the monitoring network described in Chapter 3. Data will be collected to correlate groundwater and surface water to monitor interconnected surface and groundwater. All data will be managed in the DMS, and the analysis will be included in the annual report submitted to DWR.
- Groundwater Quality Monitoring:** Groundwater quality data will be collected from the monitoring network as described in Chapter 3. Trained professionals will collect samples on a biannual basis. Samples will be sent to a certified laboratory for analysis, and results will be reviewed, managed, and reported in the annual report submitted to DWR.

- **Land Subsidence Monitoring:** Land subsidence data will be collected from the monitoring network in accordance with Chapter 3. This data will be reviewed and included in the annual report submitted to DWR.
- **Annual Report:** An annual report will be developed and submitted to DWR per Section 5.3 below.

The total estimated cost for monitoring in the Bowman Subbasin is \$104,000 as displayed by **Table 5-2** below.

**Table 5-2. Estimated Annual Monitoring Costs**

MONITORING TASK	ESTIMATED ANNUAL COST
Groundwater and Surface Water Level Monitoring	\$20,000
Water Quality Monitoring	\$20,000
Land Subsidence Monitoring	\$14,000
Annual Report	\$50,000
<b>Total</b>	<b>\$104,000</b>

### 5.1.3 GSP Implementation and Updates

Implementation of this GSP requires development and submittal of annual and periodic updates to DWR. Costs associated with the preparation of annual reports includes data and technical analyses, summary material, and evaluation of sustainability objectives. Costs and efforts associated with periodic evaluations includes information developed for the annual reports, in addition to evaluation of sustainability conditions, objectives, monitoring, and documentation of new information available since the last update to the GSP. Annual and periodic reports are described in further detail in Sections 5.3 and 5.4, respectively. It is anticipated that these reports will be prepared by technical consultants in coordination with GSA staff and in coordination with other GSAs and stakeholders. A breakdown of estimated plan update costs is provided in **Table 5-3** below.

**Table 5-3. Estimated Plan Update Costs**

DESCRIPTION	ESTIMATED ANNUAL COST
Updates to Water Budget and Groundwater Model, Analyze Effectiveness of Projects and Management Actions, Revise Sustainable Management Criteria	\$240,000
Updates to Management Strategies	\$18,000
Public Outreach	\$10,000
5-Year Periodic Updates	\$32,000
<b>Total</b>	<b>\$300,000</b>

#### 5.1.4 Project and Management Actions Development and Implementation Costs

Projects and Management Actions are described in Chapter 4. Estimated costs for development and implementation of these plans and programs are included in Chapter 4. The GSA will also incur costs for project planning as new information is obtained on Subbasin conditions and project and management actions are implemented and observed. It is anticipated that the GSA will evaluate new and existing projects for improvement based on Subbasin conditions as needed. This includes evaluation of potential impacts on sustainability indicators and development of related technical studies and planning efforts such as feasibility assessments, environmental studies, water rights evaluations, coordination with outside agencies, land evaluations, grant applications, and other applicable efforts depending on the scope of the project. Project and management actions related planning, coordination, and studies are expected to be ongoing.

#### 5.1.5 Total Costs

Annual implementation costs of this GSP are expected to vary by year based on implementation schedules for projects and management actions, necessary updates to data management and modeling systems, and other maintenance and management needs. Costs will be updated during the 5-year milestone review period. Inflation and contingency are also included for planning purposes. Contingency includes potential actions needed to respond to critically dry years or trends toward minimum thresholds or undesirable results, and inflation reflects a 3% assumed annual value, included each year, for planning and budgeting purposes. The total estimated GSP implementation cost is \$19.8 million as displayed in **Table 5-4** below.

**Table 5-4. Estimated GSP Implementation Costs through 2042**

<b>FISCAL YEAR</b>	<b>GSA ADMINISTRATION</b>	<b>MONITORING</b>	<b>5-YEAR UPDATES</b>	<b>10% CONTINGENCY</b>	<b>TOTAL</b>
<b>2022</b>	\$470,000	\$104,000	\$0	\$57,000	\$631,000
<b>2023</b>	\$484,000	\$107,000	\$0	\$59,000	\$650,000
<b>2024</b>	\$499,000	\$110,000	\$0	\$61,000	\$670,000
<b>2025</b>	\$514,000	\$114,000	\$0	\$63,000	\$690,000
<b>2026</b>	\$529,000	\$117,000	\$150,000	\$80,000	\$876,000
<b>2027</b>	\$545,000	\$121,000	\$150,000	\$82,000	\$897,000
<b>2028</b>	\$561,000	\$124,000	\$0	\$69,000	\$754,000
<b>2029</b>	\$578,000	\$128,000	\$0	\$71,000	\$777,000
<b>2030</b>	\$595,000	\$132,000	\$0	\$73,000	\$800,000
<b>2031</b>	\$613,000	\$136,000	\$169,000	\$92,000	\$1,010,000
<b>2032</b>	\$632,000	\$140,000	\$174,000	\$95,000	\$1,040,000
<b>2033</b>	\$651,000	\$144,000	\$0	\$79,000	\$874,000
<b>2034</b>	\$670,000	\$148,000	\$0	\$82,000	\$900,000
<b>2035</b>	\$690,000	\$153,000	\$0	\$84,000	\$927,000
<b>2036</b>	\$711,000	\$157,000	\$196,000	\$106,000	\$1,170,000
<b>2037</b>	\$732,000	\$162,000	\$202,000	\$110,000	\$1,205,000
<b>2038</b>	\$754,000	\$167,000	\$0	\$92,000	\$1,013,000
<b>2039</b>	\$777,000	\$172,000	\$0	\$95,000	\$1,044,000
<b>2040</b>	\$800,000	\$177,000	\$0	\$98,000	\$1,075,000
<b>2041</b>	\$824,000	\$182,000	\$227,000	\$123,000	\$1,357,000
<b>2042</b>	\$849,000	\$188,000	\$234,000	\$127,000	\$1,397,000
<b>Total</b>	<b>\$13,478,000</b>	<b>\$2,983,000</b>	<b>\$1,502,000</b>	<b>\$1,798,000</b>	<b>\$19,757,000</b>



### 5.1.6 Funding Sources

Development of this GSP was funded through Proposition 1 and Proposition 68 grant funds awarded by DWR to support the formation of GSAs and adoption of initial GSPs to achieve SGMA compliance within regulatory submittal deadlines. Ongoing implementation, monitoring, and reporting are expected to be funded through local fees and GSP priority projects and actions outlined in Chapter 4 would be funded by outside grants, cost sharing, and other funding sources. The GSA will develop and approve a financing plan with prioritized five-year CIP projects and actions to serve as the basis to impose fees to fund groundwater management activities included in the GSP. SGMA gives GSAs the authority to impose these fees (Water Code §§ 10730, 10730.2 (a).) which can cover groundwater management costs such as administration, operations and maintenance, acquisition of property, facilities, and services, supply, production, treatment and/or distribution of water, and other activities necessary to implement the GSP while maintaining SGMA compliance. These fees can be fixed and charged on a parcel or square foot basis or charged on a volumetric basis if actual historic and current water use data is available. The GSA is also granted the authority by SGMA to implement any separate fee authority (Water Code § 10730.8) and/or adopt a charge or assessment under its special district fee authority pursuant to Water Code Section 35470. Fee amount and type will be implemented through a comprehensive fee study and in accordance with legal review and regulatory requirements, SGMA compliance, and California Law. The GSA will seek additional grants and funding sources to assist with implementation costs as well.

GSP priority projects ready for implementation can take advantage of available grants to fund projects on a local or regional scale that are ready for implementation. Projects serving disadvantaged or severely disadvantaged communities may receive a higher priority under certain funding programs. The next available project funding opportunity is through the phase 2 \$77M Sustainable Groundwater Management Grant Implementation solicitation cycle expected to occur in 2022 with funding applications due to DWR for eligible GSAs/GSPs in Spring or Summer 2022. Certain GSP priority actions may be eligible for other funding sources depending on project characteristics, funding program guidelines, and funding amount requested. If the GSA/GSP pursues this funding source the project should be included in the adopted GSP and be included on the GSP five-year CIP priority list. Project applicants must be in compliance with SGMA regulations and requirements at the time of the funding request.

The GSA will provide planning for funding assistance and ensure maximum outside funding sources can be secured for eligible projects that are a priority to the GSA and GSP project applicants. Cost sharing and/or upfront costs (such as funding application preparation and submittal costs) may be required for funding success. And future funding sources may include planning or implementation funding only which can be applied as warranted based on how developed priority projects are at the time of the funding program solicitation period.

### 5.2 Schedule for Implementation

This initial GSP will be adopted and submitted to DWR by January 31, 2022. The implementation timeline will begin thereafter and will allow GSAs to develop and implement projects and management actions to meet sustainability objectives by 2042. GSP implementation also includes annual and periodic evaluations and submittals to DWR. The full schedule for implementation is subject to change and will be evaluated and updated as necessary based on implementation progress, sustainability goals, monitoring, and other factors that could affect overall implementation efforts.

The comprehensive implementation schedule update will be completed every five years as part of the GSP five-year update process, which will include the updated GSP five-year CIP program with existing project prioritization and/or addition of new projects, to assist the GSA meet SGMA compliance requirements over the planning horizon.

The GSP implementation schedule may be modified periodically as agreed to by the GSA and GSP project partner(s) based on the near-term availability of significant funding opportunities or options. Being flexible with schedule could assist the GSA/GSP maximize outside funding secured when these unique opportunities arise as needed to meet GSP sustainability criteria. An example would be passage of a new State Proposition that includes planning and/or implementation funding for GSAs/GSPs that is not currently available.

### 5.3 Annual Reporting

Annual reports will be completed and submitted to DWR by April 1 of each year pursuant to GSP Regulation §356.2. Annual reports will include sections on general information, basin conditions, and plan implementation progress for the reporting period. The annual report submitted to DWR will comply with the requirements of §356.2. The outline of subsections to be utilized in the development of the annual report, with a general outline of information to be included under each subsection, are detailed below.

#### 5.3.1 General Information (§356.4(a))

This section will highlight the key content of the annual report. An executive summary will be prepared to describe the Subbasin sustainability goals, progress of projects and management actions of the GSP, any significant findings and/or key recommendations for the reporting period, and an updated basin map.

#### 5.3.2 Subbasin Conditions (§356.4(b))

The subbasin conditions section will provide an update on groundwater and surface water conditions in the Subbasin with respect to the sustainability goals described in the GSP. This will include basic information about the Subbasin and technical information including:

- **Groundwater Elevation Data:** Groundwater elevation data will be collected from the monitoring network on a bi-annual basis as described in Chapter 3. Data will be organized in a data management system, and hydrographs and groundwater elevation contour maps will be generated and included in the annual report, including seasonal high and low conditions in relation to historical data. This section will also include a written interpretation of the data and a description of data gaps and recommendations if necessary.
- **Groundwater Extraction Data:** Groundwater extraction data will be obtained through metering efforts and pumping data or estimated by land use if necessary for the reporting period and presented via tables, maps, and a written description. Data will be presented on maps and by water use sector, with a description of the measurement method and measurement accuracy.
- **Surface Water Supply:** Surface water supply quantities will be presented based on information obtained from annual surface water diversion reporting.

- **Total Water Use:** Total water use within the GSP boundary will be evaluated through information as it is available on production records, delivery records, metered well use, and applicable management plans. Data will be presented in the annual report by water use sector, with a description of the measurement method and measurement accuracy.
- **Change in Groundwater Storage:** The estimated change in groundwater storage will be evaluated for each principal aquifer based on observed changes in groundwater levels over a selected period. Information will be presented in tabular form and as a map for each principal aquifer indicating the water year type (wet, dry, normal), groundwater use, annual change in groundwater storage, and cumulative change in storage based on historical data and new data from the reporting period.

### 5.3.3 Plan Implementation Progress (§356.4(c))

The Annual Report will include a summary of the progress of the GSP implementation of projects, management actions, and other GSA activities. It will describe the Plan's progress toward achieving interim milestones, the implementation schedule, and discuss significant updates or changes, as necessary.

## 5.4 Periodic Evaluations and Reporting

The GSA will evaluate the GSP every five years and whenever the plan is amended. The evaluation will be submitted to DWR and include the elements of the Annual Report, a summary of the GSP, project, and management action implementation progress, and progress toward meeting the sustainability goal of the Subbasin. The information that will be provided in these five-year evaluations is captured in the following subsections:

### 5.4.1 Sustainability Evaluation (§356.4(a) - §356.4(b))

This section will include an evaluation and description of current groundwater conditions for each sustainability indicator and overall progress towards sustainability. A summary of conditions in relation to interim milestones, measurable objectives, and minimum thresholds will be provided. Depictions of groundwater elevations for the evaluation period will be provided as graphs, figures, and a written description. If any minimum threshold exceedances are observed, the GSA will investigate probable causes and implement corrective actions or plans where feasible. However, minimum threshold exceedances may not always result in corrective action due to factors that may be outside of the control of the GSA.

Projects and management actions will also be evaluated to determine their implementation status, success, and progress toward reaching the Subbasin sustainability goal. This will include an assessment of conditions and whether the project or management action is contributing to an improvement in conditions. If it is determined that progress is not being made toward reaching the sustainability goal, the implementation timeline is not being met, or the project or management action is not performing as expected, the project or management action will be re-evaluated and revised or accelerated path. Similarly, if an improvement in conditions is exhibited faster than projected, the scale or timeline of projects and management actions may be re-evaluated and revised if necessary. The evaluation will describe any changes to the project and management action implementation schedule and the steps the GSA will take to revise or add to projects and management actions if necessary.

Other elements of the plan such as the basin setting, management areas, and sustainability indicators will be evaluated for any significant or unanticipated changes that may have developed during the evaluation period. The sustainability indicators will be evaluated for undesirable results, and minimum thresholds and measurable objectives will be reconsidered if necessary. This will include review of any significant changes in water use to determine if potential overdraft conditions exist and proposed mitigation measures if such conditions exist or are anticipated. Any proposed revisions will be documented in the periodic evaluation.

#### 5.4.2 Monitoring Network (§356.4(e))

The GSP monitoring network is detailed in Chapter 3 and will be evaluated during the periodic review. This will include a review of data collected, potential data gaps, and an assessment of the functionality of the monitoring network. If data gaps are identified, the evaluation will include a plan to improve the monitoring network to acquire additional data sources. A description of how new information will be incorporated into future GSP updates will be included if necessary. Installation of new data collection facilities and analysis of new data will be prioritized in the GSP.

#### 5.4.3 New Information (§356.4(f))

It is assumed that new information on groundwater conditions, projects and management actions, and sustainability objectives will become available over time to be incorporated into the GSP. Significant, new information that becomes available following plan adoption or prior periodic evaluations will be discussed, and an adaptive management approach will be applied to identify, review, and incorporate all new information into the GSP. The periodic evaluations will indicate whether new information warrants changes to any aspect of the GSP.

#### 5.4.4 GSA Actions (§356.4(g))

The GSA will complete ongoing monitoring, management, and collaboration to meet the sustainability goal specified in the GSP. The periodic evaluation will include a description of any changes in regulations or ordinances. This includes state laws and regulations or local ordinances that have been implemented since the previous periodic evaluation. The effect on elements of the GSP and any necessary updates to the GSP including the basin setting, measurable objectives, minimum thresholds, and undesirable results will be described. Furthermore, relevant or enforcement actions taken by the GSA will be described along with how such actions support sustainability in the Subbasin.


#### 5.4.5 Plan Amendments, Coordination, and Other Information (§356.4(i) - (§356.4(k))

Any completed or proposed amendments to the plan will be described in the periodic evaluation. This includes changes to the basin setting, measurable objectives, minimum thresholds, and undesirable results. A description of coordination between GSAs within the basin, between hydrologically connected basins, and land use agencies will be presented. The GSA will summarize any other information deemed appropriate to support the GSP and will provide associated required information to DWR.

The implementation schedule for the 20-year implementation period is presented in **Figure 5-1** below.

**Figure 5-1. GSP Implementation Schedule**

TASK NAME	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Plan Implementation																					
GSP Submittal to DWR	x																				
Outreach and Communication																					
Monitoring and DMS																					
GSP Reporting																					
Annual Reports	x	x	x	x	x		x	x	x	x		x	x	x	x		x	x	x	x	
5-year GSP Evaluation Reports						x					x					x					x

x Indicates a submittal.  
 Indicates ongoing event.