

Groundwater Sustainability Plan

PREPARED FOR

Colusa GSA and
Glenn GSA

DRAFT

Groundwater Sustainability Plan

Prepared for

Colusa GSA and Glenn GSA

Project No. 277-60-20-11

DRAFT

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms Per Liter
3D	Three-Dimensional
AB	Assembly Bill
AF	Acre-Feet
AN	Above Normal
AWMP	Agricultural Water Management Plans
bgs	Below Ground Surface
BMO	Basin Management Objective
BMP	Best Management Practice
C	Critically Dry
C2VSimFG	California Central Valley Groundwater-Surface Water Simulation Model – Fine Grid
CASGEM	California’s Statewide Groundwater Elevation Monitoring Program
CCR	California Code of Regulations
CDEC	California Data Exchange Center
cfs	Cubic Feet per Second
CGA	Colusa Groundwater Authority
COOP	Cooperative Observer Network

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Cr ⁶⁺	Hexavalent Chromium
CVP	Central Valley Project
CVRWQB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWC	California Water Code
D	Dry
DAC	Disadvantaged Community
Delta	San Joaquin-Sacramento River Delta
DQO	Data Quality Objectives
DTSC	Department of Toxic Substance Control
DTW	Depth to Water
DUC	Disadvantaged Unincorporated Communities
DWR	Department of Water Resources
EC	Electrical Conductivity
EWMP	Efficient Water Management Practices
ft/day	Feet per Day
GAMA	Groundwater Ambient Monitoring and Assessment
GCID	Glenn-Colusa Irrigation District
GDE	Groundwater Dependent Ecosystems
GGA	Glenn Groundwater Authority
gpm	Gallons Per Minute
GPS	Global Positioning System
GSAs	Groundwater Sustainability Agencies
GSPs	Groundwater Sustainability Plans
GWE	Groundwater elevations
GWS	Groundwater System
HCM	Hydrogeologic Conceptual Model
HUC	Hydrologic Unit Code
ID	Identification
IHM	Integrated Hydrologic Model
ILRP	Irrigated Lands Regulatory Program
InSAR	Interferometric Synthetic Aperture Radar
IRWMP	Integrated Regional Water Management Plan
IWFM	Integrated Water Flow Model
JPA	Joint Powers Authority
LAFCO	Local Agency Formation Commission
Ma	Million Years Ago
maf	Million Acre Feet
maf/yr	Million Acre Feet Per Year

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MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter
MSR	Municipal Service Reviews
NAD	North American Datum
NASA	National Aeronautics and Space Administration
NAVD 88	North American Vertical Datum of 1988
NCCAG	Natural Communities Commonly Associated with Groundwater
NHD	National Hydrology Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NSV	Northern Sacramento Valley
NWIS	National Water Information System
OAWD	Orland-Artois Water District
OSWCR	Online System of Well Completion Reports
OYWUA	Orland Unit Water Users Association
PCE	Tetrachloroethylene
PHG	Public Health Goal
ppb	Part Per Billion
ppm	Parts Per Million
RPE	Reference Point Elevations
RWMP	Regional Water Management Plan
SAGBI	Soil Agricultural Groundwater Banking Index
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SIP	Shelter-in-Place
SRSC	Sacramento River Settlement Contractors
SSURGO	Soil Survey Geographic Database
SVSim	Sacramento Valley Simulation Model
SWRCB	State Water Resources Control Board
SWS	Surface Water System
TAC	Technical Advisory Committee
taf/yr	Thousand Acre-Feet Per Year
TCCA	Tehama-Colusa Canal Authority
TDS	Total Dissolved Solids
TNC	The Nature Conservancy
USBR	U.S. Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
W	Wet

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WCR	Well Completion Report
WDL	Water Data Library
WDR	Waste Discharge Requirements
WMP	Water Management Plans
WRCC	Western Regional Climate Center

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Executive Summary

The Executive Summary will be included with August 2021 draft GSP submittal.

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CHAPTER 1

Introduction

1.1 PURPOSE OF THE GROUNDWATER SUSTAINABILITY PLAN

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package composed of Assembly Bill (AB) 1739, Senate Bill (SB) 1168, and SB 1319, collectively known as the Sustainable Groundwater Management Act (SGMA), which is codified in Section 10720 et seq. of the California Water Code.

This legislation created a statutory framework for sustainable groundwater management in California and required governments and water agencies of high- and medium-priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. SGMA empowered local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and required GSAs to adopt Groundwater Sustainability Plans (GSPs) for medium- and high-priority groundwater basins in California.

SGMA defines sustainable groundwater management as *“management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results”* (SGMA Regulations § 10721(v)). Undesirable results are defined by SGMA as the following effects:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
2. Significant and unreasonable reduction of groundwater storage
3. Significant and unreasonable seawater intrusion
4. Significant and unreasonable degraded water quality
5. Significant and unreasonable land subsidence
6. Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

The Colusa Groundwater Authority (CGA) and Glenn Groundwater Authority (GGA), or Authorities, are exclusive GSAs covering the entire geographic extent of the Colusa Subbasin. The Authorities have worked together to prepare this GSP. The purpose of this GSP is to characterize groundwater conditions in the Colusa Subbasin, evaluate and report on existing conditions relating to the six undesirable results, describe existing monitoring, management programs and policies relating to groundwater resource use, document public outreach and communication, as well as, establish sustainability goals, and to describe programs and management actions the GSAs will implement to achieve sustainable groundwater management within 20 years of implementing the GSP (California Code of Regulations Title 23 (CCR), Section 350.4 (f)).

While the GSP focuses on groundwater projects and management actions by the Colusa Subbasin GSAs, these actions are considered in the context of the entire basin setting and the actions of other GSAs in the region to achieve subbasin-level sustainability.

1.2 SUSTAINABILITY GOAL

As mandated under 23 CCR Section 354.24, the Colusa Subbasin GSAs have established a “*sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline.*”

The sustainability goal for the Colusa Subbasin GSP is to *maintain, through a cooperative and partnered approach, locally managed sustainable groundwater resources to preserve, and enhance the economic viability, social well-being and culture of all beneficial uses and users without experiencing undesirable results by managing use within the sustainable yield.*

Section 5, Sustainable Management Criteria, of the GSP describes the sustainability goal for the GSAs and is based on information from the basin setting, discussions of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved and maintained within the 20-year planning and implementation horizon.

1.3 AGENCY INFORMATION

The CGA and the GGA have worked together to develop a single GSP for the Colusa Subbasin. Collectively, these two GSAs have been deemed exclusive GSAs and cover the entire Subbasin.

The Colusa Subbasin is located in the larger Sacramento Valley Groundwater Basin and spans the eastern portions of Colusa and Glenn Counties. It is generally bounded by Stony Creek to the north, the Coast Ranges to the west, the Sacramento River and the Reclamation District 1004 western boundary to the east, and the Colusa-Yolo County boundary and the Colusa County Water District Boundary in the south. The Colusa Subbasin covers 723,823 acres.

The Colusa Subbasin has been designated as a High-Priority basin by the Department of Water Resources (DWR) with implications under the SGMA. In compliance with SGMA deadlines, the Colusa Subbasin GSP will be completed, adopted, and submitted to DWR by January 31, 2022. Both GSAs will adopt the GSP and share in GSP implementation.

1.3.1 Agency Organization and Management Structure

The CGA and the GGA have been deemed the exclusive GSAs that cover the entire Colusa Subbasin. The CGA was formed on June 29, 2017 and is a twelve-member Joint Powers Authority (JPA) with twelve Director seats. It is the exclusive GSA for the Colusa County portion of the Colusa Subbasin, and a small portion of the Butte Subbasin in Colusa County. Members of the CGA Board include:

- County of Colusa
- City of Colusa
- City of Williams
- Glenn Colusa Irrigation District
- Maxwell Irrigation District and Westside Water District
- Princeton-Cordora-Glenn Irrigation District and Provident Irrigation District
- Colusa County Water District

Chapter 1

Introduction

- Reclamation District 108
- Reclamation District 479
- Colusa Drain Mutual Water Company
- Private Pumper Representative from Colusa County Groundwater Commission

The GGA is the exclusive GSA for the portions of the Colusa Subbasin within Glenn County. The GGA consists of ten-member agencies with eight Director seats. Members include:

- City of Orland
- City of Willows
- County of Glenn
- Glenn-Colusa Irrigation District
- Glide Water District
- Kanawha Water District
- Monroeville Water District
- Orland-Artois Water District
- Princeton-Cordora-Glenn Irrigation District
- Provident Irrigation District

Each GSA Board has final authority for GSP implementation. The Board members are chosen in public meetings by the respective governing boards of the Member Agencies. Alternates for each Board member are chosen in the same manner by the same Member Agencies.

Contact information for each GSA Manager:

Colusa Groundwater Authority:
Mary Fahey, Water Resources Manager
(530) 458-0719
100 Sunrise Boulevard, Suite A
Colusa, CA 95932
mfahey@countyofcolusa.org

Glenn Groundwater Authority:
Lisa Hunter, Water Resources Coordinator
(530) 934-6501
720 North Colusa Street
Willows, CA 95988
lhunter@countyofglenn.net

1.3.2 Legal Authority

On May 14, 2018, the CGA and GGA notified DWR of their intent to prepare a GSP for the Colusa Subbasin (5-021.52). The preparation of the GSP is being coordinated and overseen by the GSAs. The Authorities hold regular meetings which are open to the public and have formed a Joint Technical Advisory Committee (TAC) to coordinate basin-wide activities. Periodic TAC meetings allow coordination with the technical consulting team and activities in adjacent subbasins. All meeting materials and information relevant to SGMA planning and implementation are readily available to the public via websites, newsletters, emails, presentation, and public meetings.

1.3.3 Estimated Implementation Cost and Agencies' Approach to Meet Costs

Note to Readers: At the time of this writing, implementation costs and the GSA's approach to meeting the costs is being developed.

1.4 GSP ORGANIZATION

The GSP is organized in accordance with 23 CCR Section 354 as follows:

- Executive Summary
- Chapter 1 introduces the Colusa Subbasin GSAs and the development of this GSP.
- Chapter 2 provides a summary of the Plan Area, monitoring and management programs, land uses, additional GSP elements and notice and communication.
- Chapter 3 discusses the Basin Setting including the hydrogeologic conceptual model for the basin, discussion of water features and conveyance infrastructure, and groundwater conditions.
- Chapter 4 reviews the monitoring networks within the subbasin pertaining to groundwater levels and quality, seawater intrusion, land subsidence, and surface water.
- Chapter 5 identifies sustainable management criteria, including goals, measurable objectives, minimum thresholds, and undesirable results.
- Chapter 6 identifies projects and management actions that work to achieve the GSAs' sustainability goals.
- Chapter 7 discusses plan implementation including anticipated costs, schedule of implementation, and annual reporting and evaluations.
- Chapter 8 provides references cited in the GSP.

To facilitate DWR review and assure compliance with all applicable GSP regulations, Table 1-1, Checklist for GSP Submittal, cross-references the chapters of this GSP to applicable GSP regulations. Terminology used in this GSP is consistent with the SGMA definitions provided in California Water Code (CWC) Section 10721 and in 23 CCR Section 351, see Appendix 1A for a glossary of terms.

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
Article 3. Technical and Reporting Standards					
352.2		Monitoring Protocols	<ul style="list-style-type: none"> Monitoring protocols adopted by the GSA for data collection and management Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin 	Chapter 4	
Article 5. Plan Contents, Subarticle 1. Administrative Information					
354.4		General Information	<ul style="list-style-type: none"> Executive Summary List of references and technical studies 	ES Chapter 2, 3, 4	ES-1 2-36, 3-101, 4-26
354.6		Agency Information	<ul style="list-style-type: none"> GSA mailing address Organization and management structure Contact information of Plan Manager Legal authority of GSA Estimate of implementation costs 	Chapter 1	1-3 1-2 1-3 1-3 1-4
354.8(a)	10727.2(a)(4)	Map(s)	<ul style="list-style-type: none"> Area covered by GSP Adjudicated areas, other agencies within the basin, and areas covered by an Alternative Jurisdictional boundaries of federal or State land Existing land use designations Density of wells per square mile 	Figure 2-1 Figures 2-3, 2-4 Figures 2-4, 2-5 Figure 2-7 Figure 2-6	2-3 2-6, 2-7 2-7, 2-11 2-14 2-12
354.8(b)		Description of the Plan Area	<ul style="list-style-type: none"> Summary of jurisdictional areas and other features 	Chapter 2	2-4
354.8(c) 354.8(d) 354.8(e)	10727.2(g)	Water Resource Monitoring and Management Programs	<ul style="list-style-type: none"> Description of water resources monitoring and management programs Description of how the monitoring networks of those plans will be incorporated into the GSP Description of how those plans may limit operational flexibility in the basin Description of conjunctive use programs 	Chapter 2	2-15 2-22 2-23

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
354.8(f)	10727.2(g)	Land Use Elements or Topic Categories of Applicable General Plan	<ul style="list-style-type: none"> • Summary of general plans and other land use plans • Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects • Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans • Summary of the process for permitting new or replacement wells in the basin • Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management 	Chapter 2	2-23 2-25 2-22
354.8(g)	10727.4	Additional GSP Contents	<p>Description of Actions related to:</p> <ul style="list-style-type: none"> • Control of saline water intrusion • Wellhead protection • Migration of contaminated groundwater • Well abandonment and well destruction program • Replenishment of groundwater extractions • Conjunctive use and underground storage • Well construction policies • Addressing groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects • Efficient water management practices • Relationships with State and federal regulatory agencies • Review of land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity • Impacts on groundwater dependent ecosystems 	Chapter 2, 3, & 6 Chapter 6 Chapter 6 Chapter 2 Chapter 6 Chapter 2 Chapter 2 Chapter 2 Chapter 3	2-27 3-63 2-22 3-64 2-22 2-22 2-18 2-4 2-23 3-74

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
354.10		Notice and Communication	<ul style="list-style-type: none"> Description of beneficial uses and users List of public meetings GSP comments and responses Decision-making process Public engagement Encouraging active involvement Informing the public on GSP implementation progress 	Chapter 2	2-29 2-33 2-31 2-28 2-33
Article 5. Plan Contents, Subarticle 2. Basin Setting					
354.14		Hydrogeologic Conceptual Model	<ul style="list-style-type: none"> Description of the Hydrogeologic Conceptual Model Two scaled cross-sections Map(s) of physical characteristics: topographic information, surficial geology, soil characteristics, surface water bodies, source and point of delivery for imported water supplies 	Chapter 3 Chapter 3	3-1 Figures 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-10
354.14(c)(4)	10727.2(a)(5)	Map of Recharge Areas	<ul style="list-style-type: none"> Map delineating existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas 	Chapter 3	Figures 3-18
	10727.2(d)(4)	Recharge Areas	<ul style="list-style-type: none"> Description of how recharge areas identified in the plan substantially contribute to the replenishment of the basin 	Chapter 3	3-43
354.16	10727.2(a)(1) 10727.2(a)(2)	Current and Historical Groundwater Conditions	<ul style="list-style-type: none"> Groundwater elevation data Estimate of groundwater storage Seawater intrusion conditions Groundwater quality issues Land subsidence conditions Identification of interconnected surface water systems Identification of groundwater-dependent ecosystems 	Chapter 3	3-52 3-62 3-63 3-64 3-69 3-72 3-74

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
354.18	10727.2(a)(3)	Water Budget Information	<ul style="list-style-type: none"> Description of inflows, outflows, and change in storage Quantification of overdraft Estimate of sustainable yield Quantification of current, historical, and projected water budgets 	Chapter 3	3-74 3-98 3-99 3-88, 3-98
	10727.2(d)(5)	Surface Water Supply	<ul style="list-style-type: none"> Description of surface water supply used or available for use for groundwater recharge or in-lieu use 		
354.20		Management Areas	<ul style="list-style-type: none"> Reason for creation of each management area Minimum thresholds and measurable objectives for each management area Level of monitoring and analysis Explanation of how management of management areas will not cause undesirable results outside the management area Description of management areas 	Chapter 3	3-99
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria					
354.24		Sustainability Goal	<ul style="list-style-type: none"> Description of the sustainability goal 	Chapter 5	
354.26		Undesirable Results	<ul style="list-style-type: none"> Description of undesirable results Cause of groundwater conditions that would lead to undesirable results Criteria used to define undesirable results for each sustainability indicator Potential effects of undesirable results on beneficial uses and users of groundwater 	Chapter 5	
354.28	10727.2(d)(1) 10727.2(d)(2)	Minimum Thresholds	<ul style="list-style-type: none"> Description of each minimum threshold and how they were established for each sustainability indicator Relationship for each sustainability indicator Description of how selection of the minimum threshold may affect beneficial uses and users of groundwater Standards related to sustainability indicators How each minimum threshold will be quantitatively measured 	Chapter 5	

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
354.30	10727.2(b)(1) 10727.2(b)(2) 10727.2(d)(1) 10727.2(d)(2)	Measurable Objectives	<ul style="list-style-type: none"> Description of establishment of the measurable objectives for each sustainability indicator Description of how a reasonable margin of safety was established for each measurable objective Description of a reasonable path to achieve and maintain the sustainability goal, including a description of interim milestones 	Chapter 5	
Article 5. Plan Contents, Subarticle 4. Monitoring Networks					
354.34	10727.2(d)(1) 10727.2(d)(2) 10727.2(e) 10727.2(f)	Monitoring Networks	<ul style="list-style-type: none"> Description of monitoring network Description of monitoring network objectives Description of how the monitoring network is designed to: demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features; estimate the change in annual groundwater in storage; monitor seawater intrusion; determine groundwater quality trends; identify the rate and extent of land subsidence; and calculate depletions of surface water caused by groundwater extractions Description of how the monitoring network provides adequate coverage of Sustainability Indicators Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends Scientific rationale (or reason) for site selection Consistency with data and reporting standards Corresponding sustainability indicator, minimum threshold, measurable objective, and interim milestone Location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies 	Chapter 4	4-1 4-1

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
354.36		Representative Monitoring	<ul style="list-style-type: none"> Description of representative sites Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators Adequate evidence demonstrating site reflects general conditions in the area 	Chapters 4 and 5	4-1
354.38		Assessment and Improvement of Monitoring Network	<ul style="list-style-type: none"> Review and evaluation of the monitoring network Identification and description of data gaps Description of steps to fill data gaps Description of monitoring frequency and density of sites 	Chapters 4 and 5	
Article 5. Plan Contents, Subarticle 5. Projects and Management Actions					
354.44		Projects and Management Actions	<ul style="list-style-type: none"> Description of projects and management actions that will help achieve the basin’s sustainability goal Measurable objective that is expected to benefit from each project and management action Circumstances for implementation Public noticing Permitting and regulatory process Time-table for initiation and completion, and the accrual of expected benefits Expected benefits and how they will be evaluated How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included. Legal authority required Estimated costs and plans to meet those costs Management of groundwater extractions and recharge 	Chapter 6	
354.44(b)(2)	10727.2(d)(3)		<ul style="list-style-type: none"> Overdraft mitigation projects and management actions 	Chapter 6	

Table 1-1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) in the GSP	Page Number(s) in the GSP
Article 8. Interagency Agreements					
357.4	10727.6	<p>Coordination Agreements – Shall be submitted to the Department together with the GSPs for the basin and, if approved, shall become part of the GSP for each participating Agency.</p>	<p>Coordination Agreements shall describe the following:</p> <ul style="list-style-type: none"> • A point of contact • Responsibilities of each Agency • Procedures for the timely exchange of information between Agencies • Procedures for resolving conflicts between Agencies • How the Agencies have used the same data and methodologies to coordinate GSPs • How the GSPs implemented together satisfy the requirements of SGMA • Process for submitting all Plans, Plan amendments, supporting information, all monitoring data and other pertinent information, along with annual reports and periodic evaluations • A coordinated data management system for the basin • Coordination agreements shall identify adjudicated areas within the basin, and any local agencies that have adopted an Alternative that has been accepted by the Department 	Appendices	