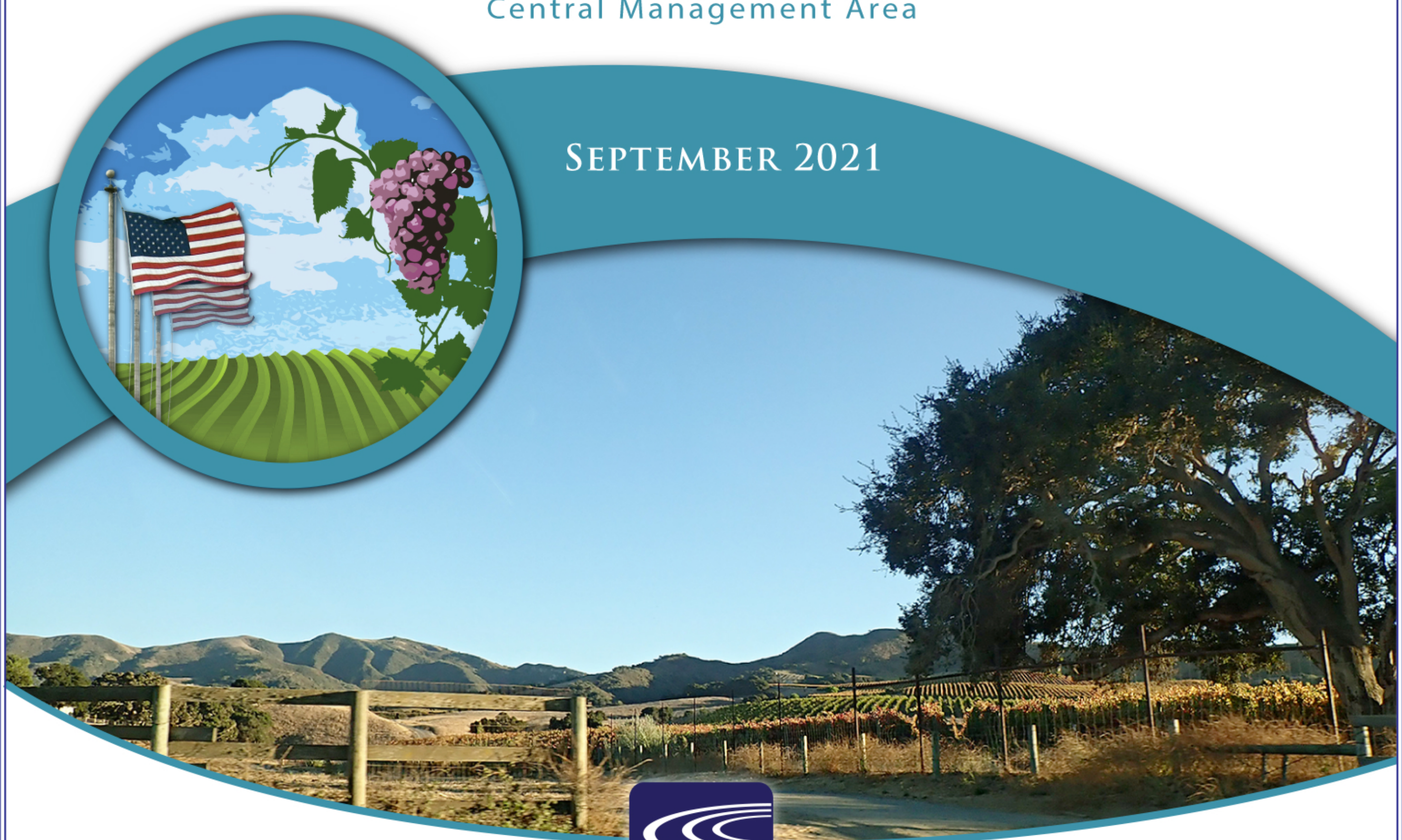
Public Draft

Groundwater Sustainability Plan
for the
Santa Ynez River Valley Groundwater Basin
Bulletin 118 Basin No. 3-15
Central Management Area
Groundwater Sustainability Agency

CMA
Central Management Area

September 2021



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DUDEK

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COVER PHOTOGRAPHS

Front Cover: Grapes and Flags, graphics produced as alternative logo for the Central Management Area and photo of Central Management Area Field taken October 22, 2019.

Back Cover: Photo of boundary of Western Management Area and Central Management Area taken October 22, 2019.

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SANTA YNEZ RIVER VALLEY GROUNDWATER BASIN

CENTRAL MANAGEMENT AREA

Groundwater Sustainability Plan

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LIST OF ACRONYMS AND ABBREVIATIONS

3D	three-dimensional
AEM	Airborne Electromagnetic
AF	acre-feet
AFB	Air Force Base
AFY	acre-feet per year
AGR	Agriculture Supply
ANA	Above Narrows Account
Basin	Santa Ynez River Valley Groundwater Basin
BCM	Basin Characterization Model
BLM	Bureau of Land Management
BMP	Best Management Practices
CAG	Citizen Advisory Group
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CCRWQCB	Central Coast Regional Water Quality Control Board
CCTAG	Climate Change Technical Advisory Group
CCWA	Central Coast Water Authority
CEQA	California Environmental Quality Act
CFS	cubic feet per second
CGPS	Continuous Global Positioning System
CIMIS	California Irrigation Management Information System
CMA	Central Management Area
COMB	Cachuma Operation and Maintenance Board
CRCD	Cachuma Resource Conservation District
CSOB	County of Santa Barbara
CSD	Community Services District
CTA	Conservation Technical Assistance
CWC	California Water Code

DACs	Disadvantaged Communities
DBID	Database Identification Number
DDW	Division of Drinking Water
DMS	Data Management System
DO	Dissolved Oxygen
DPS	Distinct Population Segment
DRINC	Drinking Water Information Clearinghouse
DWR	Department of Water Resources
EIR	Environmental Impact Report
EMA	Eastern Management Area
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ET	Evapotranspiration
FY	Fiscal Year (July 1 through June 30)
GAMA	Groundwater Ambient Monitoring Assessment
GC	Groundwater Conditions
GCM	Global Circulation Model
GDE	Groundwater Dependent Ecosystem
GPM	gallons per minute
GPS	Global Positioning System
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
HCM	Hydrogeologic Conceptual Model
HUC	Hydrologic Unit Codes
ID No.1	Improvement District No. 1
ILRP	Irrigated Lands Regulatory Program
IND	Industrial Service Supply
InSAR	Interferometric Synthetic Aperture Radar
IRWM	Integrated Regional Water Management
LSYR	Lower Santa Ynez River

LUST	Leaking Underground Storage Tanks
M&I	Municipal and Industrial
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MOU	Memorandum of Understanding
MUN	Municipal and Domestic Supply
MWC	Mutual Water Company
NCCAG	Natural Communities Commonly Associated with Groundwater
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCE	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OEP	Outreach and Engagement Plan
OWTS	In-site Wastewater Treatment System
PCPD	per capita per day
PROC	Industrial Process Supply
RWQCB	Regional Water Quality Control Board
SBCAG	Santa Barbara County Association of Governments
SBCFCWCD	Santa Barbara County Flood Control and Water Conservation District
SBCWA	Santa Barbara County Water Agency
SDWIS	Safe Drinking Water Information System
SFB	Space Force Base
SGMA	Sustainable Groundwater Management Act
SMCL	Secondary Maximum Contaminant Level
SSC	Species of Special Concern
SWGP	Stormwater Grant Program
SWP	State Water Project
SWRCB	State Water Resources Control Board
SYRA	Santa Ynez River Alluvium
SYRVGB	Santa Ynez River Valley Groundwater Basin

SYRWCD	Santa Ynez River Water Conservation District
TDS	Total Dissolved Solids
USBR	United State Bureau of Reclamation
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USP	United States Penitentiary
UWMA	Urban Water Management Act
UWMP	Urban Water Management Plan
VAFB	Vandenberg Air Force Base
VSFB	Vandenberg Space Force Base
WDR	Waste Discharge Requirement
WMA	Western Management Area
WQO	Water Quality Objective
WR	Water Rights Order
WY	Water Year (October 1 through September 30)
µg/L	micrograms per liter

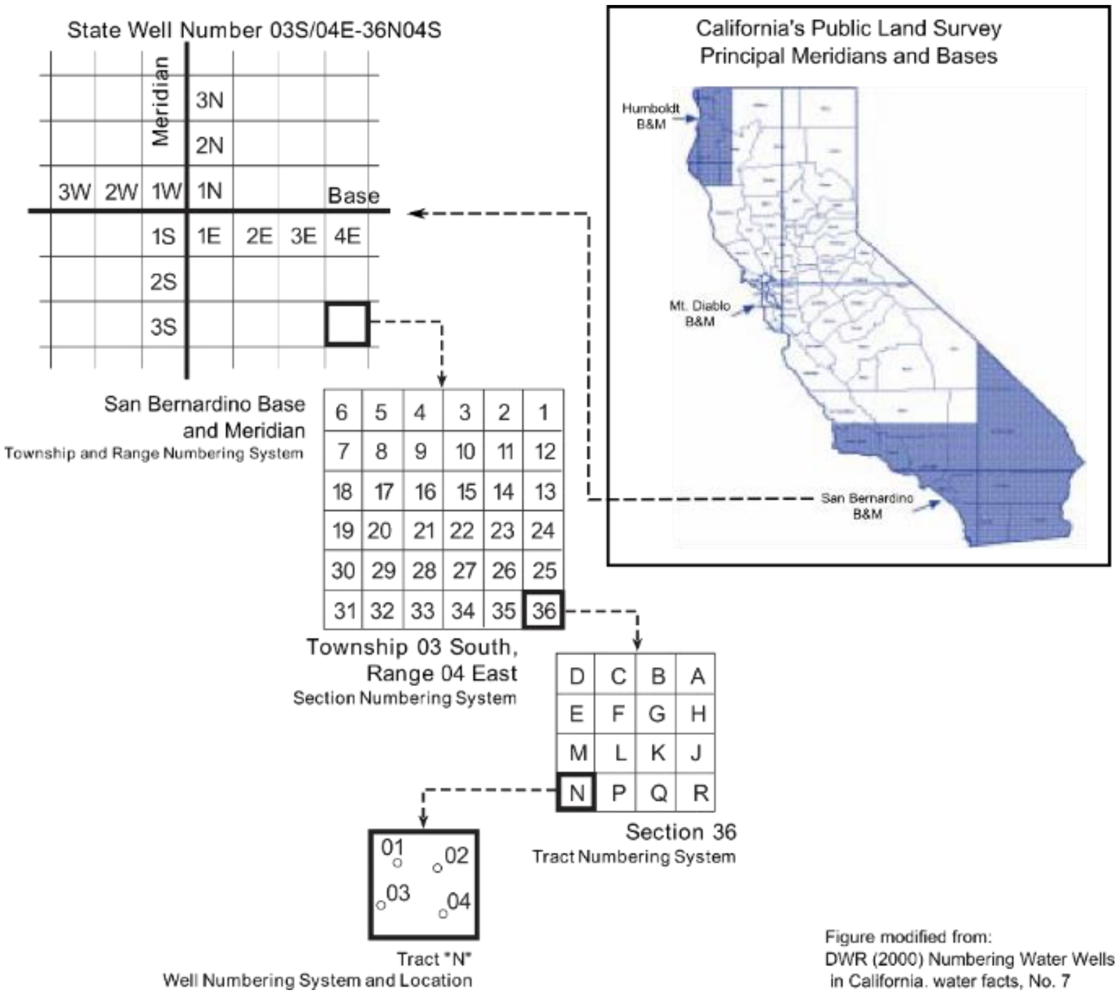
GEOLOGIC UNITS:

QG	Geologic Unit, River Channel Deposits
QAL	Geologic Unit, Younger Alluvium
QOS	Geologic Unit, Older Dune Sands
QOA	Geologic Unit, Terrace Deposits / Older Alluvium
QO	Geologic Unit, Orcutt Sand
QTP	Geologic Unit, Paso Robles Formation
TCA	Geologic Unit, Careaga Sand
TF	Geologic Unit, Foxen Formation
TSQ	Geologic Unit, Sisquoc Formation
TM	Geologic Unit, Monterey Formation

WELL NUMBERING DESCRIPTION

Wells in Santa Ynez River Valley Groundwater Basin have a unique State Well Number assigned by the California Department of Water Resources based on the public land grid, and includes the township, range, and section in which the well is located. Each section is further subdivided into sixteen 40-acre tracts, which are assigned a letter designation as shown below. All wells in Santa Ynez use the San Bernardino (“S”) base line and meridian, so this letter is generally omitted. Lands not part of the Bureau of Land Management Cadastral survey, such as Mexican Land grants land map are interpolated from other sources. In maps and in texts monitoring wells by their section, tract, and well number, following the United States Geologic Survey (USGS) convention for abbreviation. If the township and range are otherwise made obvious, the well may be shortened further to section, track, and well numbers. Occasional exceptions to this naming scheme are made for wells drilled or used for other purposes.

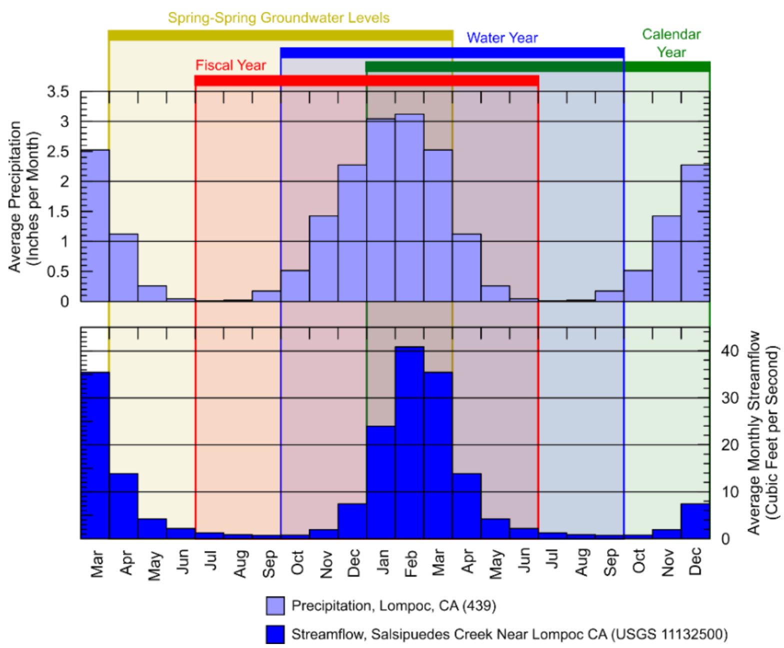
The USGS 15-digit well number based on degrees, minutes, and seconds of latitude (6 digits) and longitude (7 digits) and sequential number (2 digits) are also shown on wells that are part of the USGS databases. Finally, a 4-digit unique database identification number (DBID) is used in the database management system to connect well information from various sources.



California Department of Water Resources' Numbering System for Water Wells

WATER YEAR DESCRIPTION

Several different year time periods are used in managing Santa Ynez River Valley Groundwater Basin water resources: Water Year, Calendar Year, Fiscal Year and Water Year (District), and Spring-Spring Groundwater measurements. For the Sustainable Groundwater Management Act Water Years are October 1st to September 30th, (CWC Section 10721(aa)) which combines early winter months in with the remainder of the winter, better dividing the year on a seasonal basis. Calendar Years are the traditional and commonly used January 1st to December 31st year, which starts near the winter solstice. The Santa Ynez River Water Conservation District (SYRWCD) Fiscal Year and Water Year (CWC Section 75507(a)) from July 1st to June 30th is used, which breaks the year during the low summer precipitation months. Annual spring high groundwater levels run from March-March. Finally, the Santa Barbara County Flood Control District annual hydrology reports use a September 1st to August 31st reporting year. Figure below shows how most of these years line up against the average monthly precipitation at Lompoc, and the average monthly stream flow in Salsipuedes Creek at the stream gage.



- Water Year: October 1st to September 30th
- Calendar Year: January 1st to December 31st
- Fiscal Year/ Water Year (SYRWCD): July 1st to June 30th
- Spring-Spring Groundwater Levels: March to March

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EXECUTIVE SUMMARY

ES Abstract

This Groundwater Sustainability Plan (GSP) is prepared in accordance with the 2014 Sustainable Groundwater Management Act (SGMA) and covers the Central Management Area (CMA) of the Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB) located in coastal central California. There is one principal aquifer in the CMA: the Buellton Aquifer which covers the Buellton Upland and the older formations that lie under the Santa Ynez River alluvium near the City of Buellton. The Santa Ynez River is the primary surface water source within the Basin. The subflow of the Santa Ynez River is considered part of the river flow and is managed as surface water pursuant to the administrative authority and jurisdiction of the State Water Resources Control Board (SWRCB) over waters flowing in known and definite channels. The analyses conducted for this GSP indicate that current Basin conditions are sustainable and no undesirable results (defined as significant and unreasonable impacts to sustainability indicators) are occurring. Potential undesirable results have been identified and specific minimum thresholds have been developed to help ensure that undesirable results do not occur under future conditions. Potential project operations and management actions designed to maintain and improve groundwater conditions and sustainability have been identified and are described within this GSP.

ES Chapter 1: Introduction

ES Introduction, Agency, and Communication (GSP Sections 1a, 1b, 1c)

SGMA requires that the Basin develop one or more GSPs that outline how the Basin will achieve groundwater sustainability by 2042. Physical and political complexities within the Basin resulted in decisions by local public agencies to develop three GSPs under a coordination agreement to satisfy SGMA requirements for the entire Basin. The Western, Central, and Eastern Management Areas (WMA, CMA, and EMA) make up the Basin. This GSP is prepared to address the SGMA requirements for the CMA portion of the Basin.

The primary sustainability goal and purpose of these GSPs are to manage groundwater resources in the WMA, CMA, and EMA without causing undesirable results and facilitate long-term beneficial uses of groundwater within the Basin. Beneficial uses of groundwater in the Basin include municipal, domestic, and agricultural uses, in addition to riparian habitat that supports environmental ecosystems.

In 2016 and 2017, three local Groundwater Sustainability Agencies (GSA) were established for the Basin. Three GSA-eligible public entities ratified an agreement and formed the CMA GSA, with each of the public entities having a seat on the CMA GSA Committee. Two of the three member agencies, the City of Buellton and the Santa Ynez River Water Conservation District both have voting seats on the Committee, whereas the Santa Barbara County Water Agency has a non-voting seat.

During the development of this GSP the CMA GSA committee met regularly on SGMA matters. The GSA developed an Outreach and Engagement Plan to facilitate engagement with stakeholders. A volunteer public Citizens Advisory Group (CAG) was created with members representing a group of groundwater users to help solicit public feedback on GSP elements. Newsletters and press releases about the GSA and SGMA were created and distributed through numerous channels, including utility bills. All three management areas used a centralized website to aid with communications, tracking meetings, and receiving public comments.

ES Plan Area (GSP Section 1d)

The Basin is a coastal groundwater basin measuring approximately 317 square miles, located in Santa Barbara County, California. Each of the three management areas of the Basin is covered by a GSP; this GSP is for the CMA, which is approximately 32.8 square miles. The CMA itself is divided into two subareas based on hydrogeology and topography: the Buellton Upland which are relatively steep topography, and the Santa Ynez River Alluvium which consists of the relatively flat area cut by the historical movements of the Santa Ynez River. The Santa Ynez River Alluvium is the subflow area, and the subflow of the River in that area is not groundwater as defined by SGMA and thus is not be managed by the CMA GSA, because such subflow constitutes subterranean water flowing in known and definite channels that is treated as surface water and subject to the jurisdiction and management of SWRCB.

Approximately 95% of the CMA is privately held land. There is Federal Bureau of Land Management land, State California Wildlife Conservation Board land, as well as local cities, school districts, and other district properties.

The public water agencies in the CMA are the City of Buellton Water Department, and there are several small Mutual Water Companies (MWC) which supply water outside of the city. The Central Coast Water Authority (CCWA), a wholesale water agency, operates a water pipeline that passes through the CMA and conveys imported water primarily from the State Water Project to the City of Buellton within the CMA.

Population data for communities within the CMA indicate that most people live near or within the City of Buellton or along the highway 246 corridor.

There are three General Plans, or equivalent plan areas, outlining land use in the CMA. The City of Buellton has a General Plan within its jurisdiction. The Santa Ynez Valley Community Plan is a specific General Plan from the County of Santa Barbara for the area around the city. The entire CMA is within the general plan area of the County of Santa Barbara.

ES 4 Additional GSP Elements (GSP Section 1e)

A data management system was implemented for this GSP in accordance with the SMGA. As part of its communications and public outreach, the CMA GSA prepared and distributed the Data Management Plan, a whitepaper describing the data management system. The DMS was then implemented.

ES Chapter 2: Basin Setting

ES Hydrogeologic Conceptual Model (GSP Section 2a)

A hydrogeologic conceptual model was developed and used to identify existing and projected groundwater conditions for the Basin. The hydrogeologic conceptual model presents the various conceptual components of the CMA's groundwater system, including the geologic setting; aquifer extents; physical properties, including water imports; and land use.

The geologic setting is related to the northward movement of the Pacific Plate relative to the North America Plate. Groundwater is found in younger geologic formations that have been uplifted and deformed into a large syncline fold. The Santa Ynez River has cut through and filled in the existing geology. Alluvium subareas are where the Santa Ynez River cut into underlying non-water bearing units causing a 'bedrock channel,' which limits groundwater flow. The definable bottom and lateral extents of the Basin were determined using the three-dimensional geologic model included in the hydrogeologic conceptual model. For groundwater management purposes one principal aquifer, the Buellton Aquifer, was defined as the principal formation in the Buellton Upland subarea, and the lower non-alluvial formation in the Santa Ynez River Alluvium (SYRA) subarea. The SYRA subarea consists of upper alluvial formations in a bedrock channel that convey the Santa Ynez River and the subflow of the river. Accordingly, the Santa Ynez River and its subflow are managed by the SWRCB.

The topography of the CMA is varied with low hills with steep canyons in the north and a relatively flat plain towards the south around the Santa Ynez River. Rainfall is highly influenced by local topography. However, local slope and soil types influence runoff and the amount of potential recharge to the aquifers in any particular location.

Since 1997, the CCWA has delivered State Water Project water to the Basin through the 130 mile long Coastal Branch Pipeline that enters the Basin at Vandenberg Space Force Base and terminates at Lake Cachuma. State Project Water deliveries from the pipeline are received by the City of Buellton in the CMA. Other water from this pipeline is delivered to ID No.1, City of Solvang, and Lake Cachuma, east and upstream of the CMA. The Tecolote Tunnel conveys water from Lake Cachuma to the Santa Barbara County south coast including the cities of Santa Barbara, Goleta, Montecito, and Carpinteria. The Tecolote Tunnel was completed in 1955 and is the newest of three tunnels used for exporting Santa Ynez River water to the south coast of Santa Barbara County.

Groundwater within the CMA is primarily used for agriculture, which represents the largest proportion of land and water use within the Basin. Other uses of groundwater in the basin include municipal and light industrial, small domestic uses, and environmental uses, such as groundwater dependent ecosystems.

ES Groundwater Conditions (GSP Section 2b)

This GSP describes historical, existing, and projected groundwater conditions with regard to each of the six SGMA sustainability indicators including: the chronic lowering of groundwater levels, significant and unreasonable reduction of groundwater in storage, significant and unreasonable seawater intrusion, degraded water quality, land subsidence, and depletion of interconnected surface water.

Groundwater elevation data was collected from wells throughout the CMA, in both the seasonal high (spring) and seasonal low (fall) conditions. Groundwater contours were developed by interpolating between monitoring wells. Groundwater levels were plotted over time (hydrographs) were developed to show the change in groundwater elevation at each location over time to evaluate groundwater levels and groundwater storage.

Groundwater storage over time was compared against the year type and groundwater pumping: year type was found to be a primary influence on groundwater storage. To support this analysis, a quantitate method using flow at the Salsipuedes Creek measured by the U.S. Geologic Survey (USGS) streamflow gage is described which identify the qualitative “dry” and “wet” years.

Location of known potential groundwater contamination sites were identified. The responsibility of remediating groundwater is not under the jurisdiction of the GSA but lies with other state and local agencies. Assessments to beneficial users in the basin and an assessment of recent (2015-2018) groundwater quality data were made for six constituents identified by the SWRCB. The goal of the GSP is to ensure than groundwater quality is not further degraded by groundwater pumping managed under this GSP. As an inland management area seawater intrusion was not applicable, but is addressed by the coastal WMA GSP.

Land subsidence was determined to be unlikely due to the geologic setting of the CMA, and the nature of the aquifer. Recent remote sensing data provided by Department of Water Resources (DWR) from 2015 – present show very little change in land surface elevation. Additionally, historical infrastructure records do not indicate land subsidence.

In the CMA, interconnected surface water for both the Santa Ynez River and its tributaries to the Buellton Aquifer is unlikely given that there is little perennial surface water in the CMA. The Santa Ynez River is separated from the Buellton Aquifer by bedrock west of the Buellton Bend. The extent that the Buellton Aquifer underlies the Santa Ynez River and alluvial subflow deposits east of the Buellton Bend is a data gap that will be addressed during the first year of GSP implementation (see Chapter 5). However, the surface water of the Santa Ynez River within the CMA is directly influenced by releases from Cachuma Reservoir and by diversions via shallow wells in the alluvial subflow deposits, both of which are administered by the SWRCB.

Groundwater Dependent Ecosystems (GDEs) in the CMA were assessed using an assumed rooting depth and the current depth to groundwater. A map of the GDEs in the CMA was developed. Potential GDEs along the CMA upland tributaries were greater than 30 feet above the groundwater table and were screened out of consideration for future groundwater management. The exception being an isolated area near the confluence of Santa Rosa Creek and the Santa Ynez River mainstem, where groundwater levels are estimated to be within 30-feet of the ground surface. This area will be surveyed to evaluate the potential for GDEs. Potential GDEs along the Santa Ynez River are not considered vulnerable due to historically stable water levels, based on a review of previous studies done in the area. The stability may in part be due to the management of the Santa Ynez River under SWRCB Order 2019-148.

ES Water Budgets (GSP Section 2c)

Water budgets are calculations of the flows of water in and out of the various components of the Basin's surface water and groundwater systems. The various components of the water budget are introduced in the hydrogeologic conceptual model. Three water budget periods were created: historical, current, and projected. Water flows in any particular year are highly dependent on the weather, and to a lesser extent, the antecedent conditions. The selection of hydrologic years for each of the three budget periods was coordinated with the other two management areas (WMA and EMA).

The period of 1982 through 2018 was selected as the historical period. Stream flow along Salsipuedes Creek were used as a proxy for water supply conditions in the Basin. Flows during this historical period are similar to the long-term monitoring at the same gage, indicating that the years are likely representative of the long-term period. The years from 2012 to 2018 were all relatively dry years, so the current period was started in 2011. To meet the 50-year planning horizon required by SGMA, the projected period is 2018 through 2072.

The length of the historical water budget in this GSP is 36 years, which exceeds the 10-year SGMA requirement. For surface water, the average inflows were 100,200 acre-feet per year (AFY) and ranged from 4,570 to 724,710 AFY, with most of this variability influenced by the Santa Ynez River flows. Surface water outflows were on average 100,070 AFY and ranged from 7,085 to 710,805 AFY. Groundwater is less variable, with inflows ranging between 1,990 to 6,570 AFY, and an average inflow of 3,550 AFY. The two primary drivers of variability in groundwater were percolation from surface water and recharge from precipitation. Groundwater outflows ranged from 1,450 to 5,590 AFY with an average of 3,540 AFY. Agricultural pumping was the largest influence on groundwater flow and had the greatest variation over the historical period. The average annual pumping total of 2,760 AFY (Table 2c.2-5) for the historical period (1982 through 2018, 37 years) resulted in zero net change in groundwater storage in the Buellton Aquifer, so this water budget analysis indicates that the sustainable perennial yield of the CMA is approximately 2,800 AFY.

For the current period (2011 through 2018), surface water average inflows were 32,040 acre-feet per year (AFY) and ranged from 9,130 to 141,660 AFY, with most of this variability influenced by the Santa Ynez River flows. Surface water outflows were on average 32,040 AFY and ranged from 11,100 to 140,540 AFY. Groundwater is less variable for the current period, with inflows ranging between 2,150 to 4,160 AFY, and an average inflow of 2,810 AFY. For groundwater, the two primary drivers of variability were percolation from surface water and recharge from precipitation. Groundwater outflows ranged from 3,000 to 5,290 AFY, and an average of 4,170 AFY. Agricultural pumping was the largest influence on groundwater flow and had the greatest variation over this current period.

The projected period water budget estimates population increases, projected precipitation and climate change factors. However, population of the Buellton area is expected to grow by up to 45% over the 20-year planning period (by 2042), but water use is expected to grow by only 15%. Within the 50 year planning period (by 2072) the total water usage is expected to increase by 20%. Groundwater demand is expected to increase from 3,015 AFY in 2018 to 3,198 AFY in 2042, and 3,328 AF in 2072. Projected water availability is expected to be relatively similar to historical conditions, which will likely result in a loss of groundwater storage, unless projects and management actions are undertaken to maintain sustainability.

ES Chapter 3: Monitoring and Sustainable Management Criteria

ES Monitoring Networks (GSP Section 3a)

The Monitoring Networks section of the GSP summarizes the parameters that were monitored in the Basin and identifies representative sites for monitoring for five applicable SGMA sustainability indicators. Seawater intrusion is not directly applicable to the non-coastal CMA.

Federal, state, and local monitoring networks are responsible for groundwater monitoring in the CMA, are described in this GSP. Prior to 2019 the United States Geological Survey (USGS) conducted groundwater level monitoring in the CMA and the entire Basin. Starting in 2019 the groundwater level monitoring was taken over by the Santa Barbara County Water Agency. The City of Buellton also collects groundwater levels in its wells. Estimates for groundwater storage rely on using the same network data.

Groundwater quality is currently monitored by two programs in the CMA:

- Public water system monitoring of drinking water sources by water suppliers as reported to Safe Drinking Water Information System; and
- Monitoring by commercial agriculture as part of the Irrigated Lands Regulatory Program.

Land subsidence is monitored using monthly remote sensing satellite data, which covers the entire CMA. Additionally, there is a continuous GPS (CGPS) station in the CMA, and the Central Coast Water Authority, which operates the State Water Project pipeline, has remote access to operators that can be contacted in the event of subsidence. The remote sensing tracks elevation change, while CGPS tracks elevation and horizontal movement. If a decline in land surface elevation is observed, a follow-up analysis would need to be conducted to determine whether the cause was subsidence from groundwater depletion.

Finally, two U.S. Geological Survey stream gages measure and record surface water flows, each within one mile of the CMA east and west boundaries. Monitoring of potential surface water depletion is performed by collecting groundwater levels in wells near the Santa Ynez River.

These existing monitoring networks were reviewed, and wells were selected from each based upon representativeness. Additionally, several areas were identified as locations where the network could be improved.

ES Sustainable Management Criteria (GSP Section 3b)

This section identifies the stainability goal of the Basin, conditions of undesirable results for each of the six SGMA sustainability indicators, Minimum Thresholds at the representative sites, and Measurable Objectives. These criteria are described below and summarized in **Table ES.1**.

Sustainability goals were identified as follows:

(1) Maintain long-term groundwater elevation at levels adequate to support existing and anticipated beneficial uses,

(2) Maintain a sufficient volume of groundwater in storage to ensure groundwater availability during periods of drought and recovery during wet climate conditions,

(3) Maintain water quality conditions to support ongoing beneficial use of groundwater for agricultural, municipal, domestic, and industrial and environmental uses.

For each of the five applicable SGMA sustainability indicators the potential undesirable result was identified. The potential undesirable result is determined, quantified based on the identification criteria, and the potential effects on beneficial users are described.

Undesirable results from chronic lowering of groundwater levels would result in beneficial well users' access to water being impaired. This impairment would require more energy to pump water and potential replacement of wells to access water. This undesirable result could occur if groundwater extractions exceed the sustainable yield over a period of years. Evaluation of this potential undesirable result will be based on direct measurements of groundwater levels.

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Table ES.1

Sustainable Management Criteria Indicator Summary for the CMA

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Chronic lowering of groundwater levels	Water level minimum thresholds for Representative Monitoring Wells (RMWs) screened in the Buellton Aquifer established 15 feet or more below the 2020 levels.	Groundwater elevations measured at 4 RMWs screened in the Buellton Aquifer.	Spring 2011 groundwater elevations.	Spring groundwater elevations that drop below the established groundwater elevation minimum thresholds in more than 50% of the RMWs for 2 consecutive non-drought years.
Reduction of groundwater in storage	Water level minimum thresholds for RMWs screened in the Buellton Aquifer established 15 feet or more below the 2020 levels.	Groundwater elevations are used a proxy for the total volume of groundwater in storage. Groundwater elevations will be measured at 4 RMWs screened in the Buellton Aquifer	Spring 2011 groundwater elevations.	Spring groundwater elevations that drop below the established groundwater elevation minimum thresholds in more than 50% of the RMWs for 2 consecutive non-drought years.
Seawater Intrusion	Not applicable: non-coastal management area	Not applicable.	Not applicable.	Not applicable.
Degraded Water Quality	For all constituents except Nitrate and Total Dissolved Solids (TDS), minimum threshold concentrations were established as the Water Quality Objectives by RWQCB. Nitrate minimum threshold concentration established at the drinking water Maximum Contaminate Level (MCL), and TDS is the drinking water Secondary Maximum Contaminate Level (SMCL).	Salt and nutrient concentrations measured at 7 RMWs.	For Nitrate and TDS: the MCL and SMCL. Other constituents: Median Groundwater Quality Objectives.	Minimum threshold exceedances for each constituent in more than 50% of the RMWs for 2 consecutive non-drought years.
Subsidence	A decline of six inches from 2015 land surface elevation resulting from groundwater extractions.	Review of publicly available land subsidence satellite data and continuous GPS data.	Land subsidence less than two inches compared to the 2015 InSAR data.	Land subsidence associated with groundwater production that exceeds half a foot from 2015 conditions.
Depletion of interconnected surface water	Groundwater Elevations near the Santa Ynez River that drop 15 feet or more below the Santa Ynez River channel bottom.	Groundwater elevations measured at three RMWs.	Groundwater elevations equal to five feet below the elevation of the Santa Ynez River channel bottom.	Groundwater elevations near the Santa Ynez River that drop 15 feet or more below the channel bottom in 2 of the 3 surface water depletion RMWs for 2 consecutive non-drought years.

RMW = Representative monitoring wells; RWQCB = Regional Water Quality Control Board; MCL =maximum contaminate level; SMCL = secondary maximum contaminate level; TDS = total dissolved solids; GPS = Global Positioning System; InSAR = Interferometric synthetic aperture radar; mg/L = milligrams per liter

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The potential undesirable result from chronic lowering of groundwater levels is less water available for beneficial users using existing infrastructure. This impairment would require more energy to pump water and potential replacement of wells to access water. This undesirable result could occur if groundwater extractions exceed the sustainable yield over a period of years. Evaluation of this potential undesirable result will be based on direct measurements of groundwater levels.

Groundwater storage is the volume of water that is stored in an aquifer. The potential undesirable result of a decline in groundwater storage is less water available for beneficial users, meaning that the water is physically not present to be extracted. As with groundwater levels, groundwater storage is related to pumping and other outflows exceeding the amount of water inflows into the groundwater basin over a period of years. Groundwater storage will be estimated using the groundwater elevation data to assess the volume of water involved.

In the CMA there is no direct potential undesirable result from seawater intrusion.

Potential undesirable results from degradation of water quality is impaired beneficial uses of the groundwater. To assess water quality, specific salts and nutrients are chosen for analysis. Specifically, concentrations of total dissolved solids, chloride, sulfate, boron, sodium, and nitrate.

Potential undesirable results due to land subsidence may include damage to surface infrastructure and collapsed pore space in the aquifers. Land-surface elevation changes are quantified by a remote sensing (satellite) system which uses interference patterns between radar returns to accurately calculate changes in elevation over a wide region.

The potential undesirable results related to depletions in interconnected surface water may result in impacts to groundwater dependent ecosystems. The Santa Ynez River and River alluvium are under the jurisdiction of the SWRCB. The SWRCB retains administrative authority over the surface flow and subflow of the Santa Ynez River, including wells that divert the subflow. Depletions in interconnected surface water are evaluated by assessing water levels in potential GDE areas.

With each of the six potential undesirable results described above, specific minimum thresholds were determined to protect against the potential undesirable results. For groundwater levels, minimum thresholds were based on well screen elevations and historical low groundwater levels. For groundwater storage, minimum thresholds are based on the number of wells that met the groundwater level criteria. Minimum thresholds for water quality are based on Water Quality Objectives from the SWRCB. The land subsidence minimum threshold six inches or less relative to the 2015 elevations. Minimum thresholds for interconnected surface water will be monitored by measured water level elevations in nearby wells at or above historical low water levels and within 15 feet of the elevation of the river channel bottom.

Quantifiable goals for the maintenance or improvement of the Basin were identified as the measurable objectives. Groundwater elevations pre-drought conditions (i.e., Spring 2011) were identified as the measurable objective for groundwater levels and storage. No decline in water quality relative to 2015 was set for water quality. Less than two inches of land subsidence since 2015 was set for land subsidence. Finally, to protect surface water, nearby groundwater levels no lower than 5 feet below the local river channel bottom was set as the measurable objective.

Impacts of setting these management criteria on neighboring groundwater basins is expected to be minimal as the CMA is not directly connected to neighboring groundwater basins.

ES Chapter 4: Projects and Management Actions (GSP Section 4)

Projects and Management actions (PMAs) will be implemented to maintain groundwater sustainability in the CMA. The PMAs are categorized into four groups based on when each PMA would be implemented. Group 1 PMAs would be initiated within the first year after GSP submittal. Group 1 Management Actions such as water conservation, tiered pumping fees and the installation of well meters are anticipated to close any shortfalls in maintaining the sustainable yield identified in the water budget and maintain sustainability goals. Additional Group 1 PMAs will increase water supplies further such as increased recharge through stormwater capture and supplemental imported water projects.

If Group 1 PMAs fail to have the expected results, then further actions through the implementation of other PMA groups 2, 3, and 4 will be required. PMAs in Group 2 and 3 will be implemented when the early warning and Minimum Threshold triggers for the sustainability indicators are reached.

The CMA GSA is taking an adaptive management approach to CMA management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to achieve the sustainability goal in the CMA and Basin. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

ES Chapter 5: Implementation (GSP Section 5)

This chapter describes actions to implement this GSP. Five implementation categories are described.

Implementation Group 1 is completion of work started during the drafting of this GSP. This is completion of data collection and survey work that commenced during the development of this GSP. This includes surveying all representative wells in the representative monitoring network. Additionally, data collected during the SkyTEM Airborne Geophysics aerial electromagnetic survey will be evaluated and used to update the existing geologic model, hydrogeologic conceptual model and numeric groundwater model.

Implementation Group 2 resolves data gaps in the monitoring network and the conceptual framework as identified in this GSP. This includes determining information about monitoring wells that currently have no well perforation information by video surveying and sounding, and working with landowners on adding voluntary wells to the water level and quality monitoring network. A new piezometer will also be needed to assess and monitor a potential GDE on Santa Rosa Creek. A new surface water gage at the mouth of the Santa Ynez River is also considered.

Implementation Group 3 implementation items are data collection actions to allow for improved management of the CMA. Efforts to improve data collection information on water use in the Basin will be done, including the collection of additional information from well owners. In addition, the GSA will require the installation of water meters on all wells (excluding *de minimis* domestic wells).

Implementation Group 4 and Implementation Group 5 is improved data management and SGMA updates. The former consists of update and utilized the data management system, the latter is completing SGMA annual reports (first due in 2022) and 5-year assessment and updates to the GSP (first due in 2027) will be done as required by SGMA.

CHAPTER 1: INTRODUCTION AND PLAN AREA

Section 1 A – INTRODUCTION

The Sustainable Groundwater Management Act (SGMA)[1], signed into statue on September 16, 2014, includes a structure and schedule to achieve sustainable groundwater management within 20 years. SGMA requires that groundwater basins identified by the California Department of Water Resources (DWR), as medium and high priority basins must achieve sustainability by January 31, 2042. To meet this goal, State law requires the creation and implementation of a Groundwater Sustainability Plan (GSP) for each basin. The Santa Ynez River Valley Groundwater Basin (SYRVGB), defined by DWR as Basin 3-15 (DWR 2016), is classified as a medium priority groundwater basin and requires submittal of a GSP by January 31, 2022

Local agencies recognized that the 317.4 square miles of the SYRVGB contains diverse physical and human geographies, resulting in the creation and coordination of three distinct management areas within the SYRVGB. The three distinct areas are defined as the Eastern, Central and Western Management Areas. This document is the GSP for the Central Management Area (CMA) portion of the SYRVGB (**Figure 1a.1-1**).

The CMA Groundwater Sustainability Agency (GSA) is responsible for preparing and implementing a GSP for the Central portion of the SYRVGB. Two additional GSPs are being prepared for the Western Management Area (WMA) and the Eastern Management Area (EMA). The three GSAs are being coordinated by the Santa Ynez River Water Conservation District.

The CMA GSA was formed by a Memorandum of Agreement (MOA) between the City of Buellton, the Santa Ynez River Water Conservation District and Santa Barbara County **(Figure 1a.3-1**). The CMA filed a notice of intent to form a GSA with the DWR and became the exclusive GSA for the CMA on February 2, 2017.

1 CWC Section 10720 et seq. and 23 CCR § 350 et seq.

The CMA encompasses approximately 33 square miles of the central portion of the Santa Ynez River Valley Groundwater Basin. The CMA has a complex geology and geography and is divided into two subareas: the Buellton Upland and the Santa Ynez River alluvium.

Table 1a.1-1 identifies the Management Areas of the Santa Ynez River Valley Groundwater Basin. Locations for each Management Area are shown in Figure 1a.3-1.

Table 1a.1-1
Management Areas of the Santa Ynez River Valley Groundwater Basin

Management Area	Physical Description	Committee Member Agencies
CMA Santa Ynez River Valley Groundwater Basin Central Management Area Groundwater Sustainability Agency	32.8 square miles • Santa Ynez River alluvium east of Santa Rosa Park to just west of the City of Solvang • Buellton Upland	• City of Buellton • Santa Ynez River Water Conservation District • Santa Barbara County Water Agency (non-voting member)
WMA Santa Ynez River Valley Groundwater Basin Western Management Area Groundwater Sustainability Agency	133.7 square miles • Santa Ynez River alluvium west of Santa Rosa Park to the Lompoc Narrows • Lompoc Plain • Lompoc Terrace • Burton Mesa • Lompoc Upland • Santa Rita Upland	• City of Lompoc • Vandenberg Village Community Services District • Mission Hills Community Services District • Santa Ynez River Water Conservation District • Santa Barbara County Water Agency (non-voting member)
EMA Santa Ynez River Valley Groundwater Basin Eastern Management Area Groundwater Sustainability Agency	150.9 square miles • Santa Ynez River alluvium from City of Solvang east • Santa Ynez Upland	• City of Solvang • Santa Ynez River Water Conservation District, Improvement District No.1 • Santa Ynez River Water Conservation District • Santa Barbara County Water Agency

1a.1 PURPOSE OF THE GROUNDWATER SUSTAINABILITY PLAN

The purpose of this GSP is to ensure that groundwater is managed sustainably within the groundwater basin. The GSP must also determine how the basin will achieve sustainable groundwater management within a 20-year period through monitoring and management actions.

The sustainability goal for the Santa Ynez River Valley Groundwater Basin is to manage groundwater resources in the WMA, CMA and EMA for the purpose of facilitating long-term beneficial uses of groundwater within the Basin. Beneficial uses of groundwater in the Basin include municipal, domestic, and agricultural and environmental supply. The sustainability goal is in part defined by the locally-defined minimum thresholds and undesirable results. This GSP describes how the CMA GSA will maintain the sustainability of the Basin, and how the measures recommended in the GSP will achieve these objectives and desired conditions.

The California legislature identified the following specific goals that intended to be achieved as a result of the execution of the SGMA (California Water Code [CWC] Section 10710.2):

> In enacting this part, it is the intent of the Legislature to do all of the following:
>
> (a) To provide for the sustainable management of groundwater basins.
>
> (b) To enhance local management of groundwater consistent with rights to use or store groundwater and Section 2 of Article X of the California Constitution. It is the intent of the Legislature to preserve the security of water rights in the state to the greatest extent possible consistent with the sustainable management of groundwater.
>
> (c) To establish minimum standards for sustainable groundwater management.
>
> (d) To provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater.
>
> (e) To avoid or minimize subsidence.

(f) To improve data collection and understanding about groundwater.

(g) To increase groundwater storage and remove impediments to recharge.

(h) To manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner.

(i) To provide a more efficient and cost-effective groundwater adjudication process that protects water rights, ensures due process, prevents unnecessary delay, and furthers the objectives of this part.

1a.2 SUSTAINABLE MANAGEMENT INDICATORS

Sustainable conditions occur when undesirable results are mitigated, or are not occurring in the Basin. In accordance with SGMA[2] there are six potential undesirable results that must be considered. These potential undesirable results are listed below, and are discussed in detail in Section 3b of this GSP, which details Sustainable Management Criteria.

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon
2. Significant and unreasonable reduction of groundwater storage
3. Significant and unreasonable seawater intrusion
4. Significant and unreasonable degradation of water quality
5. Significant and unreasonable land subsidence
6. Depletion of interconnected surface water and groundwater that has significant and unreasonable adverse impacts on beneficial uses of the surface water.

This GSP is a tool developed by the GSA, within input from the public and a CMA Citizen Advisory Group (CAG), to support sustainable management of, and sustainable decision-making for, the CMA.

[2] CWC Section 10721 (x), 23 CCR § 354.28(c), 23 CCR § 354.34(c),

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1a.3 GROUNDWATER SUSTAINABILITY PLAN ORGANIZATION

This GSP was developed in accordance with SGMA and the DWR-prepared Best Management Practices (BMP) and Guidance Documents. The GSP is organized as outlined below in **Table 1a.3-1**, following SGMA regulations.[3] Figures and tables are organized, labeled, and numbered accordingly.

Table 1a.3-1
Organization of the Groundwater Sustainability Plan

Chapter	Section	Title	Short Description
ES	**Executive Summary**		Summarizes the contents of the report
1	**Introduction and Plan Area**		
	a	Introduction	Introduces Plan Purpose and Contents
	b	Administrative Information	Information about Agency and Governance
	c	Notices and Communication	Outreach and Engagement
	d	Plan Area	Extents and geography of the Management Area: Subareas, Water Agencies, Governments, Well Density, Regulatory Programs, Management Plans, Population, and Land Use Considerations
	e	Additional GSP Elements	Supplemental Plan Content
2	**Basin Setting**		
	a	Hydrogeologic Conceptual Model	Conceptual components of groundwater system: Geology, Aquifers, Inflows, Outflows
	b	Groundwater Conditions	Current and historical status of the Basin: Water Levels, Storage, Seawater Intrusion, Groundwater Quality, Land Subsidence, and Interconnected Surface Water
	c	Water Budget	Flow between components of the groundwater system: Historical, Current, and Projected
3	**Monitoring Network and Sustainable Groundwater Management Criteria**		
	a	Monitoring Network	Current and representative monitoring
	b	Sustainable Management Criteria	Sustainability goal, potential undesirable results, minimum thresholds, and measurable objectives
4	**Project and Management Actions**		Potential ways to improve sustainability as needed.
5	**Plan Implementation**		
	a	Implementation Projects	Projects and actions to resolve data gaps and implement the GSP.
	b	Implementation Timeline	Timeline of implementation projects.
	c	Plan Funding	Funding opportunities.
6	**References**		Works cited and relied upon.
7	**Appendices**		Supporting documents and analysis and public comments.

3 23 CCR Division 2 Chapter 1.5 Subchapter 2 Article 5. Plan Contents

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Section 2 B – ADMINISTRATIVE INFORMATION

2b.1 AGENCY BACKGROUND

The California Department of Water Resources (DWR) identified the SYRVGB as a medium priority basin (DWR 2020). As such the associated groundwater sustainability agency (GSA) must submit a GSP by January 31, 2022 to comply with the SGMA statute[4] and SGMA regulations[5]. Major organizational documents that supported the development of this GSP are shown in **Figure 1b.1-1**.

On May 23, 2016 SYRVGB public water agencies executed a Memorandum of Understanding (MOU) (Appendix 1b-A) which organized the SYRVGB according to three separate management areas, creating the CMA, WMA, and EMA. The Central Management Area Groundwater Sustainability Agency (CMA GSA) was formed after the "*Memorandum of Agreement for Formation of a Groundwater Sustainability Agency for the Central Management Area in the Santa Ynez River Valley Groundwater Basin*" (MOA) dated January 11, 2017 (Appendix 1b-B).

To adopt the MOA, ratification occurred by all three CMA member agencies. On November 10, 2016, the Buellton City Council passed Resolution 16-26 wherein the City of Buellton resolved to become a member of the CMA GSA in cooperation with the other CMA member agencies. On December 6, 2016, the Board of Supervisors for Santa Barbara County, serving as Santa Barbara County Water Agency (SBCWA) Directors, passed Resolution 16-284 wherein the SBCWA resolved to become a member of the CMA GSA in cooperation with the other CMA member agencies. On January 11, 2017, the Board of Directors for the Santa Ynez River Water Conservation District (SYRWCD) passed Resolution 665 wherein the SYRWCD resolved to become a member of the CMA GSA in cooperation with the other CMA member agencies.

The three GSAs for the SYRVGB have coordinated to ensure consistency between the three GSPs prepared in the Basin. The GSPs are being prepared under a SGMA compliant coordination agreement[6] as specified

4 CWC Section 10720 et seq.
5 23 CCR § 350 et seq.
6 CWC Section 10721 (d) "Coordination agreement" means a legal agreement adopted between two or more groundwater sustainability agencies that provides the basis for coordinating multiple agencies or groundwater sustainability plans within a basin pursuant to this part

in SGMA. The three SYRVGB GSAs have conferred on governance, starting with the MOU in 2016 followed by the "*Intra-Basin Administrative Agreement for Implementation of the SGMA in the Santa Ynez River Valley Groundwater Basin*" (Appendix 1b-C) dated February 26, 2020. The SYRVGB Coordination Agreement between the WMA, CMA, and EMA will be included as Appendix 1b-D.

1b.1-1 Organizational and Management Structure of the Central Management Agency

GSA Mailing Address

Central Management Area Groundwater Sustainability Agency
P.O. Box 719
Santa Ynez CA 93460

GSA Physical Address

Central Management Area Groundwater Sustainability Agency
3669 Sagunto St., Suite 101
Santa Ynez CA 93460

Plan Manager Contact Information

William J. Buelow, Water Resources Manager
Santa Ynez River Valley Groundwater Basin Central Management Area GSA
P.O. Box 719, 3669 Sagunto Street, Suite 108 | Santa Ynez, CA 93460
805-693-1156 | bbuelow@syrwcd.com

1b.1-2 Governance

Governance of the CMA GSA is described in the "*Memorandum of Agreement for Formation of a Groundwater Sustainability Agency for the Central Management Area in the Santa Ynez River Valley Groundwater Basin*" (Appendix 1b-B). The CMA GSA is governed by a committee of representatives from each member agency. However, votes are weighted. There are two voting committee members representing the SYRWCD and City of Buellton, and one non-voting committee member representing the

SBCWA. The SBCWA is represented by a person or persons as appointed by the Board of Supervisors for Santa Barbara County, serving as Water Agency Directors.

A quorum to transact business s requires both voting member agencies are present. To pass any proposition or resolution, a unanimous vote of both member agencies is required.

1b.1-3 Legal Authority

As part of its creation, the authorizing resolutions for the GSA Committee granted it authority to have all powers that a GSA is authorized to exercise as provided by the SGMA, including developing a GSP consistent with the Act and DWR's regulations and imposing fees to fund GSA and GSP activities (Appendix 1b-B).

As the sole GSA for the CMA, the CMA GSA has the legal authority to manage groundwater within the CMA pursuant to SGMA. As such, SGMA grants the CMA GSA broad powers, including: the legal authority to: conduct investigations; adopt rules, regulations, ordinances and resolutions; require registration of groundwater extraction facilities and measurement of groundwater extractions by a water-measuring device satisfactory to the GSA; enter into written agreements and funding with private parties to assist in, or facilitate the implementation of, a GSP or any elements of the GSP; provide for the measurement of groundwater extractions; regulate groundwater extractions; impose fees on the extraction of groundwater and to fund the costs of groundwater management; and perform any act necessary or proper to carry out the purposes of SGMA.[7]

In accordance with CWC Section 10720.5 (b) "*Nothing in this part, or in any groundwater management plan adopted pursuant to this, part determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.*" Accordingly, this GSP does not determine or alter such surface water or groundwater rights.

7 CWC Sections 10725, 10725.2, 10725.4, 10725.6, 10725.8, 10726.2, 10726.4, 10726.5, 10730, 10730.2

1b.1-4 Implementation and Costs

As plans related to implementation of specific projects are developed, the public will be provided opportunity to review and provide comments to the CMA GSA committee.

Pursuant to CWC Section 10730, the CMA GSA is authorized to fund the costs of groundwater management by imposing fees on the extraction of groundwater or through a parcel tax or fee. The CMA GSA committee in coordination with the other two GSAs in the Basin, are evaluating the type of fee they will use to fund implementation and future project and management actions.

The CMA GSA is funded by a cost sharing agreement between the two voting CMA member agencies develop a GSP and perform related studies as approved by the CMA GSA Committee. The SBCWA, as a non-voting member, is not responsible for any other costs related to the CMA GSP development. All member agencies are responsible for their own costs to attend and participate in the CMA GSA committee.

Future implementation of the CMA GSP is described Chapter 5 of this GSP. **Table 1b.1-1** is a summary of potential implementation costs of this GSP. These costs are anticipated to be funded through fees created by the GSA, and or cost-sharing between agencies. There may be opportunities to obtain implementation grants from the State of California.

Table 1b.1-1
Summary Implementation Costs to Manage CMA Groundwater

Implementation Projects			
Task	**Type**	**Completion**	**Additional Cost Estimates [A]**
Surveying Representative Wells	One Time	WY 2023	\$2,000 - \$4,000
SkyTEM Airborne Geophysics	One Time	WY 2023	Already funded
Video Logging and Sounding Wells	One Time	WY 2023	\$7,500 - \$12,000
Add new GWL Monitoring	One Time	WY 2023	\$8,000 - \$12,000
SW Gage Installation (planning)	One Time	WY 2023	GSA Overhead [B] (\$10,000)
Well Registration Update	One Time	FY 2023-2024	GSA Overhead [B] (\$20,000)
Well Metering Requirement	One Time	CY 2023	GSA Overhead [B] (\$20,000 - \$40,000)
Data Updates	Annual	Ongoing	\$10,000 - \$15,000
SMGA WY Annual Reports	Annual	Ongoing	\$30,000 - \$50,000 [D]

[A] Estimates are in 2021 dollars. Costs are to the GSP, certain tasks include mandates for well owners.
[B] Estimated as primarily GSA staff time to administer program.
[C] CMA portions assuming continuing cost share with WMA.
[D] Estimate for first year, mature report likely starting with third annual report, estimated as \$20,000 per year.

Projects and management actions that would improve sustainability and resilience of the CMA groundwater are discussed in Section 4a of this GSP. Several projects to improve sustainability that are recommended under all basin conditions are summarized in **Table 1b.1-2**. These costs are anticipated to be funded through the GSA fees, agency cost sharing and potentially State grants.

Table 1b.1-2
Sustainability Project and Management Actions: General Management Summary Costs for CMA

Sustainability Project and Management Action			
Project and Management Action	**Proposed Completion**	**Additional Cost Estimates [A]**	**Annual Implementation Costs [B]**
Water Conservation Plan	WY 2023	$50,000 - $75,000	$30,000 - $40,000
Tired Groundwater Extraction Plan	WY 2023	$100,000 - $175,000	GSA Overhead [C] ($40,000 - $50,000)
Supplemental Imported Water Program	WY 2023	$100,000 - $120,000	Need Dependent
Buellton Upland Bioretention Bioswale Network Project (Design and Benefits Study)	WY 2022	$25,000 - $35,000	Design Dependent Install Costs

[A] All estimates are in 2021 dollars. Costs are to the GSP, certain items may include costs to other parties.
[B] Actual implementation costs will depend on results of particular suitability project and management action.
[C] Estimated as primarily GSA staff time to administer program.

1b.2 INTRA-BASIN COORDINATION BETWEEN MANAGEMENT AREAS

SGMA statute requires that multiple GSAs coordinate when developing GSPs in a single groundwater basin, such as in the Santa Ynez River Valley Groundwater Basin with the WMA, CMA, and EMA. The SGMA statue (CWC Section 10727.6) states:

> When Multiple Plans Cover a Basin. Groundwater sustainability agencies intending to develop and implement multiple groundwater sustainability plans [...] shall coordinate with other agencies preparing a groundwater sustainability plan within the basin to ensure that the plans utilize the same data and methodologies for the following assumptions in developing the plan:
>
> (a) Groundwater elevation data.
>
> (b) Groundwater extraction data.
>
> (c) Surface water supply.
>
> (d) Total water use.
>
> (e) Change in groundwater storage.
>
> (f) Water budget.
>
> (g) Sustainable yield.

During the GSP development process the CMA GSA and WMA GSA shared the same consultant team and document prepares to ensure that the two plans used the same data and methodologies. To coordinate with the EMA GSA, numerous meetings and conference calls were held between the two consultant teams to coordinate activities in each management area so that the requirements for intra-basin coordination were met. As of September 1, 2021, the CMA consultant team met with the EMA consultant team for over 40 meetings or conference calls during development of the technical elements of the GSP. Additionally, CMA consultant team regularly attended the EMA GSA committee meetings to receive public updates on EMA activity.

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Section 1 C – NOTES AND COMMUNICATION

1c.1 Administration

The Central Management Area Groundwater Sustainability Agency (CMA GSA) was formed by the City of Buellton, the Santa Ynez River Water Conservation District, and the Santa Barbara County Water Agency. The CMA filed a notice of intent to form a GSA with the DWR and became the exclusive GSA for the CMA on February 2, 2017. Meetings of the CMA GSA Committee are called, noticed, and conducted subject to the provisions of the Ralph M. Brown Act (Govt. Code sections 54950 et seq.).

Appendix 1c-A includes a list of public meetings that have been held to date for the CMA GSA as well as meetings of the CMA Citizens Advisory Group (described below). In accordance with Governor of California issued Executive Orders N-25-20 and N-29-20, which temporarily waived requirements in the Bagley-Keene Act and Brown Act, meetings were convened during the SARS-CoV-2 (COVID-19) pandemic via video teleconference and phone. The Governor of California issued Executive Orders N-33-20 and California State Department of Public Health Order of March 19, 2020 required a stay-at-home directive. Additionally, Santa Barbara County Public Health, Health Officer Order No. 2020-12.5 prohibited all gatherings within the County. Appendix 1c-B includes the reference Proclamations, Executive Orders, Health Orders, and Health Officer Orders.

1c.1-1 Public Outreach and Engagement Plan

In February 2020, the CMA GSA prepared an Outreach and Engagement Plan (OEP) to provide individual stakeholders, stakeholder organizations, and other interested parties an opportunity to be involved in the development and evaluation of this GSP. The OEP, included as Appendix 1c-C of this GSP, describes the steps the CMA GSA has taken, and will continue to take, to encourage public involvement during the development and implementation phases of this GSP. The OEP includes a list of identified stakeholders as of 2020 and describes the methods the CMA GSA has used to identify additional stakeholders, solicit public involvement, and feedback, and consider stakeholder comments and concerns during the development of, and future implementation of, this GSP.

Table 1c.1-1 provides a summary of identified stakeholder categories in the CMA.

Table 1c.1-1
Stakeholder Categories in the CMA Plan Area

Category of Interest	Examples of Stakeholder Groups	Engagement Purpose
General Public	General public	Inform to improve public awareness of sustainable groundwater management
Land Use	County of Santa Barbara City of Buellton	Consult and involve to ensure land use policies are supporting GSP and vice-versa
Private Users	Domestic users	Inform and involve to avoid negative impact to these users
Urban/Agriculture/Recreational Users	City of Buellton Small mutual water systems Golf courses	Collaborate to ensure sustainable management of groundwater
Environmental and Ecosystem	California Department of Fish and Wildlife National Marine Fisheries Service	Inform and involve to sustain a vital ecosystem
Economic Development	City of Buellton Mayor Holly Sierra County District 3 Supervisor Joan Hartmann State Assembly Member Steve Bennett State Senator Monique Limón	Inform and involve to support a stable economy
Human Right to Water	Domestic water users Disadvantaged communities	Inform and involve to provide safe and secure groundwater supplies to DACs
Integrated Water Management	Regional water management groups (IRWM regions)	Inform, involve, and collaborate to improve regional sustainability

Notes: DAC = disadvantaged community; IRWM = Integrated Regional Water Management.

1c.1-2 Citizens Advisory Group

As part of public outreach and communication, the CMA GSA Committee created the Citizens Advisory Group (CAG) to provide the GSA focused public input from representatives of different categories of groundwater uses and users in the CMA.

CAG members are members of the public who volunteered to participate in reviewing sections of the Draft GSP and other materials produced by the CMA GSA. Members of the community were invited to apply to the CAG. An ad-hoc selection committee reviewed applicants and made a recommendation to the CMA GSA Committee. The CMA GSA Committee considered the recommendations and then appointed a slate of members to the CAG. The CAG membership reflects a diversity of interests and different types of groundwater uses and users in the CMA. As requested by the Committee, the CAG provides input to the GSA by reviewing sections of the GSP and other materials and providing comment for CMA GSA consideration. The CMA GSA member agency staff organized and facilitated the CAG meetings.

CMA CAG members reviewed the following documents:

- Outreach and Engagement Plan;
- Data Management Plan;
- Subsurface Three-Dimensional Geology Technical Memorandum;
- Hydrogeologic Conceptual Model;
- Groundwater Conditions;
- Numeric Groundwater Model;
- Water Budgets;
- Sustainability Management Criteria;
- Monitoring Network.

As with the CMA GSA committee meetings, CMA CAG meetings were convened during the SARS-CoV-2 pandemic via phone and video teleconference. Appendix 1c-A includes a list of meeting dates and topics for the CMA CAG. Appendix 1c-B includes the reference Proclamations, Executive Orders, Health Order, and Health Officer Orders.

1c.1-3 Newsletters and Press Releases

The three management areas of the Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB) coordinated in creating newsletters and press releases to notify the public about the development of the GSP throughout the SYRVGB. Copies of the newsletters and press releases created to date are included as Appendix 1c-D.

Newsletters are one-page documents about the SYRVGB, the CMA GSA, and CMA GSP developments. The newsletters were distributed in both English and Spanish. Translation services were provided by DWR's Written Translation Service. The newsletters were distributed in member agency utility bills, e-mailed to interested parties, and posted on the SGMA website for the Basin (below, section 1c.1-4).

Press releases were also produced and sent to local media organizations about specific topics. As an example, one such press release reported on helicopter flights that were used as part of the Aerial Electromagnetic Method (AEM) survey in November 2020.

1c.1-4 Communication Website: SantaYnezWater.Org

The three management areas of the SYRVGB coordinated in creating a single website for communication and outreach located at: https://www.santaynezwater.org

This website is a centralized location where updates regarding SGMA activities across the basin are made available. It has been a tool to engage and inform the public and to allow for public involvement in developing the GSP.

Features of this website include a tool to enter physical addresses to identify a management area of interest and obtain additional information about each GSA. Members of the public can register as interested parties for one, or all of the SYRVGB management area GSAs (WMA, CMA or EMA), and receive emails regarding upcoming events such as GSA or CAG meetings or documents available for public review and comment.

The website also includes items related to noticing and archiving GSA activities including a calendar of GSA meetings, both past and present, upcoming events, and public comment periods, both past and present. Minutes and meeting packets from GSA meetings are made available through the website.

Additionally, the website provided opportunity for the public review process used in developing this GSP. Draft documents released to the public were posted to this website, which included a public comment tool to allow individuals to comment on a specific document, or part of documents or make a general comment.

Appendix 1c-E provides additional information about the SantaYnezWater.Org website.

1d.1-5 Public Review Comments

In accordance with the SGMA regulations[8] the CMA GSA solicited public comments on this GSP as well as supporting draft documents. As described above, request for comments included outreach to specific identified stakeholder groups, running the CAG, newsletters released through multiple channels, press releases, and development and implementation of a communications website.

Written comments received by the CMA GSA are included as Appendix Public Review Comments, located as the last appendix. Public comments were considered throughout the development of the GSP. Comments on draft documents by stakeholder technical consultants identified additional supporting data that was included in this GSP. Comments by State and Federal wildlife agencies resulted in additional clarification about principal aquifer extents, additional discussion of SWRCB Order WR 2019-0148, limits to GSA authority[9] and expanded discussion of wildlife beneficial use including existing biological opinions and wildlife monitoring programs.

8 23 CCR § 354(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.
9 Including CWC Section 10720.5 (b)

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Section 1 D – PLAN AREA

This Plan Area section addresses 23 CCR § 354.8 of the SMGA regulations. It reintroduces the geographic areas covered by the GSP, and addresses administrative, statutory, and policy issues, in addition to aspects of the built environment related to water supply and demand.

Section 1d.1, CMA Plan Area Location, reintroduces the overall extents of the Santa Ynez River Valley Groundwater Basin (Basin) and adjacent basins, the division of the Basin into three GSP management areas, coverage of the Basin by SGMA, the extents of the Central Management Area (CMA) within the Basin, and the subareas of the CMA.

Section 1d.2, Summary of Jurisdictional Areas and Other Features, describes agencies with land use jurisdiction and water agencies throughout the CMA.

Section 1d.3, Well Density, describes existing well density throughout the CMA.

Section 1d.4, Water Resources Monitoring and Management Programs, describes existing water resource monitoring and management plans within the CMA.

Section 1d.5, Regulatory Programs, describes existing regulatory programs that are applicable to the CMA.

Section 1d.6, Land Use Considerations, describes land use and projected population numbers, general plans, and other applicable planning efforts.

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1d.1 CMA PLAN AREA LOCATION

This GSP for the Central Management Agency addresses the central of three management areas that cover the entire Santa Ynez River Valley Groundwater Basin through a coordination agreement.

1d.1-1 Santa Ynez River Valley Groundwater Basin and Adjacent Basins

Santa Ynez River Valley Groundwater Basin (Basin) is designated by the California Department of Water Resources (DWR) under CWC Section 12924 as one of California's 515 alluvial basins. The Basin (DWR Basin No. 3-015) is a coastal groundwater basin encompassing approximately 317.4 square miles (203,141.4 acres) in central Santa Barbara County (County). The Basin underlies the cities of Solvang, Buellton, and Lompoc, and the unincorporated communities of Santa Ynez, Ballard, Los Olivos, Mission Hills, and Vandenberg Village. The Basin is bounded by the Pacific Ocean on the west, the Purisima Hills and San Rafael Mountains on the north, the Santa Ynez Mountains on the south, and consolidated non-water-bearing rocks of Mesozoic[10] and Tertiary[11] age on the east (DWR 2004; Upson and Thomasson 1951). These consolidated rocks underlie the unconsolidated water-bearing deposits of Tertiary and Quaternary[12] age that comprise the Basin, and define the Basin's lower boundary (Upson and Thomasson 1951). To the north, the Basin boundary is coincident with the boundary of the approximately 105.4 square mile (67,473.7-acre) San Antonio Creek Valley Groundwater Basin (DWR Basin No. 3-014).

The Basin is one of several within Santa Barbara County. **Figure 1d.1-1** shows other groundwater basins adjacent to or near the Basin. North of and bordering the Basin is the San Antonio Creek Valley Groundwater Basin.[13] The Santa Maria River Valley Groundwater Basin[14] is directly adjacent to the north of the San Antonio Creek Valley Groundwater Basin. To the southeast, along the south coast of Santa Barbara County, is the Goleta Groundwater Basin,[15] separated from the Basin by the Santa Ynez Mountain range.

10 Geologic period from 252 million to 66 million years ago.
11 Geologic period from 66 million to 2.6 million years ago.
12 Geologic period from 2.6 million years ago to the present.
13 DWR Basin 3-14
14 DWR Basin 3-12
15 DWR Basin 3-16

The Santa Ynez River Valley and adjacent San Antonio Creek Valley groundwater basins are designated by the DWR as medium priority[16] basins (DWR 2020). The DWR basin prioritization process was completed in accordance with the requirements of the Sustainable Groundwater Management Act (SGMA) of 2014 and CWC Sections 10722.4 and 10933, based on eight components as outlined in the *Sustainable Groundwater Management Act 2019 Basin Prioritization Process and Results* (DWR 2020). Basins that received total priority points ranging from greater than 14 points to less than or equal to 21 points were designated as medium priority basins. The Santa Ynez River Valley Groundwater Basin received a total of 15 priority points, with component 3 (the number of public supply wells that draw from the basin) and component 6 (the degree to which persons overlying the basin rely on groundwater was their primary source of water) being the two components that received the highest number of priority points (DWR 2020).

Table 1d.1-1
Summary of the Santa Ynez River Valley Groundwater Basin, Adjacent Basins, and Contributing Watershed Area

Basin/Watershed Name	Area			DWR Designations		Previous Groundwater Management Plan	GSP Required per SGMA
	Acres	*Square Miles*	*Basin Number*	*Critically Overdrafted*	*Basin Priority*		
Santa Ynez River Valley Groundwater Basin	203,141.4	317.4	3-015	No	Medium	No	Yes
Adjacent Basin							
San Antonio Creek Valley Groundwater Basin	67,473.7	105.4	3-014	No	Medium	No	Yes
Primary Watershed Contributing to the Santa Ynez River Valley Groundwater Basin							
Santa Ynez River Watershed	574,059.0	897.0	Not applicable				

Source: DWR 2016. California's Groundwater. Bulletin 118 Interim Update 2016
Notes: DWR = Department of Water Resources; GSP = Groundwater Sustainability Plan; SGMA = Sustainable Groundwater Management Act.

16 Basin prioritization classifies California's 515 basins and subbasins into priorities based on components identified in the California Water Code. The priority process consists of applying datasets and information in a consistent, statewide manner in accordance to the provisions in California Water Code, Section 10933(b). Further information on DWR's basin prioritization process can be found on the following website: https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization.

1d.1-2 SGMA Coverage of Basin

The Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB) is divided into three management areas based on hydrogeologic and jurisdictional boundaries, each governed by a Groundwater Sustainability Agency (GSA). The three management areas include the Western Management Area (WMA), Central Management Area (CMA), and Eastern Management Area (EMA). For the purpose of development and implementation of this GSP, the Plan Area is synonymous with the CMA of the Basin. Appendix 1d-A provides the rationale for the divisions of the three management areas.

The entire Santa Ynez River Valley Groundwater Basin is covered by one of the three groundwater sustainability plans prepared for the Basin. The extents of all three management areas were shown previously on Figure 1a.3-1 (Introduction). There are no adjudicated areas or parts of the Basin covered by a SGMA Alternative plan.[17]

1d.1-3 Plan Area: Central Management Area

The CMA boundary encompasses approximately 32.8 square miles (21,023.8 acres) of the center of the Basin (**Figure 1d.1-2**). The CMA GSA committee consists of the Santa Ynez River Water Conservation District (SYRWCD), City of Buellton, and County of Santa Barbara. The CMA is divided into two subareas[18] based on hydrogeologic and topographic characteristics: Buellton Upland, and Santa Ynez River Alluvium. **Figure 1d.1-3** shows the locations and extents of the subareas, and **Table 1d.1-2** lists the size of each subarea.

17 Alternative plans are described in 23 CCR Division 2 Chapter 1.5 Subchapter 2 Article 9. Alternatives

18 Subareas are similar to and based on the Santa Ynez River Water Conservation District Annual Report subareas, also used for managing pumping in much of the CMA. Extents were adjusted to cover the entire Bulletin 118 Interim Update 2016 (DWR 2016) basin boundary.

Table 1d.1-2
Summary of CMA Subareas by Area

CMA Subarea	Acres [A]	Square Miles
Buellton Upland	14,220	22.2
Santa Ynez River Alluvium	6,800	10.6
Total	**21,020**	**32.8**

[A] Rounded to nearest 10 acres.

1d.1-3-1 Buellton Upland Subarea

The Buellton Upland subarea consists of the hilly portions of the CMA north of the Santa Ynez River. This subarea includes the watershed of Santa Rosa Creek, Cañada de la Laguna, and the lower portions of Zaca Creek and Ballard Canyon. The northern extent of the CMA Buellton Upland is bound by the Purisima Hills, and the southern extent terminates at the Santa Ynez River Alluvium subarea.

The Buellton Upland subarea consists of relatively rugged terrain. Agricultural uses occur primarily along the flat land in the valley bottoms. Although there are no cities or urbanized areas in the Buellton Upland, there are several municipal water systems. No wastewater treatment plants are in the Buellton Upland subarea.

1d.1-3-2 Santa Ynez River Alluvium Subarea

Directly south of the Buellton Upland is the Santa Ynez River Alluvium subarea, bordered by exposed bedrock of the Sisquoc Formation, Monterey Formation, and older consolidated Miocene Formations. The Santa Ynez River Alluvium subarea spans from the EMA boundary near the City of Solvang in the east, through a large near-ninety degree west to east bend in the Santa Ynez River west of the City of Buellton, called the "Buellton Bend," to the CMA-WMA boundary near Santa Rosa Park in the west.

There are agricultural and urbanized areas in the CMA portion of the Santa Ynez River Alluvium subarea. The majority of the City of Buellton is located in this subarea.

Groundwater recharge of the alluvium is primarily received from the surface and underflow of the Santa Ynez River, tributary creek flow, seepage, and irrigation return flows. The Santa Ynez River and its subflow are managed by the California State Water Resources Control Board (SWRCB) as part of regional surface water rights. The water flowing through the alluvium, in known and definite channels, is not considered groundwater as defined by SGMA, but, rather, is considered surface water by the SWRCB and the extraction of such water is not subject to the SGMA.

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1d.2 SUMMARY OF JURISDICTIONAL AREAS AND OTHER FEATURES

1d.2-1 Land Use Jurisdictions within the CMA Plan Area

The CMA Plan Area consists of the City of Buellton (City) and private rural land under Santa Barbara County jurisdiction. The developed land uses in the Plan Area include in general residential, commercial, and agricultural. Approximately 5% of the Plan Area consists of the City and 95% consists of the private land (**Figure 1d.2-1**, Public Lands). **Figure 1d.2-2** identifies specific State and Federal Land indicating the California Wildlife Conservation Board has protected lands along Santa Rosa Creek, and the Federal lands are lands under the Bureau of Land Management (BLM), part of the U.S. Department of the Interior, run out of the BLM Bakersfield Field Office. The land uses in the Plan Area contributing watershed include primarily agricultural (e.g., vineyards, field crops, pasture) and open space (e.g., recreational). Table 1d.2-1 summarizes the land ownership and jurisdiction in the Plan Area.

Table 1d.2-1
Summary of Land Ownership in the CMA Plan Area

Ownership Type	Agency	Description	Acres / % of Total
Private	Private	Mixed land uses including primarily residential, commercial, and agricultural under Santa Barbara County jurisdiction	19,998.0 / 95%
City	City of Buellton	Mixed land uses including primarily residential and commercial	1,025.8 / 5%
		Grand Total	21,023.8 / 100%

Source: Geographic information system (GIS) analysis of jurisdictional boundaries.

1d.2-1-1 Santa Barbara County

The Department of Planning and Development has land use authority in the unincorporated Santa Barbara County parts of the CMA Plan Area. The Department of Planning and Development conducts policy development, planning, permitting, and inspection services through its divisions which include administration, building and safety division, development review, and long-range planning. Section 1d.6, Land Use Considerations, provides greater detail on land use, population, and general plan land use policies relevant to the GSP.

1d.2-1-2 City of Buellton

The City of Buellton Planning Department has land use authority within the City limits. The Planning Department conducts planning, economic development, and code enforcement. Section 1d.6, Land Use Considerations, provides greater detail on land use, population, and general plan land use policies relevant to the GSP.

1d.2-2 Water Agencies Relevant to the Plan

The retail water agencies serving the CMA Plan Area include the City of Buellton, Bobcat Springs Mutual Water Company (MWC), and Mesa Hills MWC. The wholesale water agency relevant to the Plan Area is the Central Coast Water Authority (CCWA), which delivers State Project Water (SWP) to the City of Buellton. Each water agency relevant to the Plan Area is described below. Water district boundaries and regional water infrastructure are shown on **Figure 1d.2-3**, Water Agencies and Infrastructure.

1d.2-2-1 City of Buellton

The City of Buellton (public water system 4210018) is the only city within the CMA. The City provides potable water service to 1,836 connections and to a population of 5,464 within the City limits (SWRCB 2021a). The City relies on groundwater and the SWP to satisfy customer demands (City of Buellton 2021; SWRCB 2021a). The City's potable water system consists of four municipal supply wells and two water treatment facilities (City of Buellton 2021). Three of the municipal wells are located in the Santa Ynez River Alluvium subarea and one is located in the Buellton Upland subarea. The City has two additional wells located in the Santa Ynez River Alluvium subarea that is used solely for irrigation purposes, including for the Zaca Creek Golf Course (City of Buellton 2021). In addition, the City owns and operates a wastewater treatment plant. Secondary treated effluent from the plant is discharged into infiltration basins for replenishment of the groundwater Basin. Approximately 478,000 gallons per day of secondary treated effluent was discharged into the infiltration basins in 2020 (City of Buellton 2021).

The City's permit to pump subflow from the Santa Ynez River Alluvium subarea is currently 1,385 acre-feet per year (AFY). In 2020, the City provided 1,214.0 acre-feet (AF) of water to its customers, 869.3 AF of which was groundwater (City of Buellton 2021). Approximately one-half of the potable water provided by the City is used for domestic purposes and the other half is used for commercial and industrial processes (City of Buellton 2021). The daily water use for 2020 was 198 gallons per capita per day (City of Buellton 2021). **Table 1d.2-2** summarizes the City of Buellton water use for three recent years.

Table 1d.2-2
City of Buellton Annual Water Use

Calendar Year	Population	Buellton Upland (AF)	Santa Ynez River (AF)	State Water Project (AF)	Total Water (AF)	Daily Per Capita Use (GPDPC)
2020	5,464	219.3	650.0	344.7	1,214.0	198
2019	5,453	314.3	564.6	296.0	1,174.8	192
2018	5,098	326.9	699.2	165.3	1,191.4	209

Source: City of Buellton (2021), City of Buellton (2020), City of Buellton (2019).
Notes: AF = Acre-Feet; GPDPC = gallons per day per capita.

Due to the number of connections, the City of Buellton is not considered an urban water supplier[19] or agricultural water supplier[20].

1d.2-2-2 Bobcat Springs Mutual Water Company

Bobcat Springs MWC (public water system 4200891) provides potable water service to 47 connections and a population of 120. Bobcat Springs MWC relies on groundwater from two extraction wells as the sole source of supply (SWRCB 2021a). Annual water use for the years 2014 through 2018 ranged between 92 to 107 acre-feet per year (DWR 2019b).

1d.2-2-3 Mesa Hills Mutual Water Company

Mesa Hills MWC (public water system 4200862) provides potable water service to 36 connections and a population of 54. Mesa Hills MWC relies on groundwater from two extraction wells as the sole source of

19 Per CWC Section 10617, an urban water supplier means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly, to more than 3,000 customers or supplying more than 3,000 AFY of water.
20 Per CWC Section 10608.12(a), an agricultural water supplier means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water.

supply (SWRCB 2021a). Annual water use for the years 2014 through 2018 ranged between 97 and 122 acre-feet per year (DWR 2019b).

1d.2-2-4 Jonata Homeowners Association

Jonata Homeowners Association (public water system 4200814) provides potable water service to 16 connections and a population of 45. Jonata Homeowners Association relies on groundwater from one extraction wells as the sole source of supply (SWRCB 2021a).

1d.2-2-5 North Buellton Hills Water Works

North Buellton Hills Water Company (public water system 4200809) provides potable water service to 8 connections and a population of 30. Reported to use a local public agency as the sole source of supply (SWRCB 2021a).

1d.2-2-6 Hager Mutual Water Company

Hager MWC (public water system 4200940) is a state small water system[21] with less than 15 service connections and a population of less than 25.

1d.2-2-7 Central Coast Water Authority

The Central Coast Water Authority (CCWA), public water system 4210030, is a wholesale supplier of urban water for thirteen (13) water agencies in Santa Barbara County (CCWA, 2021a). CCWA is a public entity organized under a joint exercise of powers agreement dated August 1, 1991, by the cities and special districts responsible for the creation and maintenance of water resources in portions of the North County, Santa Ynez Valley, and the South Coast areas of Santa Barbara County. The CCWA Board of Directors includes two SYRVGB GSA member agencies: City of Buellton has a 2.21% vote, and Santa Ynez River Water Conservation District Improvement District #1 (EMA GSA member agency) has a 7.64% vote (CCWA 2021a).

21 California Health and Safety Code Section 116275.

CCWA owns and operates a water treatment plant and pipeline that delivers water primarily from the State Water Project (SWP) to project participants in Santa Barbara and San Luis Obispo counties. The distribution system consists of an approximate 130-mile-long pipeline (Coastal Branch Pipeline), treated water tanks at the water treatment plant, three interim storage facilities, one energy dissipation facility, nine turnouts, four isolation valve facilities, a chloramines removal and water pumping facility, and the Lake Cachuma inlet monitoring facility (CCWA 2021b). Major reservoirs and pipelines are shown on Figure 1d.2-3, Water Agencies and Infrastructure. In 2020, CCWA delivered 12,175 acre-feet to its clients out of a possible 43,886 acre-feet of water (CCWA 2021a).

The City of Buellton's full allocation of SWP water is 636 AFY, which includes a 58 AFY drought buffer to enhance the reliability of SWP water during shortages (CCWA 2020). In fiscal year 2020/21, the City requested 399 AF of SWP water (CCWA 2020). The Hydrogeologic Conceptual Model (HCM) (Section 2a.3) includes time series graphs of CCWA imports to the Santa Ynez River basin and major water quality.

1d.2-2-8 Santa Ynez River Water Conservation District

The Santa Ynez River Water Conservation District (SYRWCD) was established by the Santa Barbara County Board of Supervisors in October of 1939 for the primary purpose "To protect water rights and conserve and augment the District's water supplies in an environmentally responsible manner for residential, agricultural and commercial uses." (SYRWCD 2021). The SYRWCD is a water conservation district organized under CWC Sections 74000-76501.

The SYRWCD encompasses approximately 180,000 acres of the Santa Ynez River watershed from Lake Cachuma to where the River discharges into the Pacific Ocean at Surf Beach (Stetson 2021). The SYRWCD receives its operating budget from ad valorem property taxes and charges levied on the production of groundwater from water-producing facilities within the SYRWCD boundary (Stetson 2021). The SYRWCD works with public agencies and landowners to maintain a balance of water resource allocations for all beneficial uses and users of water in the Basin. The SYRWCD does not serve potable water, including within the CMA.

1d.2-2-9 Santa Barbara County Water Agency

The Santa Barbara County Water Agency (SBCWA) is a special district that was established by the State Legislature in 1945 to control and conserve storm, flood, and other surface waters for beneficial use and to enter into contracts for water supply. As of February 1994, the SBCWA along with the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) special district are organized under the Water Resources Division of the Public Works Department of the County of Santa Barbara. The SBCWA prepares investigations and reports on the County's water requirements, groundwater conditions, efficient use of water, and other water-supply-related technical studies, and manages a number of County-wide programs, including the Integrated Regional Water Management (IRWM) Program, the Regional Water Efficiency Program, and the winter cloud seeding program.

The Water Resources Division also administers the Cachuma Project and the Twitchell Dam Project contracts with Reclamation, holds the SWP water contract[22] with DWR, and participates in some of the County's GSAs.

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22 SBCFCWCD holds the contact with DWR for delivery of State Water Project (SWP) water. DWR (2021). Management of the California State Water Project.

1d.3 WELL DENSITY

The SYRWCD maintains a registry of all water-producing facilities within its jurisdiction. Property owners must register any new water-producing facility within 30 days or be guilty of a misdemeanor (CWC Section 75640). Table 1d.3-1 is a count of wells and the average density for each of the CMA subareas. **Figure 1d.3-1** shows the density distribution by square mile (section) for wells for agricultural use, **Figure 1d.3-2** shows the same for domestic wells, and **Figure 1d.3-3** shows the same for municipal wells.

Table 1d.3-1
Well Density by Water Use for CMA Subareas

CMA Subarea	Agriculture		Domestic		Municipal	
	Well Count	Average per Sq. Mile	Well Count	Average per Sq. Mile	Well Count	Average per Sq. Mile
Buellton Upland	48	2.16	55	2.48	-	-
Santa Ynez River Alluvium	82	7.74	66	6.23	4	0.38
Total	**130**	**3.96**	**121**	**3.69**	**4**	**0.12**

Source: Santa Ynez River Valley Water Conservation District
Subarea is strictly based on geographic extents in this table, not aquifers wells are drawing from. City of Buellton has 1 well pumping from the Buellton Aquifer and 3 wells pumping from the Santa Ynez River Alluvium.

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1d.4 WATER RESOURCES MONITORING AND MANAGEMENT PROGRAMS

1d.4-1 Water Resources Monitoring

Water resource monitoring including groundwater elevation monitoring, water quality, groundwater extraction, and stream flow and precipitation monitoring are introduced in this section. Additional information is provided in additional sections of this GSP, primarily the Groundwater Conditions (Section 2b) and the Monitoring Network (Section 3a) and Sustainable Management Criteria (Section 3b).

1d.4-1-1 Groundwater Elevation

Three groundwater elevation monitoring programs were identified in the CMA. Groundwater elevation or level data was used in the Groundwater Conditions (Section 2b), Monitoring Network (3a), and Sustainable Management Criteria (Section 3b).

Water level data is collected semi-annually by the SBCWA at several wells throughout the CMA. This program formerly was run by the United States Geologic Survey (USGS). The United States Bureau of Reclamation collects monthly groundwater levels for wells within the alluvium of the Santa Ynez River as part of information operations of the Lake Cachuma Reservoir. The City also collects groundwater levels for their own well network on a monthly basis.

1d.4-1-2 Groundwater Quality

Two sources of groundwater quality data were identified in the CMA. Groundwater quality data was used in the Groundwater Conditions (Section 2b), Monitoring Network (3a), and Sustainable Management Criteria (Section 3b).

The public water system within the CMA report water quality data for public water sources including wells to the Division of Drinking Water for compliance with the Safe Drinking Water Act. The data is collected by individual public water systems including the CMA GSA member agency, City of Buellton.

The Irrigated Lands Regulatory Program (ILRP) is a program of the State Water Resource Control Board that applies to commercial crop or pasture lands. Commercial farmers are required to submit the results of water quality testing in order to receive operating permits.

1d.4-1-3 Groundwater Extraction

Three sources of groundwater extraction data were identified for the CMA. Groundwater extraction data was used in developing the Water Budget (Section 2c) and the groundwater model.

The SYRWCD, in its role of managing and conserving groundwater as a Water Conservation District, collects reported production data for all wells within its jurisdiction on a semi-annual basis and assesses a groundwater charge based on reported production. Not all wells are metered and production may be estimated by water use factors that include crop type and acreage, household size, and livestock numbers.

The GSA member agency, City of Buellton, monitors the daily pumping volume by well.

An additional source of groundwater pumping information is DWR's Water Use and Efficiency Branch which conducts a yearly survey of public water agencies used in updating the California Water Plan[23] (DWR, 2019). These Public Water Systems Statistics Surveys generally provide monthly totals of water use by public water agency.

1d.4-1-4 Streamflow Monitoring

Streamflow monitoring is conducted by the USGS. Locations and volumes of current and historical monitoring are shown in the Groundwater Conditions (Figure 2b.6-1).

1d.4-1-5 Precipitation Monitoring

There are three identified sources of precipitation monitoring within the area of the CMA. Precipitation data is discussed in more detail in the Hydrogeologic Conceptual Model (Section 2a).

23 Previous version of this were published as DWR Bulletin 160.

County of Santa Barbara operates a series of weather stations throughout Santa Barbara County including within the CMA. National Oceanic and Atmospheric Administration (NOAA) operates a single station at Lompoc. The California Irrigation Management Information System (CIMIS), part of DWR's Water Use and Efficiency Branch operates the "Lompoc" and "Santa Ynez" stations.

1d.4-2 Management Plans

1d.4-2-1 Central Coast Water Authority Urban Water Management Plan

Central Coast Water Authority (CCWA) water supply management is outlined in its 2020 Urban Water Management Plan (UWMP) (CCWA 2021). As a wholesale supplier of urban water, CCWA is required to prepare urban water management plans on a 5-year cycle.[24] Past CCWA UWMP were prepared in 2005, 2010, and 2016. CCWA supplies thirteen (13) water agencies in Santa Barbara County, and the CCWA UWMP follows this regional water supply perspective. UWMP describe existing and planned water supply sources, identify human and/or environmental threats to water reliability, outline how state-mandated water conservation targets will be met,[25] establish water shortage contingency plans, and assess whether their existing and future water supplies will be sufficient over a 20-year planning horizon. Projections of growth and land use in the service area along with drought scenarios are incorporated in the long-term water supply assessment.

1d.4-2-2 Buellton Uplands Groundwater Basin Management Plan

In 1992, the State Legislature provided an opportunity for local groundwater management with the passage of AB 3030, the Groundwater Management Act (CWC Section 10750 et. seq. Part 2.75). Many basins developed groundwater management plans (GWMPs) to provide planned and coordinated monitoring, operation, and administration of groundwater basins with the goal of long-term groundwater resource sustainability. The Groundwater Management Act was first introduced in 1992 as AB 3030, and has since been modified by SB 1938 in 2002 and AB 359 in 2011. These significant pieces of legislation

24 Per CWC 10617, an urban water supplier means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly, to more than 3,000 customers or supplying more than 3,000 AFY of water.

25 The Water Conservation Act of 2009 (SB X7-7) requires that the state reduce urban water consumption by 20% by the year 2020, as measured in gallons per capita per day.

establish, among other things, specific procedures on how GWMPs are to be developed and adopted by local agencies.

The City of Buellton and SYRWCD started the GWMP process under AB 3030 in 1994 (SYRWCD and City of Buellton 1995). The GWMP was prepared for the Buellton Uplands which “includes the area north of the Santa Ynez River that extends eastward from the Santa Rita Uplands Basin to the east of the City of Buellton.” The GWMP provided a review of current and projected groundwater conditions, defined an overall groundwater management goal and basin management objectives, described existing and an expanded monitoring program, and identified conservation actions (SYRWCD and City of Buellton 1995). As of January 1, 2015, new or updated GWMPs cannot be adopted in medium and high priority basins; therefore, the 1995 GWMP will be superseded by this GSP.

1d.4-2-3 Santa Barbara County Integrated Regional Water Management Plan

The Santa Barbara County Integrated Regional Water Management (IRWM) Program began in 2005 following the passage of Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002. Chapter 8 of Proposition 50 authorized the legislature to appropriate $500 million for IRWM planning, the intent of which was to encourage agencies to develop plans using regional water management strategies for water resources and to develop projects using these IRWM strategies to protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water. The Santa Barbara County IRWM developed and then adopted its first IRWM plan in 2007, and under Proposition 50 received $25 million for 14 countywide projects. The County IRWM program developed and then adopted its first IRWM plan in 2007, and under Proposition 50 received $25 million for 14 countywide projects. The County IRWM Plan was updated under the Proposition 84 Guidelines in 2013, and received 5.7 million for 13 countywide projects.

Disadvantaged communities (DACs) in the CMA are discussed in Section 1d.6-1. In 2018, the region was awarded almost $900,000 in direct funds to DACs, and the region applied for further implementation funds (up to $6.3 million) in spring 2019.

In July 2019, another update to the IRWM Plan was prepared to ensure that the County remains eligible for funding under the Proposition 1 Guidelines (County of Santa Barbara 2019a). The Proposition 1 IRWM

Grant Program provides funding for projects that help meet the long-term water needs of the state, including the need to decrease reliance on imported water sources, increase infrastructure resilience to the impacts of climate change, and locally manage and prioritize watershed resources and water infrastructure projects. This 2019 Update focused on improving the previous IRWM Plan and incorporating the outcome of the SGMA and the formation of groundwater sustainability agencies (County of Santa Barbara 2019a). The IRWM Plan region encompasses all of Santa Barbara County. IRWM grants are discussed in Section 5c as potential funding for GSP implementation and proposed project and management actions.

1d.4-2-4 Storm Water and Sewer System Management Plans

In 2005, the City of Buellton (City) created a Storm Water Management Program to ensure that water quality from stormwater and storm events does not act of a source of pollution to nearby water bodies (City of Buellton 2005). In 2018 the County produced a County-Wide Integrated Stormwater Resource Plan which identified and evaluated water quality priorities for each watershed based on waterbodies with current water quality regulatory actions and the pollutant generating activities in each watershed (Geosyntec 2018).

Additionally, the City also prepared a Sewer System Management Plan to properly manage, operate, and maintain all parts of the sanitary sewer system to reduce and prevent sanitary sewer overflows (City of Buellton 2020b).

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1d.5 REGULATORY PROGRAMS

1d.5-1 Porter-Cologne Water Quality Control Act and Clean Water Act Permitting

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act; codified in CWC Section 13000 et seq.) is the primary state water quality control law for California. Whereas the federal Clean Water Act applies to all waters of the United States, the Porter-Cologne Act applies to waters of the state, which includes isolated wetlands and groundwater in addition to federal waters. The Porter-Cologne Act is implemented by the California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). In addition to other regulatory responsibilities, the RWQCBs have the authority to conduct, order, and oversee investigation and cleanup where discharges or threatened discharges of waste to waters of the state could cause pollution or nuisance, including impacts to public health and the environment. The Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB) is located in the southern part of the Central Coast Region (RWQCB Region 3) and within the Santa Ynez Hydrologic Unit, based on the RWQCB Water Quality Control Plan for the Central Coastal Basin (Central Coast Basin Plan; RWQCB 2019). These statutes are relevant to the GSP in that they regulate the quality of point-source discharges (e.g., wastewater treatment plant effluent, industrial discharges, and on-site wastewater treatment systems (OWTSs) and non-point source discharges (e.g., stormwater runoff) to the underlying aquifer.

The Central Coast Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the Central Coast Basin Plan (CWC Sections 13240–13247). The Porter-Cologne Act provides the RWQCBs with authority to include in their Basin Plans water discharge prohibitions applicable to particular conditions, areas, or types of waste. The Central Coast Basin Plan is continually being updated to include amendments related to implementation of total maximum daily loads, revisions of programs and policies within the RWQCB Central Coast Region, and changes to beneficial use designations and associated water quality objectives. The beneficial uses for groundwater are identified in the Central Coast Basin Plan as being suitable for agricultural water supply, municipal and domestic water supply, and industrial use (RWQCB 2019). Unlike beneficial uses of surface water (which vary based on individual surface water), the RWQCB designates the same beneficial uses for all DWR-designated groundwater basins throughout the Central Coast Region.

The Central Coast Basin Plan defines water quality objectives for groundwater generally (for taste, odors, and radioactivity) and for specific beneficial uses (i.e., municipal/domestic supply and agricultural supply). The water quality objectives for municipal/domestic supply are the same as primary drinking water standards (i.e., maximum contaminant levels) found in Title 22 of the California Code of Regulations. For agricultural uses of groundwater, the Central Coast Basin Plan provides water quality objectives consisting of maximum concentrations for various inorganic chemicals (including certain metals and nitrate) and guidelines for various physical and general mineral properties (Tables 3-1 and 3-2 in RWQCB 2019). The Central Coast Basin Plan defines additional objectives for select constituents specific to certain groundwater basins, including the SYRVGB (RWQCB 2019). Table 1d.5-1 provides the median groundwater objectives for the Basin as defined in the Central Coast Basin Plan.

Table 1d.5-1
Median Groundwater Objectives for the Santa Ynez River Valley Groundwater Basin

Sub-Area	TDS	Chloride	Sulfate	Boron	Sodium	Total Nitrogen
Santa Ynez	600	50	10	0.5	20	1
Santa Rita	1,500	150	700	0.5	100	1
Lompoc Plain	1,250	250	500	0.5	250	2
Lompoc Upland	600	150	100	0.5	100	2
Lompoc Terrace	750	210	100	0.3	130	1

Source: RWQCB 2019.
Notes: All values in milligrams per liter (mg/L); TDS = total dissolved solids. Extents and boundaries of Santa Rita and Santa Ynez sub-areas extents are not rigorously defined. Santa Ynez likely means Solvang and east (EMA). Santa Rita likely applies to the Santa Rita Upland (WMA) and Buellton Upland (CMA).

It should be noted that the Central Coast Basin Plan addresses inland waters, coastal waters (enclosed bays, estuaries, and coastal lagoons), and groundwater, whereas the Water Quality Control Plan for Ocean Waters of California (Ocean Plan; SWRCB 2019) establishes beneficial uses and water quality objectives for waters of the Pacific Ocean. Also, the Ocean Plan prescribes effluent quality requirements and management principles for waste discharges and specifies certain waste discharge prohibitions. The Ocean Plan also provides that the SWRCB shall designate Areas of Special Biological Significance and requires wastes to be discharged a sufficient distance from these areas to assure maintenance of natural water quality conditions (SWRCB 2019). The Vandenberg State Marine Reserve, established by the California Department of Fish and Wildlife in September 2007, is an approximately 32.9 square mile Marine Protected Area adjacent to the Basin that extends just beyond Rocky Point to the south, to near Purisima Point to the north, and up to approximately 3.75 miles offshore from the mean high tide line (CDFW 2016). The recreational and/or commercial take of all marine resources is prohibited within the Vandenberg State Marine Reserve. There are no Areas of Special Biological Significance, as identified by the SWRCB, in or adjacent to the Basin.

The Porter-Cologne Act requires a “Report of Waste Discharge” for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. CWC Section 13260(a) requires that any person discharging waste or proposing to discharge waste—other than to a community sewer system—that could affect the quality of the waters of the state file a Report of Waste Discharge with the applicable RWQCB. For discharges directly to surface water (waters of the United States), a National Pollutant Discharge Elimination System (NPDES) permit is required, which is issued under both state and federal law. For other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (such as groundwater and isolated wetlands), Waste Discharge Requirements (WDRs) are required and are issued exclusively under state law. WDRs typically require many of the same best management practices (BMPs) and pollution control technologies as required by NPDES-derived permits.

The NPDES and WDR programs regulate construction, municipal, and industrial stormwater and non-stormwater discharges under the requirements of the Clean Water Act of 1972 and the Porter-Cologne Act, respectively. The construction and industrial stormwater programs are administered by the SWRCB, whereas individual WDRs, low-threat waivers, and other Basin-specific programs are administered by the Central Coast RWQCB. Programs and policies that have particular relevance to the Basin include the following:

1. **Stormwater General Permits** (Construction and Industrial General Permits). SWRCB and the Central Coast RWQCB administer a number of general permits that are intended to regulate activities that collectively represent similar threats to water quality across the state and thus can

appropriately be held to similar water quality standards and pollution prevention BMPs. Construction projects more than one-acre in size are regulated under the statewide Construction General Permit and are required to develop and implement a stormwater pollution prevention plan. Similarly, industrial sites are also required to develop a stormwater pollution prevention plan that identifies and implements BMPs necessary to address all actual and potential pollutants of concern. There are currently 16 entities within the Basin subject to an industrial stormwater pollution prevention plan based on a review of industrial storm water reports submitted to the SWRCB (SWRCB 2021b). Three (2) of the 16 entities are located in the CMA. These entities include Lucas and Lewellen Winery, HSS Recycling Center, and Mission Ready Mix (SWRCB 2021b).

2. **Irrigated Lands Regulatory Program**. Water discharges from agricultural operations include irrigation runoff, flows from tile drains, irrigation return flows, and stormwater runoff. These discharges can affect water quality by transporting pollutants, including pesticides, sediment, nutrients, salts (including selenium and boron), pathogens, and heavy metals, from cultivated fields into surface waters and/or groundwater. To prevent agricultural discharges from impairing the waters that receive these discharges, the Irrigated Lands Regulatory Program (ILRP) regulates discharges from irrigated agricultural lands. Regulation by ILRP is accomplished by issuing WDRs or conditional waivers of WDRs to growers. These orders contain conditions requiring water quality monitoring of receiving waters and corrective actions when impairments are found. Through a series of events related to the passage of SB 390 (Alpert), the ILRP originated in 2003. Initially, the ILRP was developed for the Central Valley RWQCB. As the Central Valley RWQCB ILRP progressed, a groundwater quality element was added to the filing requirement for agricultural lands that had previously been subjected to only surface water discharge concerns. To date, the different RWQCBs are in different stages of implementing the ILRP. The Central Coast RWQCB has a conditional waiver program for irrigated agricultural lands throughout the region, focusing on priority water quality issues such as pesticides and toxicity, nutrients, and sediments—especially nitrate impacts to drinking water sources. There are a number of enrollees to the program within the Basin (SWRCB 2021c).

3. **On-site Wastewater Treatment Systems Requirements**. Requirements for the siting, design, operation, maintenance, and management of on-site wastewater treatment systems (OWTS) are

specified in the SWRCB's OWTS Policy (SWRCB 2018). The OWTS policy sets forth a tiered implementation program with requirements based upon levels (tiers) of potential threat to water quality. The OWTS policy includes a conditional waiver for on-site systems that comply with the policy. Since 1991, on-site sewage disposal systems in the County have been regulated by the County Public Health Department, Environmental Health Services Division. Santa Barbara County regulations for on-site sewage disposal systems are contained in Article I, Chapter 18C of the County Code, which was most recently updated in 2015. These regulations set forth specific requirements related to (1) permitting and inspection of on-site systems; (2) septic tank design and construction; (3) drywell and disposal field requirements; and (4) servicing, inspection, reporting, and upgrade requirements. Standards pertaining to system sizing and construction are contained in the California (Uniform) Plumbing Code. Additional requirements for on-site sewage disposal systems in the County are adopted as part of community plans or as project-specific mitigation measures or conditions applied to development proposals lying within a designated "Special Problem Area" of the County. The Central Coast RWQCB approved the County's Local Agency Management Program, developed by Environmental Health Services with local stakeholders, on November 20, 2015, and it became fully effective January 1, 2016.

4. **Individual Waste Discharge Requirements**. Individual Waste Discharge Requirements (WDRs) are required for point source discharges to land not otherwise covered under a general permit program or conditional waiver. The purpose of individual WDRs is to define discharge prohibitions, effluent limitations, and other water quality criteria necessary to ensure discharges do not result in exceedances of Central Coast Basin Plan objectives for receiving waters, including groundwater. There are 74 individual active WDRs in the Basin, 21 of which are located within the CMA. Of the 21 active WDRs in the CMA, 19 are associated with private agricultural operations (e.g., vineyards) and two are issued to wastewater treatment facilities (SWRCB 2021c). The two wastewater treatment facilities are the City of Buellton Wastewater Treatment Plant (WDR Order No. 99-134) and Solvang Wastewater Treatment Plant (WDR Order No. R3-2007-0069) (SWRCB 2021c). These facilities are subject to a monitoring and reporting program which requires regular sampling of influent, effluent and receiving waters to verify that the facilities are meeting applicable water quality standards (e.g., the Ocean Plan). Required submittals under the WDR

permits include a variety of monitoring, inspection, and technical reports that are submitted monthly and annually to the Central Coast RWQCB, and requirements for reporting and rectifying emergency/unplanned discharges (e.g., sanitary sewer overflows).

Implementation of this CMA GSP would not affect the applicability or implementation of the regulatory programs discussed above. Continued implementation of Porter-Cologne Act and the Clean Water Act permitting would advance the GSP's sustainability goals related to water quality. The County requires new development and redevelopment projects proposed within the Basin to comply with NPDES permits, WDRs, and OWTS requirements as part of its permitting and approval process. These programs will continue to provide benefits to water quality by requiring both point and non-point discharges to comply with Central Coast Basin Plan water quality objectives and to be protective of Central Coast Basin Plan beneficial uses throughout SGMA's planning and implementation horizon. In addition, the application of stormwater permits means specific performance standards for capture and infiltration of stormwater runoff would be implemented where applicable, providing opportunities for enhanced recharge of the Basin.

1d.5-1-1 Beneficial Uses and Users

The beneficial uses for groundwater identified in the Central Coast Basin Plan include municipal and domestic supply (MUN), agricultural supply (AGR), industrial process supply (PROC), and industrial service supply (IND) (RWQCB 2019). The beneficial uses and users in the CMA Plan Area include, but are not limited to, the following: (1) holders of overlying groundwater rights; (2) municipal, domestic and agricultural well operators; (3) public water systems; (4) local land use planning agencies; (5) environmental users of groundwater; (6) surface water users; (7) federal government; (8) disadvantaged communities; and (9) entities listed in SGMA (CWC Section 10927) that are monitoring groundwater elevations in all or part of the CMA managed by the GSA. Of the beneficial uses and users listed, the municipal and agricultural sectors are the primary groundwater users in the CMA Plan Area. Private groundwater well owners who extract less than 2 AFY are considered de minimis users under SGMA.[26]

[26] CWC Section 10721(e) "De minimis extractor" means a person who extracts, for domestic purposes, two acre-feet or less per year.

1d.5-2 Groundwater Well Permitting

Statewide standards for the construction, repair, reconstruction, or destruction of wells are found in DWR Bulletin 74-81 and 74-90 (i.e., California Well Standards) (DWR 1981 and 1991). The California Well Standards include requirements to avoid sources of contamination or cross-contamination, proper sealing of the upper annular space (i.e., first 50 feet), disinfection of the well following construction work, use of appropriate casing material, and other requirements. In October 2017, Governor Brown signed SB 252, which became effective on January 1, 2018. SB 252 requires well permit applicants in critically overdrafted basins to include information about the proposed well, such as location, depth, and pumping capacity. The bill also requires the permitting agency to make the information easily accessible to the public and the GSAs. The CMA Basin is not designated as critically overdrafted (DWR 2016).

The Santa Barbara County Environmental Health Services issues groundwater well permits in the Basin. The Santa Barbara County Environmental Health Services notifies water agencies in the Basin of newly permitted wells in the Basin. Well owners within the boundaries of the Santa Ynez River Water Conservation District must register their new and existing wells regardless of whether the well is operational or not.

1d.5-3 Title 22 Drinking Water Program

The SWRCB Division of Drinking Water (DDW) regulates public water systems in the state to ensure the delivery of safe drinking water to the public. A public water system is defined as a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. All six water companies in the CMA Plan Area are classified as public water systems (SWRCB 2021a). Private domestic wells, wells associated with drinking water systems with less than 15 residential service connections, industrial wells, and irrigation wells are not regulated by DDW. Single-parcel and multiple parcel/state small water systems are regulated by the County. DDW enforces the monitoring requirements established in Title 22 of the California Code of Regulations (CCR) for public water system wells, and all the data collected must be reported to DDW. Title 22 also designates the maximum contaminant levels (MCLs) for various waterborne contaminants, including volatile organic compounds, non-volatile synthetic organic compounds, inorganic chemicals, radionuclides, disinfection byproducts, general physical constituents, and other parameters. Water quality compliance monitoring of all source water is required every 12 to 108 months (1 to 6 years) depending on the constituent. For example, nitrate as nitrogen shall be tested for every 12 months, whereas gross alpha (radiological) is required to be tested for every 108 months. Additionally, public water systems are required to submit annual consumer confidence reports that detail the water quality testing results. Similarly, the County enforces the monitoring requirement established in Title 22 for single-parcel and multiple-parcel/state small water systems. Small water systems are required to complete water source yield and quality testing as part of the permit application process, and water quality testing at regular defined intervals upon receipt of an approved permit.

1d.5-4 Water Supply Planning and Water Use Efficiency

Over the years, California has passed a series of Senate Bills (SB), including SB X7-7, SB 610, SB 221, SB 1262, and most recently SB 606, that together outline the regulatory framework for water conservation and water supply planning, and for considering issues of water availability in the environmental and permitting process for land use plans, projects, and subdivisions. These bills have been codified in the CWC Sections 10608–10609.42, which establish water use and demand reduction targets; Sections 10610–10657, which address UWMPs; and Sections 10910–10914, which address water supply assessments, and California Government Code Section 66473.7 (part of the Subdivision Map Act of 1893), which contains requirements related to written verifications (i.e., “will-serve” letters). Collectively, these laws, along with the California Environmental Quality Act (CEQA) of 1970, prompt cities, counties, special districts, and water suppliers to evaluate growth in a broader geographic and temporal context, by coordinating land use planning with water availability and sustainability. SB 1262, which became effective in 2017, made changes to existing law to integrate to some extent existing law governing written verifications and water supply assessments with the passage of SGMA. The sections of the California Water Code (CWC) addressing water supply now contain several provisions relating specifically to groundwater, which if used wholly or in part to supply a project or subdivision, triggers additional analytical steps that could expand the necessary scope of a CEQA document, water supply assessment, and/or written verification, as applicable. SB 1262 added language in the subdivision map act clarifying additional considerations when part or all of the water supply comes from groundwater, especially in adjudicated basins, basins in critical overdraft, and/or basins designated as high or medium priority pursuant to SGMA. In addition to incorporating information from UWMPs, water supply assessments may incorporate relevant information from GSPs prepared pursuant to SGMA.

AB 1668 and SB 606, passed in May 2018, would require the SWRCB, in coordination with DWR, to adopt long-term standards for the efficient use of water, as provided, and performance measures for commercial, industrial, and institutional water use on or before June 30, 2022. The bill, among other things, establishes a standard for indoor water use of 55 gallons per capita daily to be reached by 2025, 52.5 gallons per capita daily beginning in 2025, decreasing to 50 gallons per capita daily beginning in 2030, or as determined jointly by DWR and SWRCB in accordance with necessary studies and investigations. DWR will also adopt long-term standards for outdoor residential water use and outdoor irrigation in connection with commercial, industrial, and institutional water use. With the 20% by 2020 conservation goal pursued in the Water Conservation Act of 2009, these bills extend UWMP requirements, but will measure compliance with uniform standards based on the aggregate amount of water that would have been delivered the previous year by an urban retail water supplier if all that water had been used efficiently (rather than relative to a water district's baseline). The legislation has a variance process available to allow for exceptions in special circumstances approved by DWR. AB 1668 continues the requirements for urban water suppliers to submit UWMPs every 5 years (though in years ending in 6 and 1 instead of 0 and 5), and makes water suppliers ineligible for any water grant or loan if it does not submit a UWMP. The bills also add requirements for agricultural water management.

1d.5-5 Operational Flexibility and Conjunctive Management Considerations

Operational flexibility is a key consideration in integrated water resource management because it helps water purveyors adapt to known legal, operational, and environmental constraints and plan for an uncertain future, especially as it relates to drought resiliency and the effects of climate change. Operational flexibility can be measured over a given time horizon and/or geographic scale (e.g., water district service area) as the difference between available water supply and service area demand. Operational flexibility is maximized when a water purveyor has a large variety of sources in a water supply portfolio, when it has local control over such sources, and when such sources are connected to each other (e.g., conjunctively managed). On a general statewide scale, water purveyors are increasingly looking to minimize reliance on imported water supplies by promoting stormwater recharge, maximizing wastewater recycling, and sustainably developing local sources of water.

Water purveyors in the CMA Plan Area rely primarily on groundwater. The City of Buellton is the only water agency in the Plan Area that receives SWP water. Because of the significant reliance on groundwater, it is of utmost importance that local groundwater is sustainably managed. With the passage of SGMA and the sustainable management criteria established in this GSP (Chapter 3), once adopted, minimum thresholds and measurable objectives may be established for each sustainability indicator to avoid undesirable results and mitigate potential effects to beneficial uses and users of groundwater in the Basin.

1d.5-6 Water Rights Agreements and Environmental Regulations

State water rights and environmental regulations, to a large extent, control the operations of Cachuma Reservoir (Lake Cachuma), the flow in the Santa Ynez River below Bradbury Dam, and storage of water within the Santa Ynez Alluvial Subarea. Bradbury Dam, which impounds water on the Santa Ynez River forming Lake Cachuma, was constructed by the U.S. Bureau of Reclamation (Reclamation) in 1953 to provide a reliable water source for Cachuma Project Member Units including Santa Ynez River Water Conservation District Improvement District No. 1, Goleta Water District, the City of Santa Barbara, Montecito Water District, and Carpinteria Valley Water District. In addition, water from Lake Cachuma is released to satisfy downstream users on the lower Santa Ynez River with senior water rights to surface water and to recharge the Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB). Releases from Lake Cachuma are governed by two water accounts, the Above Narrows Account and Below Narrows Account, which accrue credits (acre-feet of water) that can be used to provide water to downstream users. Releases from the Above Narrows Account are made to benefit downstream water users between Bradbury Dam and the Lompoc Narrows. Releases from the Below Narrows Account are conveyed to the Narrows for the benefit of water users in the Lompoc Plain subarea (Stetson 2021).

Reclamation currently owns and operates Bradbury Dam in accordance with permits and water rights orders issued by the SWRCB. In 1958, water rights Permits 11308 and 11310 were issued to Reclamation to store water from the Santa Ynez River. The permits were later modified in years following through a series of hearings and revised orders (Orders WR 73-37 and WR 89-18) to address the volume and timing of water releases from Lake Cachuma to satisfy downstream water rights. In 1987, the California Sportfishing Protection Alliance filed a complaint with the SWRCB against Reclamation alleging Cachuma Project operations were adversely impacting federally listed endangered anadromous steelhead trout (*Oncorhynchus mykiss, O. mykiss*) in the lower Santa Ynez River. In response to the allegation and as required by SWRCB WR 94-5, Reclamation prepared, with direction from SWRCB as lead agency under CEQA, a draft Environmental Impact Report (EIR) that evaluated measures needed to protect the steelhead fishery. The National Marine Fisheries Service (NMFS) simultaneously completed a Biological Opinion (NMFS 2000) pursuant to Section 7 of the Federal Endangered Species Act of 1973 for the Reclamation's operation and maintenance of Bradbury Dam. In 2011, the SWRCB released a final EIR (SWRCB 2011), and subsequently certified the final EIR. The SWRCB subsequently issued WR 2019-0148 based on the findings of the final EIR which requires Reclamation to provide higher flows in the lower Santa Ynez River during above normal and wet water years, and to provide flows equivalent to those required under the Biological Opinion in all other water year types. In addition, WR 2019-0148 requires Reclamation to study the feasibility of additional measures that may be necessary to restore the steelhead fishery to good condition, including fish passage around Bradbury Dam and habitat restoration in the upper Santa Ynez River and its tributaries where the majority of historical spawning and rearing habitat exist. WR 2019-0148 is the latest water rights order issued to Reclamation. Studies that may result in additional amendments to the original water rights permits are ongoing.

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1d.6 LAND USE CONSIDERATIONS

The following section presents a review of population data and land use characteristics for the CMA Plan Area, including the various land use plans and their applicability to groundwater resource management. State law requires that all cities and counties adopt a comprehensive, long-term general plan that outlines physical development for the county or city. The general plan must cover a local jurisdiction's entire planning area so that it can adequately address the broad range of issues associated with the city or county's development. Ultimately, the general plan expresses the community's development goals and embodies public policy relative to the distribution of future public and private land uses. The general plan may be adopted as a single document or as a group of documents relating to subjects or geographic segments of the planning area.

Most of the planning documents relevant to the CMA Plan Area fall under the umbrella of the Santa Barbara County Comprehensive Plan (Comprehensive Plan), which is a "living document" made up of many parts that are periodically updated by the County's Department of Planning and Development. The core structure of the document is to have broad countywide land use policies that are refined in various community plans—the local setting, policy issues, and community concerns are taken into account through a public participation process. All elements of a general plan, whether mandatory or optional—including community plan principles, goals, objectives, policies, and plan proposals—must be internally consistent with each other and all elements have equal legal status (i.e., no element is legally subordinate to another).

The development and implementation of this GSP is relevant to several general plan and community plan elements because each contain policies and implementation actions that are intended to be protective of water resources. All applicable land use plans acknowledge the major constraints on growth that the lack of water availability presents. The County's general plans broadly encourage water conservation, and prohibit development, such as tentative map and subdivision approvals, unless the availability of water can be demonstrated. Several plan elements intersect, including the Conservation Element, the Environmental Resource Management Element, and the Groundwater Resources Element, and contain policies specifically aimed at water resources and groundwater sustainability.

In a few cases, identified below, the passage of SGMA and the adoption of this GSP may supersede some of the land use plan policies or underlying assumptions within them. Where this occurs, it is expected that future general plan and community plan updates, and/or updates to general plan theoretical buildout estimate, will consider the sustainability goals, sustainable management criteria, and the projects and management actions of this GSP, resulting in revisions to relevant land use plans elements.

1d.6-1 Land Use and Population

The primary developed land uses in the Plan Area consist of residential, commercial, and agricultural uses (**Figure 1d.6-1**, Land Use). Agricultural land is the single largest land use type comprising approximately 80% of the entire Plan Area. The predominant types of agriculture within the Plan Area include field crops, pasture, and vineyards. Table 1d.6-1 presents a summary of land uses in the Plan Area.

Table 1d.6-1
Summary of Land Use in the CMA Plan Area

Land Use	Number of Parcels	Area (Acres)	Percent of Total
Agricultural	190	16,694.1	79.4%
Commercial	178	200.7	1.0%
Highways and Streets[a]	8	606.3	2.9%
Industrial	57	113.9	0.5%
Institutional	5	16.4	0.1%
Multi-Family Residential	334	38.1	0.2%
Recreational	9	71.0	0.3%
Single-Family Residential	1,678	3,122.0	14.9%
Undefined[b]	35	8.9	<0.1%
Utilities/Rights-of-Way	34	30.8	0.1%
Vacant	56	121.7	0.6%
Total	**2,584**	**21,023.8**	**100%**

Source: Santa Barbara County 2019 parcel GIS data layer.
Notes:
[a] Includes road right-of-ways and areas not included in the parcel data layer.
[b] Consists of parcels where land use type has not been defined. Based on a review of aerial imagery, it appears these parcels are primarily residential and commercial.

There are several sources of population data for the Plan Area, most of which are derived from decennial census counts, which last occurred in 2010.[27] Sources of population information are as follows:

- **U.S. Census Bureau**: The U.S. Census Bureau conducts a census count every 10 years. Census data are gathered by tracts, blocks, and census-designated places. Census blocks were intersected with the CMA boundary to determine the population within the Plan Area for 2010. Census blocks that intersected the boundary of the CMA were area-weighted to determine the population that falls within the Plan Area.
- **City and County General Plans**: The City of Buellton (City) and the County of Santa Barbara (County) gather data on development, growth, and land use patterns, and make population estimates in conjunction with census data. The general plans relevant to the Plan Area were reviewed for historical and current population data.
- **Santa Barbara County Association of Governments**: Santa Barbara County Association of Governments (SBCAG) is a regional planning agency comprised of the County and eight incorporated cities within the County. The SBCAG produces demographics data and growth forecasts for the County which were reviewed and used to forecast population growth within the Plan Area.

On a countywide level, population growth is associated primarily with the growth of incorporated cities. Between 2000 and 2010, the cities of Buellton, Guadalupe, and Santa Maria experienced significant population increase upwards of 29% while population change within the unincorporated areas of the County was 0% (SBCAG 2012). In 2010, the total population of the County was 423,800. By 2040, the total population of the County is forecast to be 519,965, an increase of 96,165 or approximately 23% from 2010 (SBCAG 2012).

Based on U.S. Census Bureau data, the population of the Plan Area in 2010 was approximately 5,592. As shown in Table 1d.6-2, the population of the Plan Area is concentrated in the City of Buellton. The City of Buellton alone accounted for approximately 86% of the Plan Area population in 2010. Using the regional forecast growth rate for each 5-year period for 2010 to 2040, the population of the Plan Area is projected

27 Results from the 2020 census were unavailable at the time of writing this GSP.

to be approximately 6,861 by the year 2040 (Table 1d.6-2). **Figure 1d.6-2** shows the population density throughout the Plan Area.

Table 1d.6-2
Past, Current, and Projected Population for
Santa Barbara County, City of Buellton, and CMA Plan Area

Area	Population						
	2010	*2015*	*2020*	*2025*	*2030*	*2035*	*2040*
County	423,800	428,614	445,891	470,445	495,000	507,482	519,965
City of Buellton	4,811	4,866	5,062	5,341	5,619	5,761	5,903
Plan Area	5,592	5,656	5,883	6,207	6,531	6,696	6,861

Source: SBCAG 2012 and 2013; 2010 U.S. Census Bureau GIS data layer.
Notes: 2015 to 2040 population of City of Buellton and Plan Area estimated based on County growth forecast for same period.

As defined in California Health and Safety Code, Section 116275, disadvantaged communities (DAC) are Census geographies having less than 80% of the statewide annual median household income. Based on 2018 DAC mapping at the Census Block Group level, approximately 14% (2,988.6 acres) of the Plan Area is considered disadvantaged (median household income of less than $56,982). The portion of the Plan Area identified as disadvantaged consists of unincorporated rural land in the western part of the CMA (DWR 2021b).

1d.6-2 General Plans

General plans are considered applicable to the GSP to the extent that they may change water demands within the Basin or affect the ability of the CMA GSA to achieve sustainable groundwater management over the planning and implementation horizon. The general plans applicable to the Plan Area include the Santa Barbara County Comprehensive Plan (Comprehensive Plan) and City of Buellton General Plan. These two general plans are described below and summarized in Table 1d.6-3.

Table 1d.6-3

Summary of General Plan Policies Relevant to Groundwater Sustainability in the CMA Plan Area

Element	Policy/Action No.	Quoted Description	GSP Consistency
Santa Barbara County Comprehensive Plan			
Conservation Element – Groundwater Resources Section	**Goal 1**: To ensure adequate quality and quantity of groundwater for present and future County residents, and to eliminate prolonged overdraft of any groundwater basins.		
	Policy 1.1	The County shall encourage and assist all of the County's water purveyors and other groundwater users in the conservation and management, on a perennial yield basis, of all groundwater resources.	Consistent.
	Action 1.1.1	The County shall encourage and, where feasible, financially assist in continued studies of new or supplemental water sources and the more efficient use of existing sources, for the purpose of avoiding, reducing, or eliminating prolonged overdraft. To ensure that such water is used to reduce overdraft (as opposed to supplying only new uses), the County shall encourage water purveyors to give first priority to offsetting existing demands met by overdrafting groundwater supplies.	Consistent.
	Action 1.1.2	The County will seek the voluntary cooperation with purveyors during the early planning of any supplemental water sources that the purveyors propose or plan to develop. The County will coordinate with the purveyor, to the extent allowed by the purveyor, to ensure that: (1) environmental constraints are fully incorporated into the location and design of such projects; and (2) mitigations are applied to the fullest extent feasible and consistent with County permit conditioning policies and practices to minimize the magnitude of significant impacts.	Consistent.
	Policy 1.2	The County shall encourage innovative and/or appropriate, voluntary water conservation activities for increasing the efficiency of agricultural water use within the County.	Consistent.
	Action 1.2.1	The County shall provide support to the Soil Conservation Service, the Resource Conservation District, and other appropriate agencies to continue the Irrigation Management Program and other such water conservation and management efforts.	Consistent.

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Action 1.2.2	The County shall support the expansion of existing efforts by the U.C. Cooperative Extension/Farm Advisor, in cooperation with the Agricultural Commissioner, Soil Conservation Service, Resource Conservation District, and other appropriate agencies, to develop and update a verifiable comprehensive database on agricultural water use and conservation effectiveness. Such efforts should include incentives for groundwater users to collect and provide more accurate data, as needed to permit the development of more precise determinations of consumptive groundwater use.	Consistent, but SGMA now provides additional regulatory authority and tools to collect groundwater data.
	Policy 1.3	The County shall act within its powers and financial abilities to promote and achieve the enhancement of groundwater basin yield.	Consistent. GSA now has additional authorities to do the same.
	Policy 1.3.1	Where feasible and consistent with the County's applicable Comprehensive Plan element(s), the County shall encourage and assist appropriate agencies in ongoing or future projects and programs which increase groundwater recharge and basin yield, as long as such projects and programs can be shown not to degrade groundwater quality. Such activities could include, but would not be limited to, cloud seeding, range management, dams, and spreading basins.	Consistent.
	Goal 2: To improve existing groundwater quality, where feasible, and to preclude further permanent or long-term degradation in groundwater quality.		
	Policy 2.1	Where feasible, in cooperation with local purveyors and other groundwater users, the County shall act to protect groundwater quality where quality is acceptable, improve quality where degraded, and discourage degradation of quality below acceptable levels.	Consistent.
	Action 2.1.1	In reviewing or preparing basin management plans under the Groundwater Management Act and other applicable law, the County shall consider both the quantity and quality of groundwater in affected basins. Pumpage that causes intrusion of poor quality water, if and where identified, should receive particular attention for improved management.	This policy should be updated to reflect SGMA, as it supersedes the Groundwater Management Act.
	Action 2.1.2	In basins or sub-basins with water quality problems, the County will encourage reduction of salt and other pollutant loading from all sources through cooperative, voluntary efforts and, where feasible, will take direct action in this regard.	Consistent. Note that while cooperative and voluntary efforts are preferred, SGMA gives GSA authority to mandate mitigation if sustainability criteria are threatened or exceeded.

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Policy 2.2	The County shall support the study of adverse groundwater quality effects which may be due to agricultural, domestic, environmental and industrial uses and practices.	Consistent.
	Action 2.2.1	The County shall cooperate in ongoing and future studies which determine the current and potential extent of agricultural, domestic, environmental and industrial pollutants in various County aquifers, and to ascertain better methods by which agriculturalists can prevent increasing pollutant loads in the future. Such studies should be coordinated with the basin planning and enforcement work done by the RWQCB and SWRCB, and should involve other appropriate agencies and groundwater users.	Consistent.
	Goal 3: To coordinate County land use planning decisions and water resources planning and supply availability.		
	Policy 3.1	The County shall support the efforts of the local water purveyors to adopt and implement groundwater management plans pursuant to the Groundwater Management Act and other applicable law.	These policies and actions should be updated to reflect SGMA, as it supersedes the Groundwater Management Act.
	Action 3.1.1.	The County shall encourage the preparers of groundwater management plans to consider environmental factors, including but not limited to the potential link between groundwater resources and riparian habitat.	
	Policy 3.2	The County shall conduct its land use planning and permitting activities in a manner which promotes and encourages the cooperative management of groundwater resources by local agencies and other affected parties, consistent with the Groundwater Management Act and other applicable law.	
	Action 3.2.1	The County Flood Control & Water Conservation District or the County Water Agency, as feasible and as requested by a local agency or agencies pursuant to the Groundwater Management Act, may assume responsibility in preparing a groundwater management plan pursuant to the Groundwater Management Act and other applicable law.	
	Policy 3.2	The County shall use groundwater management plans, as accepted by the Board of Supervisors, in its land use planning and permitting decisions and other relevant activities.	
	Action 3.3.1	The Board of Supervisors, in consultation with the County Planning Commission, shall accept a groundwater management plan which promotes and is consistent with the Goals of this Groundwater Resources Section of the Conservation Element. Such acceptance shall be rescinded where specific facts and circumstances indicate that a plan has been rendered inadequate to promote these Goals.	

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Action 3.3.2	The County shall conserve waters to the extent feasible through exercise of the County's discretionary land use planning and permitting decisions, and shall promote such conservation through related public and private actions.	
	Policy 3.4	The County's land use planning decisions shall be consistent with the ability of any affected water purveyor(s) to provide adequate services and resources to their existing customers, in coordination with any applicable groundwater management plan.	Consistent.
	Action 3.4.1	The County, in its planning activities, shall work cooperatively with local water purveyors, the County Water Agency, the County Flood Control and Water Conservation District, State and Federal agencies concerned with water resources, and private groups and individuals with particular interest and expertise related to water resources.	Consistent.
	Action 3.4.2	Santa Barbara County shall develop its land use plans and policies in a manner which takes into account all groundwater uses (e.g., domestic, agricultural, natural resources and habitats, etc.).	Consistent.
	Action 3.4.4	Santa Barbara County shall encourage and assist local water purveyors in developing adequate water supplies (groundwater, surface water, desalination, etc.) to serve their customers and communities consistent with the applicable general plan(s).	Consistent.
	Action 3.4.5	The County shall facilitate the efforts of purveyors to serve overlying landowners from the purveyor's system.	Consistent.
	Policy 3.5	In coordination with any applicable groundwater management plan(s), the County shall not allow, through its land use permitting decisions, any basin to become seriously overdrafted on a prolonged basis.	Consistent. Note that the Basin is not designated as critically overdrafted by DWR.
	Action 3.5.1	Based on input from the County Water Agency and P&D, the Board, in coordination with the responsible water purveyor(s), shall designate any basins within the county as "seriously overdrafted" if the following conditions are present: Prolonged overdraft which results or, in the reasonably foreseeable future (generally within ten years) would result, in measurable, unmitigated adverse environmental or economic impacts, either long-term or permanent. Such impacts include but are not limited to seawater intrusion, other substantial quality degradation, land surface subsidence, substantial effects on riparian or other environmentally sensitive habitats, or unreasonable interference with the beneficial use of a basin's resources. The County's fundamental policy shall be to prevent such overdraft conditions.	Consistent. These now constitute the main sustainability indicators under SGMA. Note that the Basin is not designated as critically overdrafted by DWR.

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Action 3.5.2	In seriously overdrafted basins, the County shall not approve discretionary development permits if such development requires new net extractions or increases in net extractions of groundwater, pending development and County acceptance of a basin management plan, consistent with the Groundwater Management Act or other applicable law, which adequately addresses the serious overdraft.	Consistent. Note that the Basin is not designated as critically overdrafted by DWR.
	Policy 3.6	The County shall not make land use decisions which would lead to the substantial overcommitment of any groundwater basin.	Consistent.
	Policy 3.6	New urban development shall maximize the use of effective and appropriate natural and engineered recharge measures within project design, as defined in design guidelines to be prepared by the Santa Barbara County Flood Control and Water Conservation District (SBCFCWCD) in cooperation with P&D.	Consistent.
	Action 3.6.1	In cooperation with the USGS and local water purveyors, the County should conduct or participate in a study to identify in more detail those areas where natural and enhanced recharge is occurring or may occur in each of the County's major groundwater basins and develop detailed design guidelines for ways to protect recharge areas from further degradation.	Consistent.
	Policy 3.8	Water-conserving plumbing, as well as water-conserving landscaping, shall be incorporated into all new development projects, where appropriate, effective, and consistent with applicable law.	Consistent.
	Action 3.8.1	The County shall continue to encourage and, where feasible, financially participate in water-saving landscape experiments and education programs, such as those conducted by the Water Agency's Regional Water Conservation Program.	Consistent.
	Action 3.8.2	The County shall continue to develop and refine uniform standards and guidelines for water conservation in new development projects, which shall recognize that different physical characteristics within various areas may require more than a single set of standards and guidelines. All cities within the County shall be encouraged to adopt similar standards and guidelines.	Consistent.
	Policy 3.9	The County shall support and encourage private and public efforts to maximize efficiency in the pre-existing consumptive M&I use of groundwater resources.	Consistent.
	Action 3.9.2	The County, in consultation with the cities, affected water purveyors, and other interested parties, shall promote the use of consistent "significance thresholds" by all appropriate agencies with regard to groundwater resource impact analysis.	Consistent.

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Action 3.9.3	The County shall continue to refine and update its "significance thresholds" as new data becomes available and as overdraft conditions persist, as specified in the County's CEQA Guidelines. The County's acceptance of duly prepared and adopted groundwater management plans also may necessitate the adjustment of appropriate groundwater thresholds.	Consistent. Note that the Basin is not designated as critically overdrafted by DWR, and sustainable management criteria of this GSP may necessitate updated significance thresholds.
	Goal 4: To maintain accurate and current information on groundwater conditions throughout the County.		
	Policy 4.1	The County shall act within its powers and financial abilities to collect, update, refine, and disseminate information on local groundwater conditions.	Consistent.
	Action 4.1.1	The County Water Agency shall continue to monitor water levels from existing monitoring wells and, in coordination with the U.C. Cooperative Extension/Farm Advisor, shall request, on a voluntary basis, private and public water purveyors and major private groundwater users, including agricultural users, to provide periodic records of groundwater production. Unless deemed unnecessary by the Water Agency's Board of Directors for any year, the Agency shall compile an annual report on the status of pumping amounts, water levels, overdraft conditions, and other relevant data, and shall submit this report to the Board of Supervisors for its acceptance and possible further action. The annual report to the Board shall include a review of the results of all groundwater quality monitoring conducted in the County.	Consistent. The GSA will have this responsibility. The GSA will send annual reports required by DWR to the County as well.
	Action 4.1.2	The County, in consultation with the cities, other counties, affected water purveyors, and other interested parties, shall promote the use of consistent standards by all appropriate agencies with regard to groundwater resources.	Consistent. Note that sustainability criteria for basins under management of a GSP will be specific to each basin.
	Action 4.1.3	The County recognizes the need for more accurate data on all groundwater basins within the County and shall continue to support relevant technical studies, as feasible.	Consistent.
	Action 4.1.4	The County should identify areas where natural resources and habitats depend upon groundwater, and where such resources and habitats have been adversely affected by groundwater overdraft.	Consistent.

Element	Policy/Action No.	Quoted Description	GSP Consistency
	Action 4.1.6	The service area boundaries of existing and planned private water companies shall be defined. These companies shall be requested to provide this information to P&D and the County Water Agency no later than 12/31/94 or, for subsequently organized companies, within six months of their final formation.	Consistent.
	Action 4.1.7	The County recommends that all public and private water companies, districts, and agencies, to the extent legally possible, maintain mutual aid agreements with adjacent districts or private water companies in case of water shortages. Any such agreements shall be noted by the County Water Agency in its annual report (see Action 4.1.1). Such agreements would be based on short-term or emergency needs or identified economic benefits to all parties.	Consistent.
	Action 4.1.8	All water districts and city water departments which have prepared a Water Conservation Plan (under the 1984 Urban Water Management Act) and/or other long-term water planning studies, shall be asked to submit a copy of such plan(s) to the County Water Agency and P&D for review and comment. P&D shall meet with these purveyors to discuss the population/land use projections and their current status.	Consistent.
	Action 4.1.9	The County Water Agency shall continue to work with local water purveyors and other appropriate entities to promote the efficient use of water by all users through education and incentive programs. Progress on such programs shall be reported by the County Water Agency in its annual report (see Action 4.1.1).	Consistent. GSP annual reports will be submitted to the County at the same time they are submitted to DWR.
	Action 4.1.10	The County shall continue to encourage and, where feasible, financially participate in USGS, DWR, SWRCB, and local water purveyors' studies of water quality in basins throughout the County.	Consistent.
	Action 4.1.11	The County shall continue to encourage and, where feasible, materially assist the seawater intrusion monitoring programs of the USGS, local water purveyors, and other appropriate agencies.	Consistent.
	Action 4.1.12	The County shall encourage and, where feasible, materially contribute to the refinement and updating of agricultural water use ("duty") factors by the Soil Conservation Service, the U.C. Cooperative Extension/Farm Advisor, or other appropriate entities.	Consistent.
	Action 4.1.13	The County shall encourage and, where feasible, materially contribute to the refinement of estimates of agricultural water return flows by the State Department of Water Resources, the U.C. Cooperative Extension/Farm Advisor, or other appropriate entities.	Consistent.

Element	Policy/Action No.	Quoted Description	GSP Consistency
City of Buellton General Plan			
Conservation/Open Space Element – Water Resources and Water Quality	**Goal:** Improve and maintain water quality of the region		
	Policy C/OS-1	Encourage efficient water use by existing and future development.	Consistent.
	Policy C/OS-2	Encourage implementation of Best Management Practices to eliminate/minimize the impacts of urban run-off and improve water quality.	Consistent.
Santa Ynez Valley Community Plan			
Public Facilities and Services – Wastewater	**Goal WW-SYV:** Ensure adequate wastewater treatment and disposal throughout the planning area.		
	Policy WW-SYV-1	Development and infrastructure shall achieve a high level of wastewater treatment, in order to best serve the public health and welfare.	Consistent.
	Policy WW-SYV-2	Pollution of surface and groundwater shall be avoided. Where contribution of potential pollutants of any kind is not prohibited and cannot be avoided, such contribution shall be minimized to the maximum extent practical.	Consistent.
Public Facilities and Services – Water	**Goal WAT-SYV-1:** Protect the quality of surface and ground waters from degradation; maintain adequate, safe water supplies; and protect groundwater basins from prolonged overdraft.		
	Policy WAT-SYV-1	Development in the Santa Ynez Valley Planning Area shall incorporate appropriate water efficient design, technology and landscaping.	Consistent.
	Action WAT-SYV-1.1	The County Water Agency shall work with the SYRWCD ID #1 to promote educational programs that encourage efficient water use.	Consistent.
	Policy WAT-SYV-2	Existing and future water supply and quality shall continue to be periodically evaluated with specific measures identified to maintain adequate supply levels and quality, if deemed necessary.	Consistent.
	Action WAT-SYV-2.1	The County will continue to work with local water purveyors to assess water demand under Plan buildout conditions and identify the necessary infrastructure improvements to serve that demand and/or identify new sources of water or improved treatment facilities that may be necessary to meet demand.	Consistent.
Resources and Constraints –	**Goal BIO-SYV:** The Biological Resources of the Santa Ynez Valley Community Plan Area are an Important Regional Asset that Should be Protected, Enhanced and Preserved.		

Element	Policy/Action No.	Quoted Description	GSP Consistency
Biological Resources	Policy BIO-SYV-5	Pollution of the Santa Ynez River, streams and drainage channels, underground water basins and areas adjacent to such waters shall be minimized.	Consistent.

Source: County of Santa Barbara 2009a, 2009b, 2010, 2019b; City of Buellton 2008.

Notes: GSP = Groundwater Sustainability Plan; SGMA = Sustainable Groundwater Management Act; GSA = Groundwater Sustainability Agency; Basin = Santa Ynez River Valley Groundwater Basin; RWQCB = Regional Water Quality Control Board; SWRCB = State Water Resources Control Board; P&D = Planning and Development Department; DWR = California Department of Water Resources; M&I = municipal and industrial; CEQA = California Environmental Quality Act; U.C. = University of California; USGS = U.S. Geological Survey; PRC = California Public Resources Code; CWSA = Certificate of Water Service Availability.

1d.6-2-1 Santa Barbara County Comprehensive Plan

The Santa Barbara County Comprehensive Plan (Comprehensive Plan) outlines land use and growth policies at the county-wide level, and has several elements particularly relevant to groundwater sustainability, including the following:

- **Conservation Element**. The Conservation Element describes and recommends policies and programs designed to protect water resources, agricultural resources, ecological systems, historical and archaeological sites, and mineral resources (County of Santa Barbara 2010).
- **Groundwater Resources Section**. The Groundwater Resources Section is a stand-alone section of the Conservation Element that provides a review of groundwater resource limitations throughout the County, and establishes groundwater resource policies for each of the groundwater basins in the County (County of Santa Barbara 2009).
- **Environmental Resources Section**. The Environmental Resource Management Element is a compendium of the Seismic Safety and Safety Element, the Conservation Element, and the Open Space Element and includes topics such as prime agricultural lands, slopes, biological resources, habitat areas, floodplain and floodways, and geologic hazards, among others (County of Santa Barbara 2009).
- **Community Plans**. The- Comprehensive Plan is supplemented by individual community plans that take into account the local setting, policy issues, and community concerns. There are no community plans applicable to the GSP Plan Area.

1d.6-2-2 City of Buellton General Plan

The City of Buellton (City) General Plan outlines the City's land use and growth policies, reflecting the community's long-term development goals. Many of the goals and policies included in the- City's General Plan supplement those contained in the Comprehensive Plan. The element of the City of Buellton General Plan with goals and policies that explicitly address water resources is the Conservation and Open Space element (City of Buellton 2008).

1d.6-2-3 Santa Barbara County Comprehensive Plan Elements

In the Groundwater Resources section of the Comprehensive Plan's Conservation Element, the County included several findings that generally remain accurate, although certain expectations, particularly with regard to the availability of State Water Project (SWP) water, may no longer be accurate. For example, at the time of preparation (1994), the County recognized that new supplemental water sources, such as SWP water and augmentation of local supplies, would be available and could serve to replenish groundwater basins or be used in lieu of groundwater. However, the availability of SWP water supplies varies with hydrologic cycles where during wet years, the SWP is generally able to deliver sufficient water to meet delivery requests. However, during extended dry periods, the SWP can deliver only a portion of requested deliveries (DWR 2020b, CCWA 2020). For example, the City has experienced periodic drought-related curtailments of water supply from the SWP in recent years requiring the City to rely more heavily on local groundwater supplies (City of Buellton 2021). Existing conditions therefore challenge the expectation contained in the Groundwater Resources section of the County's Comprehensive Plan (County of Santa Barbara 2009a). Furthermore, the land use plans describe groundwater-related actions as voluntary cooperative and collaborative efforts that are not mandated under the regulatory schemes that existed at the time. With the passage of SGMA, specific mandates now exist.

1d.6-2-4 Santa Ynez Valley Community Plan

The Santa Ynez Valley Community Plan (Community Plan) was developed in response to concerns regarding the changing character of the Santa Ynez Valley as a result of increased growth and land use change. The Community Plan supplements the County's Comprehensive Plan and provides a framework for planning future development in the region while maintaining the visions and objectives of the area's residents. The Community Plan covers approximately 72 square miles (46,933 acres) of the Santa Ynez Valley and encompasses the unincorporated townships of Santa Ynez, Ballard, and Los Olivos. The Community Plan does not apply to the incorporated cities of Buellton and Solvang. The predominant land use designation within the Community Plan area is agriculture, followed by residential and very limited commercial and industrial. The Community Plan sets development standards to maintain the rural character and scenic value of the Santa Ynez Valley including limiting subdivision of larger agriculture parcels into smaller parcels, requiring new development to be compatible with adjacent agricultural lands, and preserving existing land designated for agriculture, among others (County of Santa Barbara 2009b).

1d.6-3 Other Planning / Land Use Considerations

All discretionary projects proposed within the Basin are subject to compliance with CEQA. In 2019, the Governor's Office of Planning and Research released an update to the CEQA Guidelines that included a new requirement to analyze projects for their compliance with adopted GSPs. Specifically, the new applicable significance criteria include the following:

- Would the program or project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- Would the program or project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Therefore, to the extent general plans allow growth that could have an impact on groundwater supply, such projects would be evaluated for their consistency with adopted GSPs and for whether they adversely impact the sustainable management of the Basin. Under CEQA, potentially significant impacts identified must be avoided or substantially minimized unless significant impacts are unavoidable, in which case the lead agency must adopt a statement of overriding considerations.

The County has long implemented its own CEQA significance thresholds based on heightened public concern and awareness for the scarcity of the County's groundwater resources. Under County guidelines, "safe yield" is defined as "the maximum amount of water which can be withdrawn from a basin (or aquifer) on an average annual basis without inducing a long-term progressive drop in water level" (County of Santa Barbara 2021). The Environmental Thresholds and Guidelines Manual prepared by the County (County of Santa Barbara 2021) outlines the appropriate use and application of various environmental impact thresholds as they relate to groundwater resources. The County originally determined in 1992 that the safe yield of the Buellton Uplands Basin (roughly equivalent to what is now considered the Buellton Upland subarea) was 1,300 AFY, with pumping that put the Buellton Uplands Basin into overdraft with an estimated “remaining life of available storage” at the time to be 184.6 years (County of Santa Barbara 2021).

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Section 1 E – ADDITIONAL GSP ELEMENTS

The SGMA statue[28] identifies plan additional elements that are not required, but addressed as determined by the CMA GSA[29]:

(a) Control of saline water intrusion.

(b) Wellhead protection areas and recharge areas.

(c) Migration of contaminated groundwater.

(d) A well abandonment and well destruction program.

(e) Replenishment of groundwater extractions.

(f) Activities implementing, opportunities for, and removing impediments to, conjunctive use or underground storage.

(g) Well construction policies.

(h) Measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects.

(i) Efficient water management practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use.

(j) Efforts to develop relationships with state and federal regulatory agencies.

(k) Processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity.

(l) Impacts on groundwater dependent ecosystems.

Elements items (e), (f), (g), and (i) are addressed in detail in project and management actions (Chapter 4) to improve conditions within the basin. Items related to (l) “Impacts on groundwater dependent ecosystems” are addressed in Hydrogeologic Conceptual Model (Section 2a) and Groundwater Conditions (Section 2b).

The Data Management System (DMS) is not included in the Plan Contents[30] article of the SGMA regulations and so is included below.

28 CWC Section 10727.4. Additional Plan Elements

29 23 CCR § 352.8 (g) description of any of the additional Plan elements included in Water Code Section 10727.4 that the Agency determines to be appropriate

30 23 CCR Division 2 Chapter 1.5 Subchapter 2 Article 5. Plan Contents

1e.1 DATA MANAGEMENT SYSTEM

A Data Management System (DMS) was developed as a central source for groundwater data, providing up-to-date technical information regarding Basin conditions. Collecting and centralizing data are steps towards meeting the goals of protecting water rights and ensuring local agencies continue to manage groundwater while minimizing state intervention. In addition to meeting these intentions, SGMA specifically requires the use of a DMS.[31]

The WMA and CMA developed a joint DMS and reserved the following domain name for access:

https://sywater.info

1e.1-1 Data Management Plan

In February 2020, the GSA prepared a Data Management Plan (DMP) to provide a complete description of the planned DMS. The DMP, provided in Appendix 1e-A of this GSP, provides discussion of the general architecture of the DMS, including aspects of the software to be used and strategies for incorporation of various types of data. The DMS uses open-source software for most of the architecture components. The plan identifies how all data types will be handled in the DMS.

The DMP discusses the expected sources of relevant data (Federal, State, County, Local, Municipal) and how they were collected for inclusion into the DMS. There is an identification of a tiered scheme for data collection and verification efforts, in order to focus efforts on higher impact data.

The DMP also includes a general description of the web interface, access to the data stored within the system, and outlines a process for exporting and importing various datasets into the system. The DMP provides other details with regards to various administration concerns, and security steps taken to protect the system.

31 23 CCR § 352.6 Each agency shall develop and maintain a data management system that is capable of storing and reporting information relevant to the development or implementation of the Plan and monitoring of the basin."

1e.1-2 Implementation

In May 2020, the GSA released a technical memorandum (Appendix 1e-B) summarizing data compilation collected and entered into the DMS during the general data collection phase of the project, and additional features that had been developed. Data collection was undertaken throughout the GSP development. Section 2b (Groundwater Conditions), Section 3a (Monitoring Networks), and Section 3b (Sustainable Management Criteria) of the GSP describe and provide interpretations the data contained in the DMS.

Planned updates and maintenance of the DMS are described in Chapter 5 (Plan Implementation).

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CHAPTER 2: BASIN SETTING

The Basin Setting for this CMA GSP is described in terms of the following three topics. The details of each topic and how each relates to the Basin Setting are presented in subsequent sections of the Chapter 2.

Section 2a. Hydrogeologic Conceptual Model

The Hydrogeologic Conceptual Model characterizes the CMA extent and management area, subareas, topography, geology, principal groundwater aquifers, primary sources of water and water uses, and the users of groundwater.

Section 2b. Groundwater Conditions

The Groundwater Conditions Section of this CMA GSP presents the available data that was evaluated, provides an assessment of current CMA groundwater conditions as observed in the period 2015 through 2020, and describes historical conditions using available data from the period 1924 through 2020.

Section 2c. Water Budget

The Water Budget Section of this CMA GSP quantifies groundwater flows into and out of the CMA, including natural conditions (precipitation, groundwater flow, etc.) and human-made conditions (reservoir releases, groundwater pumping, etc.).

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Section 2 A – HYDROGEOLOGIC CONCEPTUAL MODEL

The Hydrogeologic Conceptual Model (HCM) is required to "characterize[s] the physical components and interaction of the surface water and groundwater systems in the basin."[32] Documentation for the HCM provides a written description of the general physical characteristics of the Basin, specifically within the CMA, as related to regional hydrology, land use, and geology and geologic structures, lateral and vertical basin structure (or aquifer) limits, introduction of groundwater quality, and definition of principal aquifers and aquitards. Description of these items in the HCM provides context for subsequent sections and chapters of the GSP.

This HCM contains the following sections:

Section 2a.1, Central Management Area and Adjacent Geology, provides an introduction and overview of the geology of the CMA. This includes a description of the regional geologic structural setting, relevant geologic units, surface geologic mapping, and major structural features. A three-dimensional geologic model was developed for the Basin. Cross-sections developed from this model are provided.

Section 2a.2, Principal Aquifers and Aquitards, provides a discussion of geologic units corresponding to aquifers, including the three-dimensional groundwater basin boundaries (lateral and basal boundaries). This section also summarizes the physical characteristics of the aquifers in each subarea.

Section 2a.3, Hydrologic Characteristics, describes physical surface conditions that interact with the groundwater. This section includes topography, soil map, and watershed extent, a description of surface water components, including rivers and tributaries, and large anthropogenic alterations to the water environment, including imports, exports, and treated wastewater discharge.

[32] 23 CCR § 354.14(a) Each Plan shall include a descriptive hydrogeologic conceptual model of the basin based on technical studies and qualified maps that characterizes the physical components and interaction of the surface water and groundwater systems in the basin.

Section 2a.4, Uses and Users of Groundwater in the Central Management Area, discusses the primary use of groundwater in each of the CMA subareas, including a summary of where groundwater pumping occurs, agricultural lands, and groundwater-dependent ecosystems.

Section 2a.5, Data Gaps and Uncertainty, addresses the data gaps at the time of this GSP, and uncertainty with respect to certain components of the HCM.

2a.1 CENTRAL MANAGEMENT AREA AND ADJACENT GEOLOGY

This section of the CMA GSP provides an overview of the regional geology and defining structures within the CMA that control the lateral and vertical extent of groundwater presence, storage, and flow. Much of this section draws from the Draft Technical Memorandum on Regional Geology and 3D Geologic Model for the Santa Ynez River Valley Groundwater Basin, by Geosyntec (2020), which is included as **Appendix 2a-A**. **Appendix 2a-A** also describes the development of a three-dimensional geologic model based on data collected and analyzed as part of this GSP and references historical reports and studies.

The Basin is located on the Pacific Plate within the Transverse Range geomorphic province of California, which is characterized by east/west-striking, complexly folded and faulted bedrock formations. The Basin is in an irregular structural depression between two mountain ranges and two ranges of hills. Primary structural features of the Basin include large anticline/syncline pairs. These large folds are evident in the rocks and deposits in the valley floor between the folded and faulted Santa Ynez Mountains to the south and the folded and faulted San Rafael Mountains to the north (Upson and Thomasson 1951).

2a.1-1 Mapped Surface Geology

The surface geology of the CMA and the near vicinity has geological formations that consist of the younger water-bearing units and older non-water bearing formations that constitute the CMA portion of the groundwater basin (see **Figure 2a.1-1**) (**Appendix 2a-A**). The extents of the surface geology are based on the Los Alamos, Santa Rosa Hills, Zaca Creek, and Solvang United States Geological Survey (USGS) Quadrangle Maps.[33] Additional local faults were added to Figure 2a.1-1 based on a Quaternary map compilation by USGS (USGS 2020).

2a.1-1-1 Surface Geologic Units

Descriptions of the surficial geologic units that are shown in Figure 2a.1-1, in agreement with publicly available literature and as shown in the three-dimensional geological model and stratigraphic column (Appendix 2a-A), are provided in the following subsections. The geologic unit descriptions are provided

33 Dibblee conducted field mapping for the following USGS 7.5-minute geologic quadrangles that cover the CMA: Los Alamos, Santa Rosa Hills, Zaca Creek, and Solvang Quadrangle.

from the surface units (youngest) to deeper underlying units (oldest), as shown in Figure 2a.1-1. Detailed descriptions for the geologic units, as excerpted from Appendix 2a-A (Geosyntec 2020) are provided below:

Younger Units

River Channel Deposits (Qg)

The River Channel Deposits (Qg) occurs within the modern-day Santa Ynez River channel and consists of fine-to-coarse sand, gravels, and thin discontinuous lenses of clay and silt (Bright et al. 1992; Miller 1976; Upson and Thomasson 1951; Wilson 1959). The grain size typically decreases along the river's reach, fining toward the ocean (Upson and Thomasson 1951). The Qg unit thickness ranges from 30 feet to 40 feet, with observations of localized deposits up to 70 feet in thickness 6 miles west of the City of Buellton along the Santa Ynez River; however, these deposits are largely indistinguishable from the underlying alluvium (Upson and Thomasson 1951). The Qg in the geologic model is interpreted using the Dibblee geologic map and from borehole data, and is generally thought to be hydraulically connected to the Qal, described below.

Alluvium (Qal)

The Quaternary Alluvium (Qal) is composed of a coarse sand upper member and a fine sand lower member, which have been previously described by others (Dibblee 1950; Upson and Thomasson 1951; Wilson 1959; Miller 1976; Bright et al. 1992). For the purposes of the geologic model, these units are not differentiated, and the alluvium was modeled as a single lithologic unit. Qal is composed of unconsolidated, normally graded gravel and medium-to-very coarse sand that grades upward into fine to coarse sand with rare gravels, then fines vertically upward into fine sand, silt, and clay (Upson and Thomasson 1951; Wilson 1959; Miller 1976; Bright et al. 1992; Fugro Consultants 2007). The thickness of Qal varies from approximately 30 to 90 feet in the Buellton Santa Ynez River subarea (Upson and Wilson 1951) to approximately 170 feet to 200 feet in the Lompoc Plain (Dibblee 1950; Upson and Thomasson 1951; Evenson and Miller 1963; Miller 1976; Bright et al. 1992). In sloped areas and drainages, the thickness of Qal varies from less than 10 feet to 50 feet (Fugro Consultants 2007). Qal is the principal source of groundwater in the Lompoc Plain in the WMA (Dibblee 1950; Upson and Thomasson 1951; Evenson and Miller 1963; Miller 1976; Berenbrock 1988; Bright et al. 1992).

Terrace Deposits / Older Alluvium (Qoa)

The Quaternary Terrace Deposits and Older Alluvium (Qoa) typically consists of unconsolidated to poorly consolidated sands and gravels with common silt and clay zones (Dibblee 1950; Upson and Thomasson 1951; Miller 1976; Berenbrock 1988; Bright et al. 1992). Qoa thickness varies from 0 to 50 feet (Bright et al. 1992), up to 150 feet (Upson and Thomasson 1951; Miller 1976; Berenbrock 1988). Qoa underlies alluvium (Qal) in most of the southern Lompoc Plain, and caps hilltops, benches, and upland areas of the Santa Ynez River and major tributaries (Upson and Thomasson 1951; Miller 1976; Berenbrock 1988; Bright et al. 1992).

Orcutt Sand (Qo)

The Quaternary Orcutt Sand (Qo) consists of unconsolidated, well-sorted, coarse to medium sand and clayey sand with scattered pebbles and gravel stringers (Upson and Thomasson 1951; Bright et al. 1992). The top of the formation is locally indurated in Lompoc Valley and Burton Mesa by iron oxides, and the basal portion contains well-rounded pebbles of quartzite, igneous rocks, and Monterey chert and shale (Dibblee 1950). Qo thickness varies from 0 to 300 feet (Upson and Thomasson 1951; Evenson and Miller 1963; Bright et al. 1992).

Paso Robles Formation (QTp)

The geologic unit, Quaternary-Tertiary Paso Robles Formation (QTp) consists of poorly consolidated to unconsolidated poorly sorted gravels, sands, silts, and clays (Dibblee 1950; Upson and Thomasson 1951; Wilson 1959; Miller 1976; Berenbrock 1988; Bright et al. 1992; Yates 2010). QTp varies in thickness from 2,800 feet in the Santa Ynez Upland subarea (Upson and Thomasson 1951) to 700 feet in Santa Rita Valley in the WMA (Dibblee 1950; Miller 1976), and thins westward where it pinches out in the eastern Lompoc Plain, also in the WMA (Dibblee 1950; Upson and Thomasson 1951; Miller 1976).

QTp yields water to wells throughout the study area (Upson and Thomasson 1951; Miller 1976; Berenbrock 1988; Bright et al.1992) and is the principal water-bearing unit in the Basin near Lake Cachuma and in the Santa Ynez Upland in the EMA (Yates 2010).

Careaga Sand (Tca)

The geologic unit, Tertiary Careaga Sand (Tca) yields water and consists of massive, fine to coarse sand with lenses of gravels and fossil shells (Dibblee 1950; Woodring and Bramlette 1950; Upson and Thomasson 1951; Wilson 1959; Evenson and Miller 1963; Miller 1976). Clay and silt beds are characteristically absent, and the uniformity in grain size and presence of seashells distinguish it from the overlying QTp (Dibblee 1950; Upson and Thomasson 1951). Tca is often differentiated into the upper coarse sand Graciosa Member (Tcag) and the lower, fine sand Cebada Member (Tcac), which have been described in literature (Dibblee 1950; Woodring and Bramlette 1950; Upson and Thomasson 1951; Evenson and Miller 1963; Miller 1976; Berenbrock 1988; Bright et al. 1992). Tca thickness can vary from 450 feet to 1,000 feet (Upson and Thomasson 1951) but is typically observed from 500-foot to 800-foot thickness in the Lompoc area, surrounding Lompoc Hills, and in the Buellton area (Dibblee 1950; Evenson and Miller 1963; Miller 1976). The Careaga Sand Formation has been previously identified as an important aquifer within the Santa Ynez River Valley Groundwater Basin (Hoffman 2018).

Older Units

Tertiary-Mesozoic Rocks are consolidated non-water-bearing units, all of marine origin. They consist of the near-shore marine Foxen (Tf), Sisquoc (Tsq), and Monterey (Tm) Formations. The Foxen Formation consists of light gray or tan massive claystone, siltstone, and/or mudstone (Dibblee 1950; Woodring and Bramlette 1950; Upson and Thomasson 1951). The Sisquoc Formation is massive to very thin-bedded, white diatomite and diatomaceous mudstones, with basal massive fine sands (Dibblee 1950; Woodring and Bramlette 1950; Upson and Thomasson 1951). The Monterey Formation, primarily known for its vast oil reserves, consists of variably bedded siliceous shale, diatomaceous mudstone, porcelaneous shale, chert, phosphatic shale, silty shale, limestone, and a basal clay altered tuff (Dibblee 1950; Woodring and Bramlette 1950; Upson and Thomasson 1951).

2a.1-2 Key Geologic Structures within the Central Management Area

Several geologic fault and fold structures are shown on the geologic map of the CMA and the immediate vicinity (Figure 2a.1-1). The existence and orientation of these geologic structures are related to regional movement, generally due to north/south compression. The locations and existence of these features are based on two sources: maps produced by Dibblee (Dibblee 1950, Dibblee 2009a, Dibblee 2009b, Dibblee 2009c, Dibblee 2009d) and a Quaternary map compilation by U.S. Geological Survey (USGS 2020).

2a.1-2-1 Synclines and Anticlines in the Central Management Area

The Santa Rita Syncline is an east-west trending fold trending from the CMA to the WMA. The eastern end of the mapped syncline is in the Buellton Upland subarea of the CMA (Figure 2a.1-1). Just north of the Buellton Bend, the syncline extends southeast underneath the Santa Ynez River alluvium. The syncline extends westward through the Santa Rita subarea to the Lompoc Upland subarea in the WMA. The fold axis runs more or less southeast to northwest in the CMA. The water-bearing units in this syncline fold form the Buellton Aquifer, which, in the CMA, extends underneath a portion of the Santa Ynez River Alluvium east of the Buellton Bend. The axis of the syncline is buried under Qal and Orcutt Sand for most of the extent, therefore the location of the fold's axis is approximate.

The Purisima Anticline is an anticline fold that runs along the top of the Purisima Hills, with the eastern-most extents terminating in the vicinity of Santa Rosa Creek. East of the Purisima Anticline are smaller anticline and syncline folds that make up the Purisima Hills to the north and northeast of the CMA.

2a.1-2-2 Faults in the Central Management Area

With the exception of the Santa Ynez River Fault described below, geologic faults with potential to impede groundwater recharge, storage, or flow are not currently identified in the CMA. Additional geophysical airborne electromagnetic data collected within the CMA, in conjunction with potential input received from water users and the public, may be used to update current understanding of faults that may affect the water environment within the CMA.

The location of the Santa Ynez River Fault is shown in Figure 2a.1-1, consistent with the recent USGS Quaternary fault-and-fold map. The trace of the fault was mapped by the USGS with limited accuracy

(USGS 2020). The fault is estimated to trend northwest in the Santa Ynez River Alluvium from the eastern boundary with the EMA to the Buellton Bend (Figure 2a.1-1), at which point the fault continues northwest along the southern boundary of the Buellton Upland, paralleling the Santa Rita Syncline. The fault may correspond to the base of the Careaga Sand on the southern side of the Santa Rita Syncline.

2a.1-3 Subsurface Geologic Modeling

The three-dimensional shape of the geology at depth is a result of tectonic forces. A detailed subsurface three-dimensional model of the geologic units and structures for the CMA and immediate vicinity is provided in **Appendix 2a-A**. The geologic modeling effort included compiling new data, comprehensively collecting recent well completion reports, interpreting driller's logs and assigning the logged lithologies to principal geologic units.[34] Geologic maps and interpretations of the subsurface from past reports were also incorporated into the model. The resulting three-dimensional model is a compilation of all these sources, and represents the best available three-dimensional understanding of the CMA's geology and hydrogeology.

2a.1-3-1 Geologic Cross-Sections

The locations of four geologic cross-sections in the CMA[35] exported from the three-dimensional geological model are shown in **Figure 2a.1-2**. Details of the four cross-sectional views are shown in **Figures 2a.1-3a** through **2a.1-3c**. The locations of the cross-sections represent the structure and shape of the geologic units that underlie the CMA. A description of the geology shown in each cross-section is provided in **Appendix 2a-A**. The next section discusses these same cross-sections in terms of the aquifers in the CMA.

34 The geologic units included in the geological model, map, cross-sections, and discussion are interpreted from well drilling logs.

35 Cross-section C-C' is located 0.7 miles from CMA-WMA boundary in the WMA and is representative of the geology at the boundary between the CMA Buellton Upland subarea and the WMA Santa Rita Upland subarea.

2a.2 PRINCIPAL AQUIFERS AND AQUITARDS

Principal aquifers refer to aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. The CMA is characterized by a single principal aquifer, the "Buellton Aquifer" shown in **Figure 2a.2-1.** Non-water bearing geologic formations and perched groundwater systems are not subject to SMGA and are not principal aquifers. The subflow of the Santa Ynez River flowing through the Santa Ynez River alluvium managed by SWRCB pursuant to WR 2019-0148 and other orders and decisions, and is also not a principal aquifer.

This section describes the principal groundwater aquifer (Buellton Aquifer) within the CMA as correlated to the principal geologic units. Definition of these geologic units and principal aquifer properties is important in terms of groundwater presence, storage, and flow. These properties are also essential during development of the water budget, and evaluation of current groundwater characteristics and conditions, and for the numerical groundwater model employed to quantify groundwater flow in the Basin under historical, current, and projected future conditions. In agreement with the geologic model prepared for the Basin, the lateral and vertical extents of the Buellton Aquifer, including the definable base of the Basin, are presented and discussed in this section.

2a.2-1 Central Management Area Buellton Aquifer Basin Extent and Thickness

Geologic units are categorized in terms of aquifer properties into two broad categories: (1) water-bearing units composed of "unconsolidated" sedimentary deposits; and (2) non-water-bearing units composed of "consolidated" sedimentary deposits and crystalline rocks. The "unconsolidated" deposits allow water to infiltrate into them, be stored within them, and flow through them. The "consolidated" deposits impede groundwater infiltration, storage, and flow.

The unconsolidated, water-bearing sediments are those with sufficient permeability and storage potential to store and convey groundwater. Less-consolidated materials allow for greater permeability of water. In terms of the defined geologic units of the Buellton Aquifer, the unconsolidated sediment applies to the Careaga Sand and Paso Robles formations.

Non-water-bearing units are consolidated sediments or rock that have low porosity, low hydraulic conductivity, or a combination of the two. Low porosity means there is little space to contain groundwater. Low hydraulic conductivity means groundwater does pass through or move quickly. Consolidation such as cementation and compaction of sedimentary units reduces both porosity and hydraulic conductivity. Crystalline units in the area include igneous and metamorphic rocks, which are also significantly older and have no porosity, which is characteristic of their original extrusion. However, crystalline formations may have fractures resulting in localized instances of increased porosity and hydraulic conductivity, which may be suitable for limited use, such as domestic water supply, but they are considered non-water-bearing. In terms of the defined geologic units for the CMA, this means the Foxen Formation, Sisquoc Formation, Monterey Formation, and the older formations (Hamlin 1985).

2a.2-1-1 Central Management Area Definable Bottom of the Basin

The boundary between water-bearing and non-water-bearing geologic units form the "definable bottom of the basin"[36] and "lateral basin boundaries," [37] as defined by the Sustainable Groundwater Management Act. Regarding the lateral basin boundaries, the current DWR Bulletin 118 Basin boundary[38] is very close to the geologic contact between consolidated deposits (Foxen, Sisquoc, Monterey, and the older formations) and unconsolidated deposits (formations younger than or equal to Careaga) shown in **Figure 2a.2-2**. However, there are some minor differences with the geology mapped by Dibblee (Figure 2a.2-2) and the current CMA boundary. For example, the island of non-water bearing consolidated deposits near Buellton Bend is mapped by Dibblee to extend about 1,000 feet south of the current CMA boundary. However, throughout most of the area, the current CMA boundary lies within a couple hundred feet of the surface geology mapped by Dibblee (Figure 2a.1-1).

Based on the three-dimensional geological model (Geosyntec 2020), the *definable bottom of the Basin* was mapped using the contact between the consolidated deposits (Foxen, Sisquoc, Monterey, and the

36 23 CCR § 354.14(b)(3) The definable bottom of the basin.
37 23 CCR § 354.14(b)(2) Lateral basin boundaries, including major geologic features that significantly affect groundwater flow.
38 SGMA Portal – Basin Boundary Modification Request System. Department of Water Resources. Website. https://sgma.water.ca.gov/basinmod/ Accessed 2021-09-02.

older Formations) and unconsolidated deposits (formations younger than or equal to Careaga) as the base elevation. The Basin bottom elevation has been contoured and is shown on Figure 2a.2-2.

The lateral Basin boundaries are also shown in Figure 2a.2-2 as approximated by the CMA Basin Boundary, where the basin bottom intersects the land surface and is analogous to the hard bottom and side that contains an aquifer. As shown in Figures 2a.2-1 and 2a.2-2, the boundary of the Buellton Aquifer coincides with Buellton Upland boundary for the reach from the Buellton Bend and westward. However, east of the Buellton Bend (Figure 2a.2-1) the Buellton Aquifer extends beneath the Santa Ynez River Alluvium and subflow deposits (Figures 2a.2-1 and 2a.2-2). Figure 2a.2-2 indicates two elevation low points of the Buellton Aquifer in the middle of the synclinal structure. One low spot is located just to the west of Santa Rosa Creek, and another low spot is located west of Highway 101 in the City of Buellton (Figure 2a.2-2). This figure will be updated with the recent SkyTEM Airborne Geophysics aerial electromagnetic survey in 2022.

The combined thickness of the Basin unconsolidated deposits is shown in **Figure 2a.2-3**. This is the maximum depth of a groundwater well in an aquifer throughout the Basin. The thickness of the Buellton Aquifer ranges from less than 100 feet along the border of the synclinal structure to over 2,000 feet along the approximate axis of the Santa Rita Syncline in the Buellton Upland. The saturated thickness of the aquifer at any particular time, or volume of water, is dependent on current groundwater elevations.

2a.2-2 Principal Aquifers and Description for Central Management Area Subareas

The two subareas of the CMA correlates with the surface extents of management zones used by the Santa Ynez River Water Conservation District (**Figure 2a.2-4**, based on Stetson 2021). Zone A represents the Santa Ynez River Alluvium, which is considered part of the surface water flow and not a principal aquifer under SGMA. Zone D represents the Buellton Upland and Buellton Aquifer, the principal aquifer of the CMA. Zone D within the vicinity of the City of Buellton extends below Zone A, which is the similar to the Buellton Aquifer shown under the Santa Ynez Alluvium in Figures 2a.2-1 (extents), 2a.2-2 (base elevation), and 2a.2-3 (maximum aquifer thickness).

2a.2-2-1 Buellton Aquifer

The Buellton Aquifer consists of the Paso Robles and Careaga Formations which are found in the axis of the Santa Rita Syncline. The syncline terminates under the Santa Ynez River Alluvium in the eastern part of the CMA. The Paso Robles and Careaga Formations are older and more consolidated than the alluvial formations.

The Paso Robles Formation, is composed of sand, silt, and clay of non-marine origin and overlies the older marine Careaga Formation. The Paso Robles Formation contains a large proportion of fine-grained material and is composed chiefly of discontinuous, lenticular, and poorly assorted alluvial-fan deposits (Upson and Thomasson 1951). The lower part of the Paso Robles Formation is finer-grained than the upper part. Wells completed in the Paso Robles Formation yield from 200 to 1,000 gallons per minute (gpm) (Hamlin 1985; Upson and Thomasson 1951). The Paso Robles formation and has a similar permeability as the Orcutt Sand (Upson and Thomasson 1951), approximately 5 feet per day. In the upland deposits, the Paso Robles Formation is often completely unsaturated (Bright et al. 1992).

The Careaga Formation has two sub-members including the upper Graciosa Member with medium to coarse sand, and the lower Cebada Member with typically finer sand. The Graciosa Member is the main producer of groundwater in the Buellton Aquifer (Bright et al. 1992). Permeabilities in the Graciosa Member range from 0.1 to 100 feet per day (Upson and Thomasson 1951; Wilson 1959; Bright et al. 1992, 1997), with an average permeability of approximately 9.4 feet per day[39] (Hamlin 1985; LaFreniere and French 1968). Hydraulic conductivity of the Cebada Member ranges from 0.1 to 3 feet per day beneath the Lompoc Plain (Bright et al. 1992). The specific yield of the Careaga Formation ranges from 10-30%, and a 10% specific yield was utilized in the Buellton Upland Groundwater Management Plan (Santa Ynez River Water Conservation District and City of Buellton, 1995).

Buellton Aquifer in the Santa Ynez River Alluvium Subarea

From the CMA/EMA boundary to the Buellton Bend, the Buellton Aquifer lies underneath the Santa Ynez River Alluvium (Upson and Thomasson 1951; Wilson 1959; Geosyntec 2020 Figure 2a.1-3a and Figure 2a.2-

39 Unit conversion from 70 (gal/d)/ft^2 in Hamlin (1985).

5). The similarities between the Lower Aquifer in the WMA and Buellton Aquifer in the CMA are noted by Upson and Thomasson (1951, pg. 52):

> Thus, only near Buellton and in the Lompoc subarea, where it crosses the two ends of the Santa Rita syncline that is, for only about 18 miles of its entire course, is the Santa Ynez River in direct contact with the major bodies of water-bearing deposits (*Lower (Buellton) Aquifer*) in its valley. (Parenthesis added)

Because the majority of wells in the SYRA subarea are shallow, a precise understanding of the Buellton Aquifer underneath the Santa Ynez River is undetermined. The 3D Geologic model (Geosyntec 2020) is able to model the geologic structure of this area using the existing well logs and bedding angles of the syncline. Additional geophysical AEM data collected within the CMA will be able to fill in more details and validate the geologic structure of the Buellton Aquifer in the SYRA subarea.

Buellton Aquifer in the Buellton Upland Subarea

Excluding the agricultural areas of Santa Rosa Creek drainage, the Buellton Upland is relatively rugged and has not been extensively developed, and consequently, few wells have been drilled in the Buellton Upland, and fewer deeper wells have been drilled into the Careaga and Paso Robles formations. The lack of well and water level information over time has led to a data gap about details and changes in groundwater movement in the Buellton Upland, especially in the Careaga and Paso Robles formations. All water bearing geologic units in the Buellton Upland are grouped into the Buellton Aquifer.

Geologic cross-sections A-A’, B-B’, and C-C’ (Figures 2a.1-3a through 2a.1-3c) show the Santa Rita Syncline and the Buellton Aquifer (the Paso Robles and Careaga Formations) through the Buellton Upland from east to west. The deposits of the Paso Robles and Careaga Formations are on a steeper slope on the south side of the syncline compared with the north side flanking the Purisima Hills (Figures 2a.1-3a through 2a.1-3c). Except for the area from the CMA/EMA boundary to the Buellton Bend, the Buellton Aquifer is separated from the Santa Ynez River and subterranean alluvial deposits, by non-water bearing deposits of Sisquoc and Monterey Shale Formations (Figures 2a.1-3b and 2a.1-3c).

The groundwater movement of the Buellton Aquifer in the Buellton Upland generally follows the surface topography flowing from north to south, from the Purisima Hills towards the Santa Ynez River (Hamlin

1985). A conceptual diagram showing this water flow is **Figure 2a.2-6**. Section 2a.3 describes controls on inflows into the groundwater system, and Section 2a.4 describes uses and outflows of water out of the groundwater system including seeps and springs along the CMA southern boundary.

A recommendation was made in 1995 as part of the Buellton Upland Groundwater Management Program (Santa Ynez River Water Conservation District and City of Buellton, 1995) to develop a more extensive groundwater water level database for the Buellton Upland. So far, this update to the monitoring program in the Buellton Upland has not occurred but can be planned for as part of this SGMA effort.

This Buellton Aquifer is described in the Buellton Upland Groundwater Basin Management Plan (Santa Ynez River Water Conservation District and City of Buellton, 1995) as having "many confined and unconfined water bearing zones within the overall basin", which probably relates to the heterogeneity of the deposits of the Buellton Aquifer in the CMA and lenses of coarser deposits within both the Paso Robles and Careaga Formations.

2a.2-3 Summary of the Aquifer Properties

In the Santa Ynez River Alluvium, managed by SWRCB under WR 2019-0148, the permeability, or hydraulic conductivity, of the alluvial deposits varies widely upon location and depth. The permeability of the river gravel deposits along the Santa Ynez River ranges from 100 to 700 feet per day (Upson and Thomasson 1951). Compared to the Santa Ynez River alluvium upstream of Solvang in the EMA, which has 15% or less clay deposits in the Santa Ynez River Alluvium, the Buellton area has clay deposits that compose as much as 43% of the drilling log materials (Wilson 1959). The specific yield of the Santa Ynez River gravel deposits along the Santa Ynez River is estimated as high as 30 percent (Bright et al. 1997). However, in the Buellton area the specific yield is estimated at 17 to 18 percent (Wilson 1959).

In the Buellton Aquifer in the CMA, the permeability and storage coefficients of the Paso Robles and Careaga Formations are relatively much less than the Santa Ynez River Alluvial deposits. Hydraulic conductivity of the Graciosa Member of the Careaga Formation (upper Careaga) ranges from about 5 feet per day to 90 feet per day (Bright et al. 1992). Hydraulic conductivity of the Cebada Member of the Careaga Formation (lower Careaga) ranges from 0.1 to 3 feet per day (Bright et al. 1992). The Paso Robles Formation has a similar range of hydraulic conductivity as the Careaga. However, the Paso Robles formation in the Buellton Upland is predominantly clayey and probably yields and transmits water very slowly (Upson and Thomasson 1951). The storage coefficients for the Buellton Aquifer have been estimated to range from 0.04 to 0.08 percent (Bright et al. 1997). The specific yield for unconfined portions of the Buellton Aquifer have been estimated from 10-30%, and the Buellton Upland Workgroup concluded that a 10% specific yield was appropriate for the Buellton Aquifer (Santa Ynez River Water Conservation District and City of Buellton, 1995).

The wells in the CMA with available aquifer pump tests were analyzed. The data are from well completion reports from DWR, County of Santa Barbara Department of Environmental Health Services[40], and local water agencies. Most data is from the County of Santa Barbara because the County requires a pump test for wells that are permitted as a single parcel and as multiple-parcel water systems, State small water systems[41], and Public Water Systems with less than 200 service connections.[42] Most of the tests are of short duration and only include one observation of drawdown. Specific capacity data was analyzed for 31 pump tests in the Santa Ynez River Alluvium with well depths of less 220 feet. Similarly, specific capacity data was analyzed for 41 pump tests in the Buellton Aquifer with well depths greater than 220 feet.

Using the available pump-test data, the median yield, specific capacity, and hydraulic conductivity were calculated for each aquifer. The hydraulic conductivities were estimated using the methodology from Driscoll (Driscoll, 1986). The median yield of the pump tests was estimated to be 650 and 500 gallons per minute (gpm) for the Santa Ynez River Alluvium and Buellton Aquifer, respectively. The median specific capacity of 53 and 7 gpm per foot of drawdown was estimated for the Santa Ynez River Alluvium and Santa Ynez River Aquifer, respectively. The median hydraulic conductivities of 400 and 10 feet per day (ft/day) were calculated for the Santa Ynez River Alluvium and Buellton Aquifer in the CMA, respectively.

40 Acting as Local Primacy Agency (LPA) under Health and Safety Code 116325 et seq.

41 Health and Safety Code Section 116275 (n) "State small water system" means a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year

42 Health and Safety Code Section 116330 (a) [..] This delegation shall not include the regulation of community water systems serving 200 or more service connections. [..]

2a.2-3-1 Estimated Groundwater Age

Mapping done by Lawrence Livermore National Laboratory used tritium (^3H) helium (^3He) to estimate groundwater age (**Figure 2a.2-7**). This is an estimate of when the water last was in the atmosphere (Visser et al. 2014). This indicates the oldest groundwater is in the northwest Buellton Upland at 40 to 50 years old. The subflow in the eastern Santa Ynez River Alluvium is shown as having a younger age of 30–40 years. The east Santa Ynez River Alluvium is shown as having a younger age of 30 to 40 years. This likely represents conditions in the Buellton Aquifer, as the Santa Ynez River Alluvium is much younger being subflow of the Santa Ynez River.

Groundwater age is related to the relative amount of water that is recharged: younger water indicates higher recharge. In terms of water quality, younger water high vulnerability to groundwater contamination from the surface, but quicker recovery from contamination. The water budget (Section 2c) uses a modeling method to estimate flows, unlike this trace isotope method.

2a.2-3-2 Water Quality in the Central Management Area

Water-quality problems most frequently encountered in the CMA pertain to high salinity and hardness (City of Buellton 2021b; RWQCB 2019). The salinity measured as Total Dissolved Solids (TDS) concentration of the groundwater in the City of Buellton at 828 milligrams per liter (mg/L) in wells exceeds the recommended limit[43] of 500 mg/L, but is less than half the concentrations found elsewhere in the Basin, such as the Lompoc Plain of the WMA. In the Santa Ynez River Alluvium in the CMA, the TDS concentration of groundwater in the ranges from 630 to 2,000 mg/L (Hamlin 1985). Groundwater salinity in the Santa Ynez River Alluvium increases from east to west as the subflow travels over the non-water bearing Monterey Shale (Hamlin 1985). Conversely, in the Buellton Aquifer in the CMA, the TDS concentration of groundwater is typically less than 500 mg/L (Hamlin 1985).

Collected samples from the Santa Ynez River Alluvium in the CMA show water quality concentrations exceeding maximum or secondary contaminant levels for drinking water and impairment for irrigation, including the parameters of arsenic, iron, manganese, nitrate, and sulfate, as provided in California's

[43] Secondary Maximum Contaminant Level. Non-mandatory reference water quality standard set by Federal Environmental Protection Agency.

Groundwater Ambient Monitoring Assessment (GAMA) program (Haas et al. 2019). The Buellton Aquifer in the Buellton Upland is generally of better water quality than the Santa Ynez River Alluvium along the Santa Ynez River. However, samples for some wells in the Buellton Aquifer i have water quality concentrations exceeding maximum or secondary contaminant levels for drinking water and impairment for irrigation, including the parameters of arsenic, manganese, and nitrate as provided in California's Groundwater Ambient Monitoring Assessment (GAMA) program (Haas et al. 2019).

The current status of the CMA groundwater quality is discussed in detail in Groundwater Conditions (Section 2b). Monitoring Network (Section 3a) discusses current and future monitoring, and Sustainable Management Criteria (Section 3b) identifies specific monitoring targets as well as time series graphs.

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2a.3 HYDROLOGIC CHARACTERISTICS

Hydrologic characteristics of the CMA related to groundwater recharge, including aerial precipitation recharge, mountain-front recharge, and streamflow infiltration, are presented in this section. Additional details for these topics are discussed in Water Budget (Section 2c) which also quantifies the hydrologic inflows and outflows of the CMA.

2a.3-1 Topography

The topography of the CMA is a major factor on the movement of surface water and groundwater and magnitude of precipitation and groundwater recharge. Groundwater movement in the CMA follows the surface topography. The CMA boundary, topography, and various geographic features within or adjacent to the area are shown in **Figure 2a.3-1**. Ground-surface elevations in the CMA vary from the Santa Ynez River, at approximately 220 feet above sea level[44] near Santa Rosa Park, to the surrounding hills, which can exceed more than 1,175 feet. The mouth of Santa Rosa Creek is at approximately 240 feet, the City of Buellton is at approximately 320 to 520 feet, and the Bobcat Springs Mutual Water Company is at elevations of over 1,120 feet.

The terrain south of the Santa Ynez River rises relatively steeply to the Santa Ynez Mountains between the Santa Ynez River valley and the south coast of Santa Barbara County. North of the river the land is the hilly southern extents of the Purisima Hills, which include the Redrock Mountain peak at 1,973 feet. The Santa Rita Hills, are located west of the CMA in between the upland and the Santa Ynez River and have a peak of over 1,280 feet.

2a.3-2 Precipitation

Precipitation within the CMA is in largely driven by orthographic lift effects, and portions of the CMA at lower elevations portions generally receive less direct precipitation. **Figure 2a.3-2** shows the average precipitation within the CMA and adjacent watersheds (watershed extents discussed below in Section 2a.3-4). Direct annual average precipitation within the basin ranges from 16 inches per year in portions of

44 In accordance with 23 CCR § 351 (v), elevations are in North American Vertical Datum of 1988 (NAVD88).

Santa Rosa Creek up to 20 inches per year along the north side of the Santa Ynez River. CMA subareas annual average direct precipitation are summarized in the following table (**Table 2a.3-1**), and more detail breakdowns are found in the Water Budget (Section 2c). The watershed south of the Santa Ynez River (which flows towards the CMA) ranges from 18 up to 27 inches per year.

Table 2a.3-1
Summary of Average Annual Precipitation by CMA Subarea

CMA Subarea	Average Annual Precipitation (Average 1981-2010)
Buellton Upland	16 – 20 in/year
SYR Alluvium	17 – 21 in/year

Source: Derived from PRISM Climate Group (2014), Average Annual Precipitation 1981-2010.

Precipitation gages for the CMA and adjacent areas are also shown on **Figure 2a.3-2**. Within the CMA precipitation is measured at the Buellton Fire Station. Data for Water Year 1955-present (2021) is presented in **Figure 2a.3-3**. Shown in Figure 2a.3-3 is the annual precipitation and the cumulative departure from mean (CDM) for this data. CDM trends shows how relatively wet or dry a series of years are to the period of record. The Water Budget (Section 2c) additionally discusses precipitation and future projections.

2a.3-3 Soils and Infiltration

Precipitation and other supplemental water from agricultural sources can infiltrate to become groundwater, evaporate into the atmosphere, or run off to become surface water. Annual average precipitation within the CMA ranges from 16 inches per year in portions of Santa Rosa Creek up to 20 inches per year along the north side of the Santa Ynez River (Prism Climate Group 2014). Soil properties and slope are important controls on infiltration and runoff as well as indicate the potential for specific agricultural use. The soil characteristics of the CMA in terms of their potential infiltration rates are shown in Figure **2a.3-4**.

Soils are the combination of minerals, organic matter, living organisms, gas, and water that are located at land surface. Their total composition and elevation greatly affect their infiltration rate and contribution to groundwater recharge in addition to the types of unconsolidated or consolidated sediments underlying them.

2a.3-3-1 Natural Recharge Areas

Recharge in the CMA ranges from high to very slow as shown on **Figure 2a.3-5**. Areas with high recharge are dominant in the Buellton Upland west of Highway 101 to Santa Rosa Creek on the southern slopes of the Purisima Hills and along the Santa Ynez River. These areas correspond to Careaga Sand Formation in the Buellton Upland and to the river gravels along the Santa Ynez River.

Areas of slow or very slow recharge include areas west of the City of Buellton north and south of Highway 246 and areas east of Zaca Creek and north of Highway 246 near Ballard Canyon. These areas correspond to older alluvial deposits in the lower drainage of the tributaries in the Buellton Upland.

Recharge through seepage and percolation from the Santa Ynez River to the Santa Ynez River Alluvium is also a major source of recharge in the CMA (Upson and Thomasson 1951). Releases from Lake Cachuma for the "Above Narrows Account," described below in the Section 2a.3-4-2, Rivers and Streams, is for recharging the river alluvium in this subarea.

The Water Budget (Section 2c), uses the estimates of total recharge from the USGS Basin Characterization Model (BCM). This USGS model used monthly climate data including precipitation and soils information to estimate the volume of groundwater recharge.

2a.3-3-2 Potential Groundwater Recharge Areas

In addition to natural recharge, DWR recommends including in the Groundwater Sustainability Plan the Soil Agricultural Groundwater Banking Index (SAGBI) map (**Figure 2a.3-5**), which is a classification of the suitability of agricultural land for use in groundwater banking conducted by UC Davis (DWR 2016). Groundwater banking means using artificial recharge to store water in the aquifer for later withdrawal through pumping.

The SAGBI ratings are only available for agricultural land, and are based on a combination score using the following five factors to ensure that an artificial recharge project would be successful, including limited adverse impact on existing crops (O'Geen et al. 2015):

1. Deep percolation
2. Root zone residence time
3. Topography
4. Chemical limitations
5. Soil surface condition

Potential groundwater banking projects will be described in further detail when projects and management actions are developed for the CMA. Potential areas for artificial recharge have been identified along the Santa Ynez River, Zaca Creek, and Santa Rosa Creek, identified as "excellent" as shown on **Figure 2a.3-5.**

2a.3-4 Runoff and Surface Flows

The CMA aquifers are recharged by rainfall in the watershed and infiltration of surface flows in the Santa Ynez River and tributaries. These flows are supplemented by water-rights releases into the Santa Ynez River from Bradbury Dam at Lake Cachuma.

2a.3-4-1 Santa Ynez River Watershed

The CMA is located wholly within the Santa Ynez River watershed (**Figure 2a.3-6**).[45] Smaller local watersheds are shown in **Figure 2a.3-7,** including Zaca Creek and Santa Rosa Creek north of the Santa Ynez River. Nojoqui Creek is located south of the Santa Ynez River and is outside of the CMA. However, it is an important source of recharge to the Santa Ynez River. The larger Santa Ynez River watershed is a catchment area for the Santa Ynez River, which is a major source of recharge in the CMA within Santa Ynez River Alluvium.

Precipitation, water imports, and other water sources in the Santa Ynez River watershed outside of the CMA interact with the CMA through several routes:

45 Santa Ynez, Hydrologic Unit 18060010: 573,819 Acres

- As runoff to surface water streams and rivers, which flows as surface water and subflow into the CMA. Examples are waters of the Santa Ynez River, Zaca Creek, Santa Rosa Creek, and Nojoqui Creek. A portion of this surface flow and subflow can infiltrate the unsaturated zone to recharge the Santa Ynez River Alluvium and Buellton Aquifers.

- As mountain front groundwater recharge, which is the subsurface inflow of groundwater to lowland aquifers from adjacent mountains. This likely occurs along the north of the CMA to the Buellton Upland subarea into the Buellton Aquifer, as well as south of the CMA to the Santa Ynez River Alluvium.

- As groundwater flow between management areas. Based on the ground water elevation gradient and thickness of saturated deposits between the EMA and CMA, groundwater will flow into the CMA at the upstream boundary.

2a.3-4-2 Santa Ynez River and Tributaries

The Santa Ynez River flows west over approximately 90 miles from its headwaters in the Santa Ynez and San Rafael Mountains to the Pacific Ocean, draining approximately 900 square miles. The Santa Ynez River headwaters originate in the Santa Ynez and San Rafael Mountains at an elevation of about 4,000 feet near the eastern boundary of Santa Barbara County, with average annual precipitation of up to 49 inches per year (PRISM Climate Group 2014). The Santa Ynez River has three dammed reservoirs upstream of the EMA, CMA, and WMA: Jameson Reservoir is the farthest upstream, then Gibraltar Reservoir, and finally Cachuma Reservoir (Lake Cachuma) (Figure 2a.3-6). Although reservoir releases do flow into the Santa Ynez River, the reservoirs are also managed to divert water out of the Santa Ynez River watershed via a system of tunnels through the Santa Ynez Mountains for use by the cities located on the Santa Barbara County south coast (i.e., Goleta and Santa Barbara).

Downstream of Bradbury Dam, the dam that forms Lake Cachuma, the Santa Ynez River continues flowing west, with the River subflow entering a bedrock-confined channel in the western CMA. The flow of the river is primarily intermittent throughout the Basin, carrying mainly flood flows from tributary watershed land downstream of Bradbury Dam, and occasional spills and releases of water from Lake Cachuma. During summer months, water is released from Lake Cachuma to meet downstream water rights.

Historical flows of the Santa Ynez River at Solvang near where it enters the CMA are shown on **Figure 2a.3-8**. During summer months, water is released from Lake Cachuma to meet downstream water rights and releases for endangered steelhead (*O. mykiss*) as specified in the SWRCB Orders, the Cachuma Project Settlement Agreement, and the National Marine Fisheries Service Biological Opinion (see Section 1d.5).

There are three main tributaries in the CMA that flow into the Santa Ynez River in the CMA. These include from east to west: Zaca Creek, Nojoqui Creek, and Santa Rosa Creek. Zaca Creek has a 40-square-mile watershed and is located north of the Santa Ynez River. The Zaca Creek watershed drains approximately 27 square miles before leaving the EMA, crossing non-water-bearing geology, and then into the watershed of the CMA. Historical flows of the Zaca Creek near where it enters the CMA are shown on Figure 2a.3-8.

Nojoqui Creek has a 16.4-square-mile watershed and is located south of the Santa Ynez River. The Nojoqui watershed extends from the Santa Ynez River southward along the northern slope of the Santa Ynez Mountains. Most of the approximately 16 square miles of Nojoqui watershed is outside of the CMA boundary.

Santa Rosa Creek drains an approximately 16.5-square-mile watershed and is located north of the Santa Ynez River, originating from the southern slope of the Purisima Hills. Approximately 6.3 square miles of the watershed is located outside of the CMA.

There are several smaller tributaries in the CMA including Adobe Canyon and Ballard Canyon located east of Zaca Creek, and Cañada De La Laguna and Cañada De Los Palos Blancos between Zaca Creek and Santa Rosa Creek.

2a.3-4-2-1 Downstream Water Rights Releases

A portion of the CMA aquifer is recharged by downstream water rights releases from Lake Cachuma as ordered by the Santa Ynez River Water Conservation District (SYRWCD) pursuant to the requirements of then applicable SWRCB orders. Water rights releases for users downstream of Lake Cachuma are set forth in the State Water Resources Control Board Order of 1973 (WR 73-37), as amended in 1989 (WR 89-18) and most recently in 2019 (2019-0148). These releases are based on the establishment of two accounts and accrual of credits (storing water) in Lake Cachuma for the Above and Below Lompoc Narrows areas.

Flow at the Lompoc Narrows is measured the USGS gage 11133000 shown on Figure 2a.3-7, and Figure 2a.3-8 shows historical annual flows of the Santa Ynez River at the Lompoc Narrows. The SYRWCD designates the riparian flow subarea as Zone A, as shown in **Figure 2a.2-4** in the CMA. During downstream water rights releases, water infiltrates and recharges the alluvium in Zone A.

2a.3-4-3 Water Imports

In the CMA, water is imported to City of Buellton through the Coastal Branch Pipeline by Central Coast Water Authority (CCWA). Since 1997 this pipeline has delivered water from the State Water Project (SWP). The pipeline delivers water at turnouts to specific water distribution systems and to Lake Cachuma. Within the Basin, the receiving entities of SWP are Vandenberg Space Force Base, City of Buellton, City of Solvang, and Santa Ynez River Water Conservation District Improvement District No. 1 (ID No. 1). A map of the SYRVGB water import system is shown in **Figure 2a.3-9**. **Figure 2a.3-10** shows the annual imports through the CCWA pipeline to the CMA and to the entire SYRVGB. **Table 2a.3-2** summarizes major water chemistry in the CCWA pipeline, water quality is discussed in groundwater conditions (Section 2b.3).

Table 2a.3-2
Imported CCWA Water Quality in mg/L at
Polonio Pass Water Treatment Facilities

Calendar Year	Total Dissolved Solids (TDS)	Chloride (Cl)	Sulfate (SO_4)	Sodium (Na)	Nitrate as Nitrogen (NO_3 as N)
2020	280	70 (0 – 120)	63	56	-
2019	260	59 (13 - 146)	46	58	-
2018	220	81 (39 -140)	55	40	ND (<0.4)
2017	165 (77 – 394)	39 (8 -145)	30	24	-
2016	346 (194 – 442)	97 (41 – 138)	100	87	ND (<0.4)
2015	437 (349 – 708)	122 (80 – 205)	97	84	ND (<0.4)

Source: CCWA 2021. Ranges in parentheses indicate the measured range.
ND = non-detected, parenthesis is detection limit; - = not reported

Within the CMA, the only importer of water is the City of Buellton. The City of Buellton receives water from the Central Coast Water Authority pipeline at the turnout, as shown in Figure 2a.3-9.

Wastewater return flows sourced from these imports to the City of Buellton is collected as part of the City of Buellton's sewer system and conveyed to the Buellton Wastewater Treatment Plant before discharge (Dudek 2019). In addition, imported water also enters the CMA via wastewater effluent return flows from CCWA delivered upstream to the City of Solvang and ID No. 1 and via mixing of SWP water with water rights releases at Bradbury Dam.

2a.3-4-4 Treated Wastewater Sources

Wastewater treatment plants in the CMA act as a point source of groundwater recharge to the underlying river alluvium.

Within the CMA, wastewater is collected by the City of Buellton and the City of Solvang[46]. Wastewater is conveyed to the treatment facilities listed in **Table 2a.3-3** before it is discharged as treated effluent (Dudek 2019). Locations of the CMA wastewater treatment plants and sewer collection areas are shown in **Figure 2a.3-11**.

Table 2a.3-3
Wastewater Treatment Facilities

	Design Capacity (AFD)	Permitted Capacity (AFD)	Permitted Secondary (AFD)	Permitted Tertiary (AFD)	Current Disposal Method (Permit)	Level of Treatment	Recycled Water Uses
Buellton WWTP	2.0	4.0	4.0	0	Percolation ponds (WDR)	Secondary	Groundwater recharge
Solvang WWTP[18]	3.1	4.6	4.6	0	Percolation ponds (WDR)	Secondary	Groundwater recharge

Source: CCWA 2011, page 48. Values converted from million gallons per day.
ADF = acre-feet per day; WWTP = Wastewater Treatment Plant; WDR = waste discharge requirement

46 Solvang Wastewater Treatment Plant is located within the City of Solvang outside of the CMA, but discharges its wastewater at the border of the CMA and EMA inside the CMA.

Average daily secondary treated effluent from the City of Buellton for recent years is provided in **Table 2a.3-4** as flows into infiltration basins (City of Buellton 2021).

Table 2a.3-4
City of Buellton Secondary Treated Effluent Wastewater Volumes

Calendar Year	Population	Average Secondary Treated Effluent	
		Gallons Per Day	Acre Feet per Year
2020	5,464	478,000	535
2019	5,453	507,000	569
2018	5,098	480,000	538

Source: City of Buellton (2021), City of Buellton (2020), City of Buellton (2019).

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2a.4 USES AND USERS OF GROUNDWATER IN THE CENTRAL MANAGEMENT AREA

This section discusses the primary uses of groundwater in the CMA and presents a summary of locations where groundwater pumping occurs. In addition, this section describes water use on agricultural lands, and discusses water use by phreatophytes.

2a.4-1 Primary Uses of Groundwater

Groundwater production within the CMA is primarily used for agricultural uses, with some domestic, municipal, and industrial use. Outside of the population center of the City of Buellton, most of the CMA is a mixture of rural areas with agriculture and some suburban development. Groundwater production reported by SYRWCD Annual Report (SYRWCD Annual Report) includes the CMA, WMA, and parts of the EMA (Stetson Engineers 2021). The SYRWCD reports on average for the historical period (1982 through 2018) that the use of groundwater in the SYRWCD was 71% Agricultural Water[47], 3% Special Irrigation Water[48], and 26% Other Water.[49] **Figure 2a.4-1** presents groundwater use over this period for the CMA Buellton Upland, after it was split into a unique zone as described below. The Plan Area (Section 1d.3) included maps showing the well density for these water use types.

2a.4-1-1 Santa Ynez River Alluvium Subarea

The CMA Santa Ynez River Alluvium subarea comprises a portion of the SYRWCD Annual Report's Zone A, which extends through all of the Santa Ynez River Alluvium in the EMA, CMA, and WMA (Stetson Engineers 2021). For this larger Zone A area, overall annual average water production has ranged from 8,178 acre-feet per year (AFY) in fiscal year (FY)[50] 1979–1980 to 15,571 AFY in FY 2014–2015.

47 Water first used on lands in the production of plant crops or livestock for market (CA WAT § 75508).
48 Water used for irrigation purposes at parks, golf courses, schools, cemeteries, and publicly owned historical sites.
49 Water used for purposes not including agriculture or irrigation at parks, golf courses, schools, cemeteries, and publicly owned historical sites. Generally, refers to municipal, industrial, or domestic uses of pumped or produced water.
50 Santa Ynez River Water Conservation District's fiscal year is July 1 through June 30.

Agricultural pumping and the majority of the City of Buellton pumping is from the CMA Santa Ynez River Alluvium within this Santa Ynez River Alluvium subarea. In this zone, Agricultural Water has ranged from 6,363 to 12,677 AFY, Special Irrigation Water has ranged up to 1,059 AFY, and Other Water has ranged from 1,355 to 2,806 AFY.

Wells in this subarea that produce water from the Buellton Aquifer are part of SYRWCD Annual Report Zone D, the Buellton Upland, described in the following section.

2a.4-1-2 Buellton Upland Subarea

The Buellton Upland subarea and portions of the CMA Buellton Aquifer (Paso Robles and Careaga Formations) in the Santa Ynez River Alluvium subarea form the SYRWCD Annual Report's Zone D. Prior to FY 1993–1994, this was part of the SYRWCD Zone C. Annual average water production has ranged from 1,309 AFY in FY 1994–1995 to 4,526 AFY in FY 2014–2015.

Agricultural pumping and the City of Buellton pumping occurs from the CMA Buellton Aquifer (Zone D). For this zone, Agricultural Water has ranged from 843 AFY to 3,468 AFY, Special Irrigation water (parks, golf courses, schools, cemeteries, and publicly owned historical sites) has ranged up to 69 AFY, and Other Water (domestic, municipal, and industrial) has ranged from 236 to 1,026 AFY.

2a.4-2 Agricultural Lands

In the CMA, a majority of agricultural lands are located in the lower-lying portions of the CMA with a majority being in the Santa Ynez River Alluvium subarea, as well as in Santa Rosa Creek of the Buellton Upland (**Table 2a.4-1**). County of Santa Barbara classification of parcels by land use was presented as Figure 1d.6-1 (Plan Area). The distribution of crops within the CMA for a representative year, 2016, based on the California LandIQ database, is shown in **Figure 2a.4-2**.

Table 2a.4-1
Summary of CMA Land Use for Agriculture

CMA Subarea	Agricultural Class [A]							Total Acres [B]	Agricultural Use (% total)
	Truck Crops (acres)	Vineyard (acres)	Pasture (acres)	Grain and Hay (acres)	Field Crops (acres)	Deciduous Fruits / Nuts (acres)	Citrus / Subtropical (acres)		
Buellton Upland	340	670	160	120	80	0	0	1,370	9.70%
SYR Alluvium	860	440	300	150	10	40	0	1,810	26.60%
Total	**1,200**	**1,110**	**460**	**270**	**90**	**40**	**0**	**3,180**	**15.40%**

[A] Source of agriculture land use is from the 2016 LandIQ database. "Idle" lands not included.
[B] All numbers rounded to nearest 10 acres after summing.

Planted crops have changed over the years according to the United States Department of Agriculture (USDA) (USDA 2020). Major crops include grapes, strawberries, dry beans, walnuts, and vineyards. According to the USDA, since at least 2012, grapes are the most common crop in both the Buellton Upland and Santa Ynez River Alluvium subareas (USDA 2020).

Table 2a.4-2 presents statistics of agricultural land use for historical 1984/1986 and two recent years (2016 and 2018). This shows that total amount of agricultural land use in the CMA has decreased, however it has increased slightly in the Buellton Upland. Location of active agriculture has shifted somewhat with 52% of the lands irrigated in 1984/1986 irrigated in 2018. By comparison 89% of the active agricultural lands in 2016 were active in 2018.

Table 2a.4-2
CMA Agriculture Land Use for 1984/1986, 2016, and 2018

CMA Subarea	Agricultural Land (acres)			Continuation of Land Use (1984/86 Baseline)			
				Irrigated in 2016		Irrigated in 2018	
	1984/1986	2016	2018	Acres	Percent	Acres	Percent
Buellton Upland	1,270	1,370	1,380	550	43%	550	43%
SYR Alluvium	2,510	1,810	1,720	1,420	57%	1,420	57%
Total	**3,780**	**3,180**	**3,100**	**1,970**	**52%**	**1,970**	**52%**

Acreage rounded to nearest 10 acres. "Idle" lands not included.
Subarea is based on geographic extents in this table
Sources: FMMP 2016 shapefile; 2016 LandIQ database, 2018 LandIQ Database

Crop types affect the amount of water in demand and the timing of water use. Additionally, crops have varying tolerances for degraded water quality, and may require extra water to flush salts from soils. Finally, certain crops, such as leafy vegetables, are associated with fertilizer practices that result in high-nitrate return flows.

2a.4-2-1 Emerging Agricultural Crops: Cannabis Cultivation

The newest regulated crop type in the CMA is cannabis.[51] In June 2016 Senate Bill No. 837 established that the SWRCB has regulatory power to ensure that the diversion of water and discharge of waste associated with cannabis cultivation does not lead to a negative impact on water quality, aquatic habitat, riparian habitat, wetlands, and spring. Santa Ynez River Valley is not identified as a Cannabis Priority Watershed with a high concentration of cannabis cultivation. SWRCB policy (SWRCB 2019b) limits diversions to a maximum of 10 gpm from surface water or subterranean streams without a water right, and requires metering and retention of daily diversion records for a minimum of five years.

In June 2017, Senate Bill No. 94 generally legalized cannabis and established a regulatory system and licensing to control the cultivation, processing, manufacturing, distribution, testing, and sale of cannabis. On July 13, 2021 California established a Department of Cannabis Control to consolidate state regulation. Regulations around protected regional appellations of origin to protect CMA agriculture are being established.

Local and county regulations also apply to cannabis cultivation. City of Buellton generally prohibits commercial cannabis facilities including cultivation within the City limits.[52] In February and May 2018, Santa Barbara County adopted a series of ordinances that regulate commercial cannabis operations within the County's unincorporated area. Lands outside of public lands and areas of local jurisdiction (City of Buellton) are zoned Agriculture-II Zone[53] which requires Land Use Permits from the County.

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51 As defined in California Business and Professions Code Section 26001, parts of the plant *Cannabis sativa Linnaeus*, *Cannabis indica*, or *Cannabis ruderalis*.

52 Buellton Municipal Code Chapter 19.20.

53 Agriculture-II Zone. Commercial Cannabis Regulations. County of Santa Barbara. Web site. http://cannabis.countyofsb.org/zone/agriculture-ii.sbc Accessed 2021-08-26.

Table 2a.4-3 summarizes the status of current applications by parcel within the CMA to the County of Santa Barbara for cannabis Land Use Permits. All cannabis applications in the CMA are for parcels that in 2016 were used for agriculture. This indicates primarily a change of crop type, rather than an expansion of agriculture land use. As of August 2021, within the CMA permits for cannabis agriculture have been issued for four parcels, and were closed with no permit issued for 13 parcels.

Table 2a.4-3
CMA Cannabis Cultivation Land Use Permits as of August 2021

CMA Subarea	Permits Issued	Application In Review			Total Applications
		Approved	Processing	Closed	
Buellton Upland	1	3	7	2	13
SYR Alluvium	3	4	7	11	25
Total	**4**	**7**	**14**	**13**	**38**

County of Santa Barbara Commercial Cannabis Application status as of 2021-08-30.
Subarea is based on geographic extents in this table

2a.4-3 Industrial Use

The Plan Area (Section 1d) shows the land classification, population, and service areas for water suppliers within the CMA, as well as the distribution of municipal and domestic water supply wells.

As discussed in Section 2a.1, the Purisima Anticline north of the CMA, contains two oil and gas production fields: Barham Ranch and Los Alamos. Figure 2a.4-3 shows the location of wells drilled for the purpose of oil and gas exploration. Currently the oil and gas industry uses little water from the CMA. However enhanced oil recovery technologies which may be applied in the future can use significant amounts of fresh water that may be used from the CMA.

2a.4-4 Water Export

Water is exported from the Santa Ynez River watershed from three reservoirs on the Santa Ynez River upstream of the CMA (Jameson Reservoir, Gibraltar Reservoir, and Cachuma Reservoir [Lake Cachuma]) through a series of tunnels that supply cities located on the Santa Barbara County south coast. No groundwater or surface water exports occur within the boundaries of the CMA.

2a.4-5 Potential Groundwater Dependent Ecosystems

DWR recommends (DWR 2016) classification of potential groundwater-dependent ecosystems (GDEs)[54] as (1) wetland features commonly associated with the surface expression of groundwater under natural, unmodified conditions, and (2) vegetation types commonly associated with the sub-surface presence of groundwater (phreatophytes) (Figure 2a.4-4). The source of this dataset is a working group consisting of DWR, the California Department of Fish and Wildlife, and The Nature Conservancy (DWR 2018, Klausmeyer et al. 2018).

Phreatophytes are plants that depend on, and obtain, groundwater that lies within reach of their roots. These include plants grown within the riparian zone of a river, and some agricultural crops, such as alfalfa. Portions of the Santa Ynez River Alluvium subarea and low-lying portions of the Buellton Upland subarea are likely supportive of phreatophyte growth (Figure 2a.4-4). Historical estimates of phreatophytes water use indicate up to 4,000 AFY is used in the CMA along the Santa Ynez River (Upson and Thomasson 1951).

The vegetation most likely not connected to groundwater is located high in the watershed and occurs in a canyon to the west of Santa Rosa Creek and along Dry Creek in the northeast corner of the CMA (Figure 2a.4-4). Because these areas are high in the watershed, perched groundwater conditions may exist in these areas. Perched groundwater has been documented in the WMA in association with Orcutt Sand deposits (Miller 1976; Arcadis 2016). In the CMA, Orcutt sand is typically found in the western half of the Buellton Upland (Figure 2a.1-1), and shallow groundwater system could exist on top of clay layers within multiple lenses. Along Dry Creek in the northeastern portion of the CMA, Dibblee has mapped the non-water bearing Sisquoc Formation (Figure 2a.1-1) as the clay layer associated with this perched groundwater. . Non-water bearing geologic formations and perched groundwater systems are not subject to SGMA.

2a.4-5-1 Discharge and Springs Areas

Habitat classification and active springs and seeps within and adjacent to the Basin are shown in Figure 2a.4-4. Only one active spring and seep has been identified in the CMA on the south side of the Santa Ynez

54 CWC Section 10727.4 Additional Plan Elements: "where appropriate […] (l) Impacts on groundwater dependent ecosystems."

River just east of Nojoqui Creek (Figure 2a.4-4). The quantity of water discharging from this spring near Nojoqui Creek is currently unknown but contributes to the surface flow in the reach and not to the Buellton Aquifer.

Groundwater in the CMA discharges to the Santa Ynez River when the groundwater elevation is higher than the stream channel thalweg. Groundwater discharge to the river will occur during wet winter and spring months, but during the summer and dry winter months, the streamflow loses water to the ground water aquifers of the Santa Ynez River alluvium subarea.

2a.4-6 Wildlife Habitat

Wildlife habitat is a beneficial use of water, primarily through surface water flows of the Santa Ynez River. The controlling plan for Santa Ynez River flows, SWRCB Order WR 2019-0148 on the Cachuma Project on the Santa Ynez River (SWRCB 2019), included a Biological Assessment and Environmental Impact Report. Special species that are potentially located within the CMA are summarized in this section. However, species may have water demands and environmental needs outside of the principal aquifer in this Plan. All six SGMA sustainability indicators protect wildlife, with depletion of interconnected surface water being the SGMA indicator most closely associated with most wildlife.

The U.S. Fish and Wildlife Service (USFWS) has identified wildlife habitat areas within the CMA which support threatened or endangered species. These habitats are indirectly supported by water and land use. **Figure 2a.4-5** shows the locations of these habitat areas. **Table 2a.4-4**, below, lists the species involved.

Table 2a.4-4
U.S. Fish and Wildlife Service Identified
Threatened and Endangered Species with habitat within the CMA

Common Name	Scientific Name
California tiger salamander	*Ambystoma californiense*
Southwestern willow flycatcher	*Empidonax traillii extimus*

Source: U.S. Fish and Wildlife Service (2021)

Neither of the animal species are directly reliant on groundwater. The California tiger salamander has no known reliance on groundwater, and the Southwestern willow flycatcher is indirectly reliant on groundwater as it has reliance on riparian vegetation (Rohde et al. 2019). The California tiger salamander Santa Rita metapopulation centers on two ponds located along highway 246 at the CMA-WMA boundary and extends eastward in the Buellton Upland (U.S. Fish and Wildlife Service 2016). The Southwestern willow flycatcher is a migrant bird that spends the winter in locations such as southern Mexico, Central America, and probably South America, and has breeding range that covers southwestern United States from California to Texas (U.S. Fish and Wildlife Service 2002a).

California species of special concern (SSC) that are potentially within the CMA are the Southern Western Pond Turtle (*Emys marmorata pallida*), and the Two-striped Garter Snake (*Thamnophis hammondii*) (CDFW 2021). The Southern Western Pond Turtleis water dependent (Rhode et al. 2019) and is near endemic and has been found within the Santa Ynez River watershed (Spinks and Shaffer 2005; CDFW 2016) in perennial stretches of the river and elsewhere likely during streamflow events. Two-striped Garter Snake is among the most aquatic of the garter snakes and is often found in or near permanent and intermittent freshwater streams, creeks, and pools, with a range that historically has included the Santa Ynez River watershed although current presence is less certain (CDFW 2016).

The California Red-legged Frog (*Rana draytonii*) is common in the upper watershed of the Santa Ynez River. However, in the lower Santa Ynez River including the CMA these are rare. Deep pools with dense marginal vegetation are rare and introduced aquatic predators are abundant and diverse (U.S. Fish and Wildlife Service 2002b).

2a.4-6-1 Santa Ynez River

Stream flows and subflow of the Santa Ynez River are managed by California State Water Resources Control Board (SWRCB) under WR 2019-0148 as surface water (Section 1d.5, Plan Area).[55] The 2019 Central Coast Basin Plan identified beneficial uses of the Santa Ynez River that supported wildlife habitats

55 CWC Section 10720.5(b) Nothing in this part or in any groundwater management plan adopted pursuant to this part determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.

including Warm Fresh Water Habitat (WARM), Cold Fresh Water Habitat (COLD), Commercial and Sport Fishing (COMM), and Spawning, Reproduction, and/or Early Development (SPWN).

Steelhead in the Santa Ynez River is part of the Monte Arido Highlands Biogeographic Population Group, which is part of the Southern California[56] Distinct Population Segment (DPS) of steelhead which is considered endangered (NMFS 2012). With 94% of the estuarian habitat remaining, the Santa Ynez River has the highest percentage of historical estuarian habitat in this DPS. Groundwater extraction and agricultural development affecting SWRCB managed stream flows of the Santa Ynez River were ranked as threats to steelhead (Table 9-2 in NMFS 2012).

Arroyo chub (*Gila orcutti*) is a California species of concern, introduced to the Santa Ynez River in the 1930s that is native to other southern California river systems. In a 1993 survey these were still present in shallow pools (SWRCB 2019).

In accordance with the SWRCB and National Marine Fisheries Service (NMFS), the Lower Santa Ynez River (LSYR) is monitored by the Cachuma Operation and Maintenance Board (COMB) for Southern California steelhead/rainbow trout (*O. mykiss*) and supporting habitat conditions (COMB 2021). The Lower Santa Ynez River Fish Management Plan (ENTRIX 2000) identified ten native fish species in the Santa Ynez River: four freshwater and six in the estuary. In addition to volume and surface flow conditions, fish are sensitive to water temperature and dissolved oxygen (DO), both of which are supported by shade from riparian vegetation.

56 This area primarily consists of the highly urbanized coastal counties of Los Angeles, Orange, and San Diego southeast of Point Conception. Steelhead is Threatened in the adjacent South-Central California Coast which includes San Luis Obispo and Monterey counties also located north of Point Conception is generally more similar in terms of land use to the Santa Ynez River Valley.

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2a.5 DATA GAPS AND UNCERTAINTY

Overall, there are many existing ground water studies and data for the CMA, however, the following data gaps are currently identified for the CMA Hydrogeologic Conceptual Model: Geologic Model of the Buellton Aquifer in the Santa Ynez River Subarea and water level data in the Buellton Upland subarea.

The Santa Ynez River from the boundary between the EMA and CMA to where the river enters the Buellton Bend is the only section of the Santa Ynez River alluvium upstream of the Lompoc Narrows that is not underlain completely by non-water bearing bedrock. This section includes an extension of the Santa Rita syncline, and Buellton Aquifer deposits typically associated with upland deposits, Paso Robles and Careaga Sand, occur beneath the Santa Ynez River alluvial deposits. The 3D Geologic model (Geosyntec 2020) provides a model of the geologic structure of this area using the existing well logs and bedding angles of the syncline. Because most wells in the Santa Ynez River alluvium are shallow (<120 feet), additional geophysical AEM data collected within the CMA will be able to fill in more details and validate the geologic structure of the Buellton Aquifer in this area.

2a.5-1 Geologic Model of the Buellton Aquifer in the Buellton Upland Subarea

Both the Paso Robles and Careaga Formations (Buellton Aquifer) have discontinuous lenses of permeable coarse deposits (Upson and Thomasson 1951). An exact mapping of these discontinuous lenses and the boundary between the coarser Careaga Graciosa Member (upper unit) and less permeable Careaga Cebada Member is identified as a potential data gap. Excluding the agricultural areas of Santa Rosa Creek drainage, the Buellton Upland is relatively rugged and the Buellton Aquifer has not been extensively developed, and consequently, few wells have been drilled in the Buellton Upland. The AEM geophysics study is expected to provide detailed information that will provide additional certainty to the current hydrogeologic conceptual model in the Buellton Upland.

2a.5-2 Connection between the Buellton Aquifer in the Buellton Upland and Surrounding Area

More water level data needs to be obtained to document the hydraulic gradient between the Buellton Upland and Santa Rita subarea to the west; between the Buellton Upland and Santa Ynez River Alluvium to the south, and between the Buellton Upland and the Santa Ynez Upland to the east. The current ground water level monitoring by the County of Santa Barbara in the CMA includes only 7 wells that are monitored annually for water levels, including 2 wells to represent the Buellton Upland and 5 wells representing the Santa Ynez River Alluvium. More wells are recommended to be added to the Buellton Upland groundwater monitoring network. This recommendation was also made in 1995 as part of the Buellton Upland Groundwater Management Program (Santa Ynez River Water Conservation District and City of Buellton, 1995).

Section 2 B: GROUNDWATER CONDITIONS

This section describes groundwater conditions within the Central Management Area (CMA). The Sustainable Groundwater Management Act (SGMA) requires the Groundwater Sustainability Plan include "a description of current and historical groundwater conditions in the basin"[57] This Groundwater Conditions section presents the available data evaluated, provides an assessment of current CMA groundwater conditions as observed in the period 2015-2020, and describes historical conditions using available data from the period 1924 through 2020.

In accordance with SGMA, there are six Sustainable Management Criteria (see also Section 3b) which indicate if conditions are sustainable in the basin.[58] The indicator criteria for sustainability are summarized as:

1. Chronic lowering of groundwater levels
2. Reduction of groundwater storage
3. Seawater intrusion
4. Degraded water quality
5. Land subsidence
6. Depletion of interconnected surface water

57 23 CCR § 354.16. Groundwater Conditions

58 CWC Section 10721 (x), 23 CCR § 354.28(c), 23 CCR § 354.34(c),

The remainder of this section presents results from the review and evaluation of available data for the CMA. The SMC thresholds in Section 3b determine when effects are considered "significant and unreasonable."

This section is organized as follows.

- *Section 2b.1. Groundwater Elevation.* This section evaluates the first of the six sustainability indicators, chronic lowering of groundwater levels, and can provide a framework to evaluate some or all of the remaining sustainability indicators. This section includes groundwater elevation data and hydrographs, groundwater flow directions and maps, lateral and vertical groundwater gradients, regional groundwater pumping patterns, and changes in groundwater elevations over time.

- *Section 2b.2. Groundwater Storage.* This section evaluates the second sustainability indicator, reduction of groundwater storage. It includes data on changes in groundwater storage data over the available period of record (roughly 1980–2020).

- *Section 2b.3. Water Quality.* This section addresses, degraded groundwater quality. Beneficial uses are described, and suitability of water quality for each is discussed. Areas of known groundwater contamination and existing contaminant plumes are documented. Water Quality conditions for recent water years 2015-2018 were evaluated using published water quality objectives for groundwater.

- *Section 2b.4. Seawater Intrusion.* The CMA is an inland management area of the Basin and is not directly connected to the Pacific Ocean and therefore, seawater intrusion is not an applicable sustainability indicator for establishing sustainable management criteria for the CMA.

- *Section 2b.5. Land Subsidence.* This section addresses the rate and extent of land subsidence. The section includes available data related to current and historical ground surface elevations, potential for subsidence, and summarizes historical extent, cumulative total, and annual rate of detected land subsidence within the CMA.

- *Section 2b.6. Interconnected Surface Water and Groundwater Dependent Ecosystems.* This section addresses depletion of interconnected surface water. It identifies potential interconnected surface waters, evaluates potential depletions of those waters, and describes the general relationships between surface water, groundwater, and depletions to potential Groundwater Dependent Ecosystems within the CMA.

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2b.1 GROUNDWATER ELEVATION

This section addresses the first of the six sustainability indicators, chronic lowering of groundwater levels. Groundwater elevation data, lateral and vertical groundwater gradients, inferred groundwater flow directions, maps showing lines of equal groundwater elevations (contours), regional groundwater pumping patterns, and graphical changes in groundwater elevations over time (hydrographs) are described and evaluated in the following subsections. These descriptions include both historical seasonal and longer-term trends, and documentation of current conditions in the CMA. This section also provides a framework for data presentation and reporting on the five remaining sustainability indicators.

2b.1-1 Groundwater Elevation Data

Groundwater data were made available by the CMA Groundwater Sustainability Agency (GSA) member agencies. The data are collected by the agencies to monitor and manage their respective groundwater jurisdictions. Data provided by the CMA GSA member agencies include groundwater well names and/or identifying labels, groundwater well locations, static groundwater elevation data, and groundwater pumping or production data. Four sources of groundwater elevation data made available for this evaluation are summarized in **Table 2b.1-1**.

The groundwater elevation data were previously incorporated into the Data Management System as described in the Data Management Plan (Section 1e.1). The Data Management System was utilized to evaluate these data and prepare groundwater elevation hydrographs for the principal groundwater aquifers within the CMA based on well depth, well-casing perforated intervals, geologic conditions, and measured water level responses to recharge and pumping.

Table 2b.1-1
CMA Groundwater Elevation Data Sources

Type	Summary	Description
Monthly	City of Buellton	Static groundwater level elevation measurements provided by the City of Buellton.
Monthly	United States Bureau of Reclamation (USBR)	Groundwater level data reported in the USBR Cachuma project monthly reports. The vertical datum of the source data was converted from National Geodetic Vertical Datum of 1929 (NGVD29) to North American Vertical Datum of 1988 (NAVD88).[A]
Semiannual	United States Geological Survey (USGS) National Water Information System (NWIS)	Groundwater level data available from the USGS NWIS (entire Santa Ynez Valley).
Semiannual	County of Santa Barbara	Groundwater level data collected by the County of Santa Barbara.

Note: [A] 23 CCR § 352.4 requires that groundwater elevations be reported in NAVD88. Vertical datum is the zero-elevation from which all other elevations are referenced. In the Basin, depending on location, the difference between NGVD29 and NAVD88 is approximately 2.5–2.6 feet.

2b.1-2 Groundwater Elevation Contour Maps

In accordance with the Sustainable Groundwater Management Act (SGMA), "groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin"[59] are to be prepared for the CMA. Contours were developed for those portions of the CMA having sufficient number and distribution of groundwater wells. Groundwater elevation contour maps for seasonal high (spring 2020) and seasonal low (fall 2019) conditions within the CMA are included as **Figures 2b.1-1** and **2b.1-2**.

As described above in the Hydrogeologic Conceptual Model (Section 2b.2), the CMA has one principal aquifer, the Buellton Aquifer. There is additional water in the subflow of the Santa Ynez River, but that is not a principal aquifer under SGMA.

- Buellton Aquifer consists of Careaga Sandstone and the Paso Robles Formation in a broad syncline structure that extends underneath the Santa Ynez River Alluvium subarea. Also includes all of the formations in the Buellton Upland subarea.

59 23 CCR § 354.1(a)(1).

- Santa Ynez River Alluvium consists primarily of older and younger alluvial deposits and river gravels of the Santa Ynez River. Managed as surface water by SWRCB, and so not a principal groundwater aquifer under SGMA.

As described in the HCM (Section 2a.3), the Buellton Upland subarea topography is relatively rugged terrain. As a result of this there are few wells drilled, and even fewer that participate in the current monitoring program. Groundwater elevation contours were developed for areas adjacent with active groundwater monitoring.

2b.1-2-1 Seasonal High and Seasonal Low Groundwater Elevation Contour Maps

Seasonal High – Spring 2020

Seasonal high groundwater elevations represented by Spring 2020 measurements are presented on Figure 2b.1-1. Shown on this map are the locations of wells with groundwater monitoring data, color-coded to identify wells with screened intervals within the Santa Ynez River Alluvium Aquifer and wells screened within the Buellton Aquifer.

Santa Ynez River Alluvium seasonal high groundwater elevations were available at wells located across the Santa Ynez River Alluvium subarea and one well in the Buellton Upland subarea. The groundwater elevation data were used to calculate groundwater gradient and flow direction inferred from the contours. In the Santa Ynez River Alluvium, groundwater generally flows from east to west, in alignment with the Santa Ynez River channel. Groundwater flow in the Buellton Upland generally flows north to south from higher elevation to lower elevation.

The spring 2020 data was insufficient to create a Buellton Aquifer contour map for the CMA. Previous studies (Upson and Thomasson, 195l) have suggested that the Buellton Aquifer (referred to in Upson and Thomasson as the 'Lower Aquifer') beneath the Santa Ynez River Alluvium may be at a slightly higher hydraulic head than the Santa Ynez River Alluvium, indicating an upward vertical gradient from the Buellton Aquifer to the Santa Ynez River Alluvium. However, recent water levels in 2020 indicate water levels in the Buellton Aquifer are about 2 to 3 feet lower than the Santa Ynez River Alluvium within the

City of Buellton, indicating a downward gradient. The gradient may fluctuate from year to year or season to season.

Seasonal Low – Fall 2019

Seasonal low groundwater levels are represented by Fall 2019 groundwater elevations, and contours based on available data from wells located across the Santa Ynez River Alluvium and Buellton Upland are shown on Figure 2b.1-2. Fall 2019 Santa Ynez River Alluvium and Lower Aquifer groundwater elevation data are slightly lower in elevation with respect to the Spring 2020 seasonal high. However, horizontal flow directions and vertical gradients are consistent with the Spring 2020 conditions described above.

2b.1-2-2 Evaluation of Seasonal High and Low

As expected, seasonal low Santa Ynez River Alluvium groundwater elevations measured in Fall 2019 are generally lower than those measured in Spring 2020. Seasonal differences in water levels in the CMA for both the Santa Ynez River Alluvium and Buellton Aquifers can range from 1 to 10 feet depending upon the particular well.

2b.1-3 Groundwater Hydrographs

SGMA requires preparation of "hydrographs depicting long term groundwater elevations, historical highs and lows, and hydraulic gradients between principal aquifers."[60] Hydrographs using data from select CMA wells are shown on Figure 2b.1-3. Hydrographs were also prepared for other wells located within the CMA but are not shown on Figure 2b.1-3 because of their relatively short period lengths or limited value to assess CMA groundwater because of their locations. Additional groundwater level hydrographs are shown in Appendix 3b-A in the context of sustainable management criteria (Section 3b).

The wells shown on Figure 2b.1-3 were utilized to prepare representative hydrographs for the CMA subareas. The colors of hydrograph data points correspond to their data source noted in the figures and described in Section 2b.1-1, "Groundwater Elevation Data." The hydrographs show the measured groundwater elevation on the left y-axis (vertical axis) and the corresponding depth to groundwater on

[60] 23 CCR § 354.1(a)(2).

the right y-axis. Grid lines depicting Calendar Year are provided at the top x-axis (horizontal axis) and the bottom x-axis shows the Water Year which spans October through September, annually. Vertical columns for the water year are colored to represent water year index based on precipitation (wet, dry/critically dry, or above/below normal).

The following subsections discuss the hydrograph data presented in Figures 2b.1-4AB through 2b.1-5AD. In general, the hydrograph data show visible but slight increases in groundwater elevations during the relatively wet 1990-2000 period and decreases in groundwater elevations during the relatively dry 2005-2020 period.

2b.1-3-1 Buellton Upland

The Buellton Upland subarea consists of local alluvium, Paso Robles Formation and Careaga Sand Formation which make up the Buellton Aquifer. Groundwater hydrographs for wells located in the Santa Rosa Creek drainage (Figure 2b.1-3) are presented below.

Well 7N/32W-31M1 (Figure 2b.1-4A) represents conditions in the Buellton Aquifer. Measurements represent the seasonal high, so seasonal variation is not defined. Long-term trends indicate groundwater levels increased from 1970 through about 1985, decreased to about 1991, increased to about 2002, and have gone down since then. During the early period of the 2012-2018 drought, water levels declined by 24 feet in one year.

Well 7N/33W-36J1 (Figure 2b.1-4B) represents conditions in the Buellton Aquifer. Measurements represent the seasonal high, so seasonal variation is not defined. Long-term trends indicate groundwater levels declined from the 1940s through 1970, increased from 1970 through about 1985, decreased to about 1991, increased to about 2002, and have declined slightly since then. During the 2012-2018 drought, water levels declined by 11 feet over the course of seven years.

Wells along Santa Rosa Creek indicate that groundwater levels can be higher in the localized areas by as much as 30 to 40 feet during the years 1975 through 2012, likely indicating perched groundwater conditions in this reach.

2b.1-3-2 Santa Ynez River Alluvium

As discussed in the HCM, the Santa Ynez River Alluvium is considered part of the subflow of the river, which is regulated by the SWRCB. Because subflow is considered surface water, the Santa Ynez River Alluvial deposits upstream of the Lompoc Narrows would not be classified as a principal aquifer or managed by a GSP under SGMA. The hydrograph for wells screened within this subflow of the Santa Ynez River, well 6N/32W-17J2 (Figure 2b.1-5A) and 6N/31W-17D1 (Figure 2b.1-5B), indicates water level elevations are relatively stable to slightly declining, following periods of prolonged drought in the late 1990s and late 2010s. Long-term trends are relatively flat, likely as a result of recharge from the Santa Ynez River. The stability of the water levels is indicative of that the river stage effectively controls the ground-water level (Upson and Thompson, 1951). Seasonal variations up to 4 feet are typically observed annually. These seasonal and longer-term trends are determined primarily by managed releases from Cachuma Reservoir and extractions of the subsurface water from wells in the river alluvium.

As discussed in the HCM, the Buellton Aquifer exists near the City of Buellton as part of the Santa Rita syncline in the reach from the EMA/CMA boundary to the Buellton Bend. Well 6N/32W-12K1/2 (Figure 2b.1-5C) and Well 6N/31W-7F1 (Figure 2b.1-5D) are deep wells perforated in the Careaga formation that represents long-term conditions of the Buellton Aquifer. Well 6N/32W-12K1/2 (Figure 2b.1-5C) indicates seasonal variations up to 10 feet are typically observed annually. Water levels in both wells declined 6 to 9 feet during the period 1985-1992. Water levels then increased by 8 to 12 feet from the mid-1990s to the mid-2000s. After 2005 and 2006, water levels declined by 26 to 27 feet by year 2016. This period has the largest water level decline that has been observed historically in the CMA. However, water levels have since increased by 12 to 17 feet during the period 2017 to 2020, and water levels in Well 6N/32W-12K1/2 have now recovered to 1982 water level conditions (Figure 2b.1-5C).

Wells in the Buellton Aquifer beneath the Santa Ynez River Alluvium and the Buellton Aquifer in the Buellton Upland near the City of Buellton indicate that groundwater level elevations are typically very similar. However, during droughts water levels in the less permeable Buellton Aquifer tend to drop quicker and have lower water levels than the Santa Ynez River Alluvium, which are sustained by water rights releases from Cachuma Reservoir and recharge from the Santa Ynez River.

2b.2 GROUNDWATER STORAGE

This section addresses the second sustainability indicator, reduction of groundwater storage. In the CMA, the change in groundwater storage in the Basin was evaluated in this section with respect to baseline conditions established in 1982, using data reported annually by the SYRWCD (Stetson, 2020). Groundwater storage data for the CMA is evaluated and the cumulative changes in groundwater storage over time are discussed below. In accordance with SGMA, the section also includes "a graph depicting estimates of the change in groundwater in storage, based on data, demonstrating the annual and cumulative change in the volume of groundwater in storage between seasonal high groundwater conditions, including the annual groundwater use and water year type."[61] Graphs were created for the CMA subareas that show changes to groundwater in storage since the established baseline (1982) and are included as Figure 2b.2-1. Groundwater storage under future scenarios will be analyzed and refined with the groundwater budget and groundwater model being developed for the GSP.

2b.2-1 Cumulative Change in Groundwater Storage

Accumulated change of groundwater in storage for the CMA is shown on Figure 2b.2-1 in acre-feet (AF). This annual and cumulative change in the volume of groundwater in storage is from the annual groundwater reports produced by the SYRWCD (Stetson 2021). For the historical period (1982 through 2018), the data indicate a net increase of groundwater storage in the CMA of about 900 AF. This increase equals 24 acre-feet of change per year on average and is very close to no net change over the 38-year period.

The annual reporting of changes in groundwater storage (Stetson 2021) is based on changes in groundwater levels in representative monitoring wells. For the Santa Ynez River Alluvium subflow, the United States Bureau of Reclamation (USBR), in connection with SWRCB Order No. 2019-0148, determines on a monthly basis the quantity of dewatered storage in the subflow of the Santa Ynez River. The SYRWCD uses a similar methodology with representative monitoring wells to estimate the changes in groundwater storage for the Buellton Aquifer in the Buellton Upland (Stetson 2021).

61 23 CCR § 354.16(b).

2b.2-2 Classification of Wet and Dry Years

The HCM (Section 2a) introduced water flow elements, including precipitation over time at Buellton Fire Station (Figure 2a.3-3). The four wettest water years (water-year defined as October through September, annually) based on precipitation in the period of record at Buellton Fire Station (Water Year 1955-2020)[62] are WY 1995 (34.26 inches), WY 1983 (39.03 inches), WY 2005 (39.57 inches), and WY 1998 (41.56 inches. The four driest water years in the period of record based on precipitation correspond to WY 2015 (6.94 inches), WY 1989 (6.79 inches), WY 2007 (6.30 inches), and WY 2014 (5.87 inches). However, precipitation does not fully account for carryover effects from previous years, so a surface water stream gage was used to characterize conditions.

To characterize all water years as either wet, above/below normal, or dry/critically dry as shown on **Figure 2b.2-2**, the Salsipuedes Creek streamflow gage (U.S. Geological Survey [USGS] gage 11132500) was selected as a proxy to classify each water year. The Salsipuedes Creek streamflow gage represents a 47.1-square-mile[63] drainage area with long period of record in the Lower Santa Ynez River watershed. The 79-year dataset for the gage spans 1942 through 2020 and represents unimpeded runoff due to the absence of upstream water diversion and storage.

Discharge in acre-feet per year (AFY) for Salsipuedes Creek gage is shown on Figure 2b.2-3 for the period of record. The data are presented as a power law distribution, meaning the highest recorded flows in acre-feet have occurred in a minority of the total years recorded. Classification into a water year type followed the State Water Resources Control Board Order WR 2019-0148 methodology. Years were classified based on the rank in the period of record in one of five categories: “critically dry” (bottom 20 percentile), “dry” (20th to 40th percentile), “below normal (40th to 60th percentile), “above normal” (60th to 80th percentile), and “wet” (80th to 100th percentile).

Using the robust dataset from the Salsipuedes Creek gage (Figure 2b.2-2) the period of record was classified as wet, above/below normal, or dry/critically dry. The cumulative departure from mean graph

62 Buellton Fire Station, Gauge 233, Santa Barbara County Flood Control & Water Conservation District.
63 USGS NWIS (2020) USGS 11132500 SALSIPUEDES C NR LOMPOC CA

at the bottom indicates that the period 1995 through 2006 was relatively wet, while the period 2012 through 2018 has been relatively dry.

2b.2-3 Groundwater Use and Effects on Storage

Total annual reported groundwater use for the Buellton Upland is compared to cumulative groundwater storage loss on Figure 2b.2-4. Water use was introduced in the HCM (Section 2a.4 and Figure 2a.4-1). The groundwater uses totaled on Figure 2b.2-4 show that groundwater use in the Buellton Upland gradually increased from 1995 through 2007. Groundwater use increased in the period 2008 through 2015. Following 2015 through 2019 (current), groundwater use has declined. Cumulative groundwater storage loss indicates that effects of both hydrologic periods and groundwater use. For example, before the dry period of 2012 through 2018, the groundwater storage decreased with increased groundwater use. Conversely, during the wet period 1995 through 2016 and after above-normal water year 2017, groundwater storage increased.

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2b.3 WATER QUALITY

In accordance with SGMA, "Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes"[64] are described in this section. Water quality objectives vary depending on the beneficial use and users of groundwater being evaluated. To determine existing or future potential water quality issues within the CMA, the beneficial uses of groundwater must first be established.

This section is divided as follows:

- Section 2b.3-1, Beneficial Uses. This subsection describes the various beneficial uses for groundwater within the Basin and provides context for water quality objectives for those beneficial uses.
- Section 2b.3-2, Suitability for Beneficial Use, includes discussion of major beneficial uses.
- Section 2b.3-3, Groundwater Contamination Sites and Plumes. This section describes the known existing groundwater contaminant sites and plumes that are currently managed by other State of California regulatory bodies responsible for protecting groundwater quality and quantity.
- Section 2b.3-4, Current Groundwater Quality, includes data for selected major diffuse or natural constituents for the period water year 2015 through 2018.

2b.3-1 Beneficial Uses

The Central Coast Basin Water Quality Control Plan herein referred to as the 2019 Central Coast Basin Plan (RWQCB 2019), which includes the SYRVGB, identifies 18 beneficial uses of surface and groundwater in the SYRVGB below Cachuma Reservoir (RWQCB 2019 Table 2-1), which are briefly listed and described below. Beneficial uses were previously introduced in the Plan Area (Section 1d.5).

The following four beneficial categories apply to both groundwater and surface water in the CMA.

64 23 CCR § 354.16 (d)

- Municipal and Domestic Supply (MUN). Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply (AGR). Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- Industrial Process Supply (PROC). Uses of water for industrial activities that depend primarily on water quality (e.g., waters used for manufacturing, food processing, etc.).
- Industrial Service Supply (IND). Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

For surface water, the 2019 Central Coast Basin Plan has identified an additional 14 beneficial uses in the SYRVGB below the Cachuma Reservoir [65]. The importance of groundwater quality on these beneficial uses depends on the discharge of groundwater to surface water which is described further in Section 6.

2b.3-1-1 Median Groundwater Quality Objectives

The 2019 Central Coast Basin Plan includes median groundwater objectives for several major water quality constituents specifically for portions of the CMA. These are shown in **Table 2b.3-1** along with the secondary maximum contaminant levels (SMCL), a national federal drinking water standard for guidance regarding water for potential public supply. These "objectives are intended to serve as a water quality baseline for evaluating water quality management in the basin" (RWQCB 2019) and represent an average value in each subarea.

65 See "Table 2-1. Identified Uses of Inland Surface Waters (continued)", page 20, 2019 Basin Plan (RWQCB 2019).

Table 2b.3-1
Median Groundwater Objectives in MG/L
for the Central Management Area

Basin/Subarea	Salinity as Total Dissolved Solids (TDS)	Chloride (Cl)	Sulfate (SO_4^{2-})	Boron (B)	Sodium (Na)	Total Nitrogen (N)
Buellton Upland	1,500	150	700	0.5	100	1
Santa Ynez River Alluvium	1,500	150	700	0.5	100	1
SMCL	*500*	*250*	*250*	-	-	-

Note: The 2019 Central Coast Basin Plan values shown are for "Santa Rita" subarea, which also includes the Santa Rita Upland.

2b.3-2 Suitability for Beneficial Use

Groundwater quality in the CMA is suitable for potable and agricultural uses. Key water quality parameters in the CMA in relation to the primary beneficial uses and primary users are summarized below.

2b.3-2-1 Municipal Supply

Municipal supply is the best documented water quality in the CMA, as all public water systems of significant size are required to collect and report water quality to the State Water Resources Control Board (SWRCB) as part of the Safe Drinking Water Information System (SDWIS). Because the major public water systems, like the City of Buellton, treat the groundwater in the CMA, the majority of the water quality issues are constituents likely related to the distribution system and do not indicate general groundwater quality impairing this beneficial use. The exception is elevated levels of arsenic in water samples collected by the Bobcat Springs Mutual Water Company, located in the Buellton Upland, and reported to the SWRCB in 2009.

2b.3-2-2 Agricultural Supply

Agricultural beneficial use is the primary beneficial use in the CMA. Different crops have different sensitivities to water quality constituents, and water quality is one of many considerations in terms of crop selection. Section 2a.4 of the HCM identified major crops in the CMA as including wine grapes, dry beans, and walnuts. These include crops that are sensitive to high total dissolved solids (TDS), chloride, and boron. Agricultural water is generally untreated before use. However, poor water quality (high TDS) often can be mitigated by increased water application (increased leaching fraction).

Historical water quality in the CMA was reviewed relative to the 2019 Central Coast Basin Plan general water quality objectives for agricultural water use. Constituents with historical measurements exceeding objectives for agriculture through large areas of the CMA were boron, fluoride, and manganese. Boron was detected in samples above the irrigation reference value of 0.75 milligrams per liter (mg/L) in wells throughout the Santa Ynez River Alluvium, and in one sample collected in the Buellton Upland along Santa Rosa Creek. Fluoride was detected in a sample above the recommended 2.0 mg/L livestock reference value and above the 1.0 mg/L irrigation reference value in several samples collected in the CMA, one along Santa Rosa Creek in the Buellton Upland, and in several samples collected downstream of the Buellton Bend in the Santa Ynez River Alluvium. Manganese was detected in collected samples above the 0.2 mg/L irrigation recommendation value in several wells in the Santa Ynez River Alluvium.

2b.3-2-3 Domestic Supply

Impaired beneficial use for domestic supply was reviewed using the SWRCB Needs Analysis GAMA Tool. This tool identifies the location of domestic wells by section and indicates if groundwater is adversely affected by nitrate, arsenic, hexavalent chromium, perchlorate, 1,2,3-trichloropropane, and uranium. Unlike municipal supply, domestic supply is less likely to involve water treatment so groundwater quality is more likely to have a direct negative impact on this beneficial use. Domestic suppliers are not required to take and submit water quality samples.

In the CMA, levels of nitrate in collected samples exceeded recommended values in both the Buellton Upland along Santa Rosa creek, and the Santa Ynez River Alluvium downstream of the City of Buellton to the Buellton Bend. Detected levels of arsenic only occurred in sections in the eastern Buellton Upland, and portions of the Santa Ynez River Alluvium just east of the City of Buellton at concentrations below action levels. Concentrations of hexavalent chromium, perchlorate, 1,2,3-trichloropropane, and uranium in collected samples from the CMA were below action levels.

2b.3-3 Groundwater Contamination Sites and Plumes

Publicly available databases maintained by various State of California regulatory agencies, including the State Water Resources Control Board GeoTracker GAMA site[66], and the California Department of Toxic Substances Control EnviroStor site[67] were reviewed and evaluated. In accordance with SGMA,[68] the available data were used to identify sites that could potentially affect groundwater quality within the CMA.

Identification of existing groundwater contamination sites are mapped on Figure 2b.3-1 and the historical extents of contaminant plumes in groundwater are mapped on Figure 2b.3-2. These sites are regulated and under the oversight authority of their respective State of California agencies responsible for ensuring the contamination is mitigated in-place and directing appropriate actions to protect groundwater quantity and quality. SGMA requires[69] that sustainable groundwater management not influence plume migration and negatively influence groundwater quality. Hence, discussion of these sites is for information purposes, and all management, monitoring, compliance, and reporting activities related to these sites remain under their respective State of California agencies.

A summary of the identified sites within the CMA is provided in **Table 2b.3-2.** Contamination sites within the City of Buellton are located along Highway 246 and Avenue of the Flags and are likely related to leaking underground storage tanks (LUST) sites (**Figure 2b.3-2**).[70] Contamination at Ballard Canyon Road at the CMA/EMA boundary appears to be related to heavy metals[71]. Although these sites have multiple contaminants of concern, they are currently considered compliant with applicable regulatory orders and

66 GeoTracker. State Water Resources Control Board. Web Application. https://geotracker.waterboards.ca.gov/ Accessed 2021-08-21.

67 EnviroStor. Department of Toxic Substances Control. Web Application. https://www.envirostor.dtsc.ca.gov/public/ Accessed 2021-08-20.

68 23 CCR § 354.16 (d) [..] including a description and map of the location of known groundwater contamination sites and plumes.

69 CWC Section 10721 (x)(4) […] including the migration of contaminant plumes that impair water supplies.

70 Groundwater contamination associated with these locations includes benzene, methyl-tert-butyl ether, tert-butyl alcohol, tetrachloroethene, xylenes (total), ethylbenzene, naphthalene, toluene, and 1,2 dichloroethane.

71 Elevated concentrations of antimony, cadmium, selenium, thallium, arsenic, and manganese have been found at this location, as well as vinyl chloride, cis-1,2 dichloroethylene, and di phthalate (2-ethylhexyl).

the contaminants are being effectively monitored and managed in place or remediated to reduce future potential to impair groundwater quality.

Table 2b.3-2
Count of Potential Point Sources of Groundwater Contamination Shown on Figure 2b.3-1 by CMA Subarea

Basin/Subarea	SWRCB Cleanup Program		LUST Cleanup		Military Cleanup		DTSC Cleanup		Total	
	Open	Total	Open	Total	Open	Total	Open	Total	Open	Total
Buellton Upland	0	1	0	2	0	0	0	0	0	3
Santa Ynez River Alluvium	1	4	1	21	0	0	0	0	2	25
Total	1	5	1	23	0	0	0	0	2	28

Note: LUST = leaking underground storage tank; DTSC = Department of Toxic Substances Control.

2b.3-4 Current Groundwater Quality (2015-2018)

The distribution and concentration of selected naturally occurring or diffuse groundwater constituents are discussed in the following subsections. The constituents in this section correspond to the same constituents used for the 2019 Central Coast Basin Plan groundwater quality objectives (Table 3-1). Averages for the recent 4-year period of water years 2015 through 2018 are shown. Water quality data was primarily evaluated from three primary data compilation sources:

- Water Quality Portal, a cooperative service from USGS, the U.S. Environmental Protection Agency, and the National Water Quality Monitoring Council, which in addition to these federal sources includes some state, tribal, and local data. This is the primary source for USGS water quality data. Water quality data collected by the Santa Barbara County Water Agency is submitted to the USGS and included here.

- Safe Drinking Water Information System, which is a compilation service from SWRCB that compiles mandated water quality reports from California public water systems. Public water systems include the CMA member agency the City of Buellton.

- Irrigated Lands Regulatory Program (ILRP), an SWRCB program that tracks discharges from irrigated agricultural lands. Participants submit water quality sampling results for selected constituents. The IRLP is made available through the Safe Drinking Water Information System GeoTracker GAMA website.

The Data Management System, described in the Data Management Plan, was configured to automatically update the database with data from these three sources of water quality data. The sections below provide a snapshot of current groundwater conditions in the CMA, based on the best available data from January 1, 2015, through 2018. The spatial distribution of water quality is assessed using maps, and average concentrations are compared to the 2019 Central Coast Basin Plan water quality objectives and summarized in tables.

2b.3-4-1 Salinity (Total Dissolved Solids)

Salinity, as measured by total dissolved solids (TDS), is the dry mass of constituents dissolved in a given volume of water. There are two measurements of salinity: TDS, which is a measurement of the total mass of the mineral constituents dissolved in the water, and electrical conductivity, which is a measurement of the conductivity of the solution of water and dissolved minerals.

The Secondary Maximum Contaminant Level (SMCL) includes a recommended standard of 500 mg/L, an upper limit of 1,000 mg/L, and a short-term limit of 1,500 mg/L (SWRCB 2017). The 2019 Central Coast Basin Plan for irrigation does not provide a TDS guidance for salinity. Crops in the CMA sensitive to salinity are beans, and strawberries (Hanson 2006).

Average concentrations of TDS in groundwater samples collected during water years 2015 through 2018 for 108 measurements at 34 wells in the CMA are shown on Figure 2b.3-3. A summary of the data is provided in **Table 2b.3-3.** As shown in **Table 2b.3-3**, the average constituent concentrations in samples collected in the CMA were below the 2019 Central Coast Basin Plan Water Quality Objective (WQO). Concentrations of chloride were lower in the Buellton Upland compared to the Santa Ynez River Alluvium. The highest salinity was measured in samples collected in the western portions of the Santa Ynez River Alluvium (Figure 2b.3-3).

Table 2b.3-3
Summary of Salinity as Total Dissolved Solids (TDS)
in the CMA during Water Years 2015–2018

Subarea	TDS Average (mg/L)	TDS Minimum (mg/L)	TDS Maximum (mg/L)	TDS WQO (mg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	379	180	640	1,500	7	0
SYR Alluvium	1,042	460	1,770	1,500	26	1

2b.3-4-2 Chloride

Chloride (Cl^-) is a mineral anion and a major water quality constituent in natural systems. Chloride is characteristically retained in solution through most of the processes that tend to separate out other ions (Hem 1985). The circulation of chloride ions in the hydrologic cycle is largely through physical processes. For example, chloride is a chemical indicator commonly used to evaluate seawater intrusion, as high chloride concentrations are characteristic of seawater, and it remains dissolved in solution in most surface water conditions (see Section 4, Seawater Intrusion).

For general municipal and domestic beneficial uses the SMCL is a recommended standard of 250 mg/L, an upper limit of 500 mg/L, and a short-term limit of 600 mg/L. For agricultural beneficial use, the 2019 Central Coast Basin Plan indicates chloride levels that exceed 106 mg/L cause increasing problems for crop irrigation. Crops grown in the CMA sensitive to chloride in irrigation water include strawberries (tolerance of 100–180 mg/L) (Hanson et al. 2006).

Average concentrations of chloride in samples collected during water years 2015–2018 for 105 measurements at 34 wells are shown on Figure 2b.3-4, and a summary of the data is provided in **Table 2b.3-4**. The average concentration in samples from almost all wells were below the 2019 Central Coast Basin Plan WQO.

Table 2b.3-4
Summary of Chloride (CL) Concentrations
in the CMA during Water Years 2015–2018

Subarea	Cl^- Average (mg/L)	Cl^- Minimum (mg/L)	Cl^- Maximum (mg/L)	Cl^- WQO (mg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	58	31	95	150	7	0
SYR Alluvium	100	2	210	150	26	1

2b.3-4-3 Sulfate

Sulfate (SO_4^{2-}) is a naturally occurring anion and a major water quality constituent. The SMCL includes a recommended standard of 250 mg/L, an upper limit of 500 mg/L, and a short-term limit of 600 mg/L. The 2019 Central Coast Basin Plan does not indicate a specific sulfate guideline for irrigation water.

Average sulfate groundwater concentrations during water years 2015 through 2018 for 108 measurements at 34 wells in the CMA are shown on Figure 2b.3-6, and a summary of the data is provided in **Table 2b.3-6**. Average concentrations in sampled wells were below the 2019 Central Coast Basin Plan WQO. Concentrations of sulfate in collected samples were lowest in the Buellton Upland and higher in the Santa Ynez River Alluvium.

Table 2b.3-5
Summary of Sulfate Concentrations
in the CMA during Water Years 2015–2018

Subarea	SO_4^{2-} Average (mg/L)	SO_4^{2-} Minimum (mg/L)	SO_4^{2-} Maximum (mg/L)	SO_4^{2-} WQO (mg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	77	14	220	700	7	0
SYR Alluvium	34	1	763	700	27	0

2b.3-4-4 Boron

Boron (B) is a trace water quality constituent, and plants have specific tolerance limits for boron concentrations in irrigation water. The 2019 Central Coast Basin Plan's general guidance regarding boron toxicity from irrigation water increases from 500 to 2,000 micrograms per liter (µg/L). Crops in the CMA considered sensitive to boron are beans (750–1,000 µg/L), grapes (500–750 µg/L), strawberries (750–1,000 µg/L), and walnuts (500–750 µg/L) (Hanson et al. 2006). Concentrations above 10,000 µg/L may be toxic to fish.

Concentrations of boron detected in groundwater samples during water years 2015 through 2018 in the CMA are shown on Figure 2b.3-7, and a summary of the data is provided in **Table 2b.3-6**. Concentrations of boron in groundwater samples collected during other periods are below 500 µg/L objective in the Buellton Upland, and concentrations of boron in half the samples collected in Santa Ynez River Alluvium exceeded the 500 µg/L objective.

Table 2b.3-6
Summary of Boron Concentrations
in the CMA during Water Years 2015–2018

Subarea	B Average (µg/L)	B Minimum (µg/L)	B Maximum (µg/L)	B WQO (µg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	-	-	-	500	0	0
SYR Alluvium	475	470	480	500	1	0

Note: Non-Detect (ND) Values are Treated as Zero in Calculations.

2b.3-4-5 Sodium

Sodium (Na^{+}) is a mineral cation and a major water quality constituent in natural systems. The 2019 Central Coast Basin Plan indicates the primary concern for sodium in irrigation water is the sodium absorption ratio (SAR). The sodium absorption ratio is the relative concentration of sodium to calcium and magnesium and is managed to maintain soil permeability.

Average concentrations of sodium collected in 105 samples from 33 locations in the CMA during water years 2015 through 2018 are shown on Figure 2b.3-7, and a summary of the data is provided in **Table**

2b.3-7. The average concentrations in most wells were below the 2019 Central Coast Basin Plan WQO. Sodium concentrations were generally lower in the Buellton Upland. The highest concentrations were in samples from wells located in the Santa Ynez River Alluvium.

Table 2b.3-7
Summary of Sodium Concentrations
in the CMA during Water Years 2015–2018

Subarea	Na^+ Average (mg/L)	Na^+ Minimum (mg/L)	Na^+ Maximum (mg/L)	Na^+ WQO (mg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	41	27	69	100	7	0
SYR Alluvium	103	16	399	100	17	9

2b.3-4-6 Nitrate

Nitrogen is the primary atmospheric gas, however its presence in water is related to the breakdown of organic waste. Total nitrogen in groundwater is the sum of organic nitrogen and the three inorganic forms: nitrate (NO_3^-), nitrite (NO_2^-), and ammonia (NH_3). These forms are ubiquitous in nature and come from fixation by microbes in soil and water and by lightning. Sources for high concentrations in water sources include fertilizers, animal and human waste streams, and explosives. Nitrogen and phosphorus are key for life and are found in many fertilizers.

The maximum contaminant limit (MCL) and public health goal is 10 mg/L for combined nitrate plus nitrite as nitrogen (Banks et al. 2018). The 2019 Central Coast Basin Plan indicates increasing problems for irrigation of sensitive crops if nitrate as nitrogen is between 5 and 30 mg/L, and problems for livestock watering if nitrate plus nitrite as nitrogen exceeds 100 mg/L.

Nitrate concentrations are reported either as nitrate (the full mass of the nitrate anion), or as nitrogen (the mass of the nitrogen). For this study all values have been converted to nitrate as nitrogen. The best available data and coverage for nitrogen within the CMA for recent years is from ILRP, which measures and reports combined nitrate-nitrite values. In the CMA, measurements of nitrate concentrations are significantly greater than nitrite, so combined nitrate-nitrite are approximately equal to nitrate alone.

Average concentrations of nitrate in 126 groundwater samples collected at 34 locations during water years 2015 through 2018 are shown on Figure 2b.3-8, and a summary of the data is provided in **Table 2b.3-8**. High nitrate concentrations are found throughout the CMA. The lowest concentrations of nitrate are measured in samples from wells located in the Santa Ynez River Alluvium.

Table 2b.3-8
Summary of Nitrate as Nitrogen
in the CMA during Water Years 2015–2018

Subarea	NO_3 as N Average (mg/L)	NO_3 as N Minimum (mg/L)	NO_3 as N Maximum (mg/L)	NO_3-NO_2 as N WQO (mg/L)	Wells Below WQO (count)	Wells Above WQO (count)
Buellton Upland	3.489	0.100	34.200	1	3	10
SYR Alluvium	5.781	ND	239.000	1	15	17

2b.3-4-7 Historical Trends

Historical water quality trends in the CMA have been analyzed with available historical data from 1980 to present in California's Groundwater Ambient Monitoring Assessment (GAMA) program (Haas et al. 2019). Mixed trends were noted in the CMA for the identified constituents in the 2019 Central Coast Basin Plan (TDS, sulfate, and nitrate) and no trends for additional constituents (arsenic, hexavalent chromium, iron and manganese)[72]. The mixed nature of these trends is most likely to various natural and manmade sources (Haas et al. 2019).

These baseline water quality data are provided as a snapshot of current conditions. The responsibility of regulating water quality lies with other existing agencies and programs, and a goal of the CMA GSP will be to not significantly and unreasonably influence existing (background) water quality conditions. Future monitoring is discussed in the Monitoring Network (Section 3a) and protective targets are discussed in Sustainable Management Criteria (Section 3b). Hence, future groundwater management actions implemented by the CMA will not interfere with other agencies objectives or responsibility to manage, maintain, or improve water quality.

72 Figures 20-26 (Haas et al. 2019)

2b.4 SEAWATER INTRUSION

The CMA is an inland management area of the Basin and is not directly connected to the Pacific Ocean and therefore, seawater intrusion is not an applicable sustainability indicator for establishing sustainable management criteria for the CMA.

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2b.5 LAND SUBSIDENCE

The fifth sustainability indicator, land subsidence, is evaluated within the CMA in this section. SGMA requires evaluation of the "extent, cumulative total, and annual rate of land subsidence, including maps depicting total subsidence,"[73] with the overall goal of avoiding the undesirable result of "significant and unreasonable land subsidence that substantially interferes with surface land uses" as a result of changing groundwater conditions throughout the Basin.[74] Land subsidence is not an issue of concern in the CMA as discussed in more detail below. The USGS land subsidence map of California does not include any portion of the SYRVGB.[75]

Land subsidence may result from tectonic forces or the extraction of oil, gas and water. Land subsidence resulting from groundwater use and aquifer deformation (the action or process of changing in shape or distorting, especially through the application of pressure) may be of two kinds: elastic or inelastic.

Elastic deformation occurs from the compression and expansion of sediments due to pore pressure changes that occur with fluctuations in groundwater elevations (Borchers and Carpenter 2014). Therefore, elastic deformation may be cyclical in nature corresponding to seasonal groundwater recharge or groundwater discharge or extraction. Elastic deformation does not result in permanent loss of pore space or land subsidence.

Inelastic deformation may result in irreversible land subsidence and is commonly related to groundwater discharge or extraction from fine-grained sediments within clay or silt aquitards (Borchers and Carpenter 2014). Permanent land subsidence related to groundwater withdrawal generally occurs in an aquifer when groundwater elevations and changes in groundwater storage consistently decrease falling below historical seasonal and longer-term ranges. The resulting combination of increased pressure from the weight of the overlying sediments (overburden stress) and reduction in hydraulic pressure within the

73 23 CCR § 354.16(e). The extent, cumulative total, and annual rate of land subsidence, including maps depicting total subsidence, utilizing data available from the Department, as specified in Section 353.2, or the best available information.

74 CWC Section 10721(x)(5). Significant and unreasonable land subsidence that substantially interferes with surface land uses.

75 USGS, Areas of Land Subsidence Web Application. https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html. Accessed 2021-07-08.

aquifer (pore pressure) essentially squeezes the water out of the compressible clay beds within the aquifer system. This type of deformation is irreversible and represents a permanent loss in aquifer storage.

2b.5-1 Geologic Setting

The HCM (Section 2a) introduces the geologic setting, units, and extents, which are discussed relative to their potential influence on land subsidence. Generally, fine-grained sediments are susceptible to inelastic deformation. Inelastic compaction of coarse-grained sediment is usually negligible (Borchers and Carpenter 2014). The principal aquifers of the CMA and WMA are primarily coarser material and not subject to a significant risk of land subsidence. Previous studies of well logs in the regional aquifers in the Basin indicate 40 to 70 percent coarse grained material in the Santa Ynez River Alluvium deposits (HCI 1997).

2b.5-1-1 Tectonic Movement

Tectonic movement is a potential source for land surface elevation changes within the CMA. The Basin is within the Transverse Range geomorphic province of California, a tectonically active region of California. Rapid uplift is occurring in places within the Transverse Range, such as in the Santa Ynez Mountains, where uplift is estimated at approximately 2 millimeters per year (Hammond et al. 2018). Likewise, in tectonically active areas where uplift is occurring, subsidence may also be observed in response to fault motion. However, this type of subsidence is not influenced by groundwater use or water resource management actions in the CMA.

2b.5-2 Historical Records

There is little or no documentation of physical evidence of subsidence such as well casing failure, infrastructure disruption, or earth fissures within the CMA. The risk of future significant impacts is low because long-term groundwater levels have been mostly static.

The Caltrans (District 5), Department of Water Resources (DWR), and Santa Ynez River Water Conservation District have not observed or reported infrastructure failures due to land subsidence within the Basin for the past 100 years (Appendix 2b-A, Dudek, 2020). Staff from the City of Solvang Public Works Department are not aware of any land subsidence issues throughout the Santa Ynez Valley (M. van der

Linden, personal communication, August 12, 2020; Appendix 2b-A, Dudek, 2020). John Brady of the Central Coast Water Authority (CCWA) engineering department reported that since the 27-mile long CCWA pipeline (see Figure 2a.3-9, HCM) was built in 1990 there have been no triggers of the isolation valves and, in his opinion, there has been no groundwater related land subsidence in the area (Appendix 2b-A Dudek, 2020).

2b.5-3 Remote Sensing Data

Remote sensing data from Interferometric Synthetic Aperture Radar (InSAR) for January 2015 through September 2019 is available from DWR. Over this time period, land surface elevation changes have ranged from an estimated increase of 0.5 inch to a decrease of 0.5 inch (Figure 2b.5-1), although vertical accuracy of InSAR data is around 0.61 inches (Towill, 2020). The elevation changes mapped in Figure 2b.5-1 indicate that about a third of the area in the CMA actually increased in elevation. The area that increased in elevation includes the area around the City of Buellton and along the Santa Ynez River, which are the areas with the most groundwater pumping, which is further evidence that land subsidence is currently not a problem in the CMA. Appendix 2b-A includes detailed maps of the remote sensing dataset.

2b.5-4 Continuous Global Positioning System Data

USGS continuous global positioning system (CGPS) station (BUEG) was installed near the city of Buellton and has been collecting horizontal and vertical displacement data since January 2015 as shown on Figure **2b.5-2**. This indicates very little vertical change over this time, with the biggest changes (of approximately 20 mm, or 0.78 inches) due to manual updates.

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2b.6 INTERCONNECTED SURFACE WATER AND GROUNDWATER DEPENDENT ECOSYSTEMS

The sixth sustainability indicator, depletion of interconnected surface water, is addressed in this section. The various beneficial uses of surface water and groundwater are presented in Section 2a.4 and 2b.3 and include various natural environments that rely on surface water and groundwater.

In accordance with SGMA, "interconnected surface water" is defined as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted."[76] In this section, surface waters within the CMA that potentially meet this definition are identified. In addition, SGMA regulations require Groundwater Dependent Ecosystems (GDEs) be identified[77] as part of the description of groundwater conditions. GDEs are ecological communities or species that depend on groundwater emerging from aquifers or rely on groundwater occurring near the ground surface. Hence, GDEs are considered and discussed below because they could be influenced by chronic lowering of groundwater levels (second sustainability indicator) and depletions of interconnected surface water.

2b.6-1 Current Surface Water Conditions

In the CMA, the Santa Ynez River is gaged at several locations (Figure 2b.6-1) which shows river flows through the CMA have a strong seasonal pattern (Figure 2b.6-2). The USGS Solvang Gage (ID No. 11128500) measures the flow of Santa Ynez River entering the CMA. **Table 2b.6-1** indicates that the gaged flows into the CMA entirely ceased during 13 of the past 20 years.

Santa Ynez River flows in the CMA are substantially influenced by upstream dam and reservoir operations. Surface flows will exist during water rights releases as described in the HCM (Section 2a.3-4-2-1). Water rights releases are typically made during the months of July through October when flows at Buellton would otherwise not exist. In addition, during above-normal and wet year types, flow targets ranging from 5 to

76 23 CCR § 351 (o) "Interconnected surface water" refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.

77 23 CCR § 354.16 (g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.

48 cubic feet per second (cfs) are to be maintained at the Solvang gage for endangered steelhead (*O. mykiss*) by the U. S. Bureau of Reclamation pursuant to SWRCB WR 2019-0148 (see HCM Section 2a.5).

Table 2b.6-1
Annual Minimum Gaged Flows of the Santa Ynez River in the CMA

Water Year	Minimum Flow at Solvang (USGS Gage 11128500) cubic-feet/second	Minimum Flow at Lompoc Narrows (USGS Gage 11133000) cubic-feet/second	Spill from Cachuma Reservoir acre-feet/year	Hydrologic Year Type [A]
2001	3.2	1.3	112,313	Wet
2002	0	0	0	Dry
2003	0	0	0	Below Normal
2004	0	0	0	Dry
2005	3.07	1.5	260,078	Wet
2006	2.7	0.5	62,869	Above Normal
2007	0	0	0	Critical
2008	0.67	0	22,994	Above Normal
2009	1.02	0	0	Dry
2010	0	0	0	Below Normal
2011	4.71	1.8	85,755	Wet
2012	1.3	0	0	Dry
2013	0	0	0	Critical
2014	0	0	0	Critical
2015	0	0	0	Critical
2016	0	0	0	Dry
2017	0	0	0	Above Normal
2018	0	0	0	Dry
2019	0	0	0	Above Normal
2020	0	0	0	Below Normal

Note: [A] Based on Hydrologic Year Type Classification in SWRCB Order 2019-0148, based on Lake Cachuma inflow, which also correspond to the classification using Salsipuedes Creek gage. Water Year 2010 is classified Below Normal in the lower watershed (Salsipuedes Creek gage) and Above Normal in the upper watershed (Lake Cachuma inflow).

Cachuma Inflow acre-feet/year (afy)	Classification
<4,550 afy	Critical
4,551 - 15,366 afy	Dry
15,367 - 33,707 afy	Below Normal
33,708 - 117,842 afy	Above Normal
>117,842 afy	Wet

2b.6-2 Interconnected Surface Water for the Santa Ynez River

The Santa Ynez River Alluvium lays unconformably on or beside either the non-water bearing sediments of the consolidated Monterey Shale and Sisquoc Formations or the low permeability Careaga Formation. The Santa Ynez River is separated from the Buellton Aquifer by bedrock west of the Buellton Bend. The extent that the Buellton Aquifer underlies the Santa Ynez River and alluvial subflow deposits east of the Buellton Bend is a data gap (Section 2a.5-1). Because the underflow of the Santa Ynez River is considered part of the surface water flowing in a known and definite channel, there is no interconnected surface water in the CMA. The Santa Ynez River surface water and underflows are managed by the SWRCB for the reach of the Santa Ynez River in the CMA and will not be managed under SGMA by the CMA GSA.

Diversions from the Santa Ynez River Alluvium are subject to SWRCB regulation which considers it the same as surface water diversions. As described in the HCM (Section 2a), the Santa Ynez River Alluvium is recharged from the surface water of the river.

2b.6-3 Interconnected Surface Water for Tributaries to the Santa Ynez River

All tributaries within the CMA (Figure 2b.6-1) are ephemeral. As shown on **Figure 2b.6-2**, Zaca Creek, the largest CMA tributary, has no measurable flow during half of the period of record. Most flow occurs in wet and above normal years between February to March, with no flow between June to November. This indicates these tributaries are "completely depleted"[78] during part of the year and do not meet the SGMA definition for interconnected surface water. As shown in the HCM (HCM Figure 2a.5-2) there are no identified springs associated with these tributaries.

2b.6-4 Groundwater Dependent Ecosystems in the Central Management Area

SGMA statute identifies addressing GDEs as a potential additional plan element.[79] SGMA defines GDEs as "ecological communities of species that depend on groundwater emerging from aquifers or on

[78] 23 CCR § 351 (o)
[79] CWC Section 10727.4 Additional Plan Elements: "where appropriate […] (l) Impacts on groundwater dependent ecosystems."

groundwater occurring near the ground surface."[80]In some settings, groundwater can be critical to sustaining springs, wetlands, and perennial flow (baseflow) in streams, as well as to sustaining vegetation such as phreatophytes that directly tap groundwater through their root systems.

Mapping of California Department of Water Resources' Natural Communities Commonly Associated with Groundwater dataset indicates most potentially sensitive ecological habitats within the CMA are located along the Santa Ynez River. As described in the HCM (Section 2a), these habitats are dependent on subflows of the Santa Ynez River (HCM Figure 2a.4-4) and not substantively on groundwater from the Buellton Basin. The recent SWRCB Order WR 2019-0148 states (pg. 2):

> The Santa Ynez River provides habitat for the Southern California Distinct Population Segment (DPS) of steelhead trout (*Oncorhynchus mykiss*) (steelhead), which is listed as an endangered species under the federal Endangered Species Act (ESA). (16 U.S.C. §§ 1531-1544.) The Cachuma Project has adversely affected the steelhead fishery by blocking access to the majority of suitable spawning and rearing habitat upstream, and by modifying flows in the mainstem of the lower Santa Ynez River (mainstem) below Bradbury Dam to the point that the survival of the species is uncertain. (E.g., NOAA-12, p. 6.) Currently, Reclamation operates and maintains Bradbury Dam on the Santa Ynez River in accordance with a Biological Opinion issued by the National Marine Fisheries Service (NMFS) on September 11, 2000 (2000 Biological Opinion) pursuant to section 7 of the federal ESA. (16 U.S.C. § 1536.)

SWRCB Order WR 2019-0148 requires additional releases from Cachuma Reservoir beyond the 2000 Biological Opinion (NMFS 2000) to protect steelhead (*O. mykiss*). In addition to the endangered steelhead trout species, riparian habitat along the lower Santa Ynez River also supports a great diversity of aquatic non-fish and terrestrial wildlife species (SWRCB 2019).

Historical impacts to GDEs along the Santa Ynez River were evaluated as part of the SWRCB Cachuma Project Water Rights hearings (Jones and Stokes 2000). The SWRCB Final Environmental Impact Report (SWRCB 2011) summarized the findings as follows:

80 23 CCR § 351 (m) "Groundwater dependent ecosystem" refers to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.

> Jones & Stokes (2000) observed that, even in dry years, groundwater levels in the basin remained less than 10 feet below the channel thalweg along most of the river and remained at relatively constant depths below the ground surface on the banks of the river. The groundwater has been maintained at depths suitable to support mature phreatophytic plants (such as willows and cottonwoods), in combination with winter flows. Jones & Stokes (2000) concluded that the operations of the Cachuma Project since 1973 have not altered groundwater conditions in a manner that adversely affects riparian vegetation.

Based on this study by Jones and Stokes (2000), habitats along the Santa Ynez River are not currently considered vulnerable due to pumping in the Santa Ynez River Alluvium, due in part to water rights releases under the SWRCB Order WR 2019-0148 for the Cachuma Project and the resulting stable groundwater levels. Moreover, as explained above, the Alluvium's subflow is not considered groundwater as defined by SGMA.

Potential GDEs have been mapped by the California Department of Water Resources, the California Department of Fish and Wildlife, and The Nature Conservancy along the tributaries of the CMA (Figure 2a.4-4, HCM), including the ephemeral tributaries in the Buellton Upland north of the Santa Ynez River, including Dry Creek, Santa Rosa Creek, Cañada de Palos Blancos, and Cañada de Laguna Creek, and Zaca Creek. These were assessed into three categories based on the relationship to the aquifer (**Figure 2b.6-3**). If depth to groundwater has historically exceeded the 30-foot depth identified by the Nature Conservancy as representative of groundwater conditions that may sustain common phreatophytes and wetland ecosystems (Rohde et al. 2018), the potential GDE was identified as unlikely to be affected by groundwater management (Category C on Figure 2b.6-3). Riparian areas of the Santa Ynez River were identified as being managed by the SWRCB as part of Santa Ynez River surface and subflow (Category B on Figure 2b.6-3). The remaining area consists of GDEs likely related to groundwater levels (Category A on Figure 2b.6-3). Part of the Category B area that overlies the Buellton Aquifer may have some influence from the Buellton Aquifer water levels. This area is grouped with the Category A to form the potential GDEs. **Table 2b.6-2** below summarizes the land areas involved.

Table 2b.6-2
Potential CMA Groundwater Dependent Ecosystem Categorization.

Category	Description	Acres	Percentage
A	Potential GDE Associated with a Principal Aquifer	11	0.6%
B	Riparian vegetation not subject to SGMA	1223	70.5%
C	Unlikely to be Affected by Groundwater Management	501	28.9%
Potential GDE	Category B over Buellton Aquifer	807	46.5%
Total		**1,735**	**100%**

Section 2 C: WATER BUDGET

The Sustainable Groundwater Management Act (SGMA) requires that a Groundwater Sustainability Plan (GSP) include: "a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored."[81] This section describes the water budget within the Central Management Area (CMA) of the Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB).

A water budget is an accounting tool that quantifies inflows (sources) and outflows (sinks) occurring within a groundwater basin (or specified management area) using the following equation:

Inflows − Outflows = Change in Storage

The water budget is a key component of overall understanding of the Basin and contributes to developing the following GSP elements:

- Identifying data gaps
- Evaluating monitoring requirements
- Evaluating potential projects and management actions
- Estimating the sustainable yield
- Evaluating undesirable results (negative impacts)
- Informing water management decision making

Annual water budget components for the historical period (1982 through 2018) were assembled, compiled, and summarized. Total inflow and outflow components are presented in the water budgets for the historical data period (1982 through 2018), "current conditions" (2011 through 2018), and "projected conditions" (2018 through 2072). These data are evaluated to identify potential long-term trends in groundwater basin supply and demand and estimates of inflows and outflows and groundwater storage

81 23 CCR § 354.18.

changes. The results support interpretation of trends in measured water levels in wells, and a preliminary estimate of sustainable yield based on the perennial or safe yield.

Perennial yield, also referred to as safe yield, is defined as a long-term average annual amount of water which can be withdrawn from a basin under specified operating conditions without inducing a long-term progressive drop in water levels (Stetson 1992). The estimated perennial yield for the base period is calculated as follows:

Perennial Yield = Average Annual Pumping + Average Annual Change in Storage

Perennial yield can also be defined as pumping but that does not impact the physical or chemical integrity of the groundwater, but as used here relates only to the chronic lowering of groundwater levels for a base period in which precipitation approximates long-term average precipitation.[82]

Sustainable yield is defined in SGMA as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus that can be withdrawn annually from a groundwater supply without causing an undesirable result."[83] An undesirable result[84] is defined as significant and unreasonable effects on one or more of the following six sustainability indicators:

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82 The focus on long-term lowering of groundwater levels is also the focus of DWR's definition of overdraft in Bulletin 118 Update 2003 (DWR 2003): "Condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years, during which the water supply conditions approximate average conditions. Overdraft can be characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years."

83 CWC Section 10721 (w) "Sustainable yield" means the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.

84 CWC Section 10721 (x)

1. Chronic lowering of groundwater levels
2. Reduction of groundwater storage
3. Seawater intrusion
4. Degraded water quality
5. Land subsidence
6. Depletion of interconnected surface water

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2c.1 WATER BUDGET ELEMENTS

This section provides a summary of the data sources used for development of the water budget. A conceptual diagram showing the components of the surface water and groundwater systems in the CMA is provided in **Figure 2c.1-1**. Water supply and water use within the CMA as well as groundwater conditions are dependent upon precipitation. Precipitation, either directly or as streamflow infiltration, recharges the groundwater supplies of the CMA. This Water Budget quantifies groundwater flows into and out of the CMA, including natural conditions (runoff and recharge from precipitation, groundwater flow, riparian evapotranspiration) and human-made conditions (dam releases, groundwater pumping, and return flows).

2c.1-1 Water Year Type Classification

Groundwater Conditions Section 2b.2-2 ("Classification of Wet and Dry Years") describes how water year types are classified in the CMA. For consistency, the hydrologic year type for the CMA is based on the methodology similar to the recent State of California Water Resources Control Board (SWRCB) Order WR 2019-0148 (SWRCB 2019). Years are classified based on the rank in the period of record in one of five categories: critically dry (bottom 20th percentile), dry (20th to 40th percentile), below normal (40th to 60th percentile), above normal (60th to 80th percentile), and wet (80th to 100th percentile). **Table 2c.1-1** compares the water year classification of the CMA and SWRCB Order WR 2019-0148 to the annual precipitation at Buellton Fire Station for the historical period (1982 through 2018).[85] Consistency between different stations throughout the Basin is indicated in **Table 2c.1-1**, except the CMA and SWRCB hydrologic year type based on surface water inflow reflects antecedent soil moisture conditions. For example, the annual precipitation in year 1997 was 81% of average at the Buellton Fire Station. However, because the precipitation occurred during a wet climatic trend following wet years 1993 and 1995, the water year is classified with above normal runoff and recharge conditions.

85 Buellton Fire Station, Precipitation Gauge 233, Santa Barbara County Flood Control & Water Conservation District. Water Years 1955–2020. Period of record average is 16.6 inches per year.

Table 2c.1-1
Annual Precipitation and Water Year Classification for CMA

			Hydrologic Year Type Classification [A]		
	Buellton Fire Station		CMA	Upper Santa Ynez River	
Water Year	Precipitation (in/year)	% of Average [B]	USGS Gage 11132500 (Salsipuedes Creek)	SWRCB WRO 2019-0148	Climatic Trends[C]
1982	**14.4**	86%	Dry	Below normal	Wet
1983	**38.8**	233%	Wet	Wet	Wet
1984	**10.0**	60%	Below normal	Above normal	Dry
1985	**12.2**	74%	Dry	Dry	Dry
1986	**19.3**	116%	Above normal	Above normal	Dry
1987	**11.2**	67%	Dry	Critically Dry	Dry
1988	**17.3**	104%	Dry	Dry	Dry
1989	**7.3**	44%	Critically Dry	Critically Dry	Dry
1990	**6.7**	40%	Critically Dry	Critically Dry	Dry
1991	**17.9**	107%	Below normal	Above normal	Dry
1992	**27.1**	163%	Above normal	Wet	Wet
1993	**27.4**	165%	Wet	Wet	Wet
1994	**12.6**	76%	Below normal	Below normal	Wet
1995	**34.3**	206%	Wet	Wet	Wet
1996	**13.3**	80%	Below normal	Below normal	Wet
1997	**13.5**	81%	Above normal	Above normal	Wet
1998	**40.9**	246%	Wet	Wet	Wet
1999	**14.5**	87%	Above normal	Below normal	Normal
2000	**18.4**	111%	Above normal	Above normal	Normal
2001	**28.4**	171%	Wet	Wet	Normal
2002	**8.5**	51%	Dry	Dry	Normal
2003	**17.5**	105%	Below normal	Below normal	Normal
2004	**9.4**	57%	Dry	Dry	Normal
2005	**39.6**	238%	Wet	Wet	Normal
2006	**19.2**	115%	Above normal	Above normal	Normal
2007	**7.0**	42%	Critically Dry	Critically Dry	Normal
2008	**19.3**	116%	Above normal	Above normal	Normal

			Hydrologic Year Type Classification [A]		
	Buellton Fire Station		CMA	Upper Santa Ynez River	
Water Year	Precipitation (in/year)	% of Average [B]	USGS Gage 11132500 (Salsipuedes Creek)	SWRCB WRO 2019-0148	Climatic Trends[C]
2009	**10.8**	65%	Critical	Dry	Normal
2010	**18.5**	111%	Below normal	Above normal	Normal
2011	**21.4**	129%	Wet	Wet	Normal
2012	**11.4**	68%	Dry	Dry	Dry
2013	**7.8**	47%	Critically Dry	Critically Dry	Dry
2014	**5.9**	35%	Critically Dry	Critically Dry	Dry
2015	**7.0**	42%	Critically Dry	Critically Dry	Dry
2016	**10.7**	64%	Critically Dry	Dry	Dry
2017	**20.4**	122%	Above normal	Above normal	Normal
2018	**7.9**	48%	Critically Dry	Dry	Normal

[A] Dry and critically dry years are shaded yellow; wet years are shaded blue; and normal, below normal, and above normal years are unshaded. **Notes:** CMA = Central Management Area; USGS = U.S. Geological Survey; SWRCB = State Water Resources Control Board; WRO = Water Resources Order; in/year = inches per year.

[B] Average for period of record (1955–2020) is 16.6 inches per year.

[C] GSI 2021.

2c.1-2 Water Budget Analysis Time Periods (Historical, Current, and Projected)

The historical water budget period, or base period, is selected to be water years 1982 through 2018 (37 years; see **Figure 2c.1-2**). Water years start on October 1 of the previous year and run through September 30th of the current year.[86] This 37-year time period is in accordance with SGMA by being longer than 10 years and includes the "most recently available information."[87] This period includes two major historical droughts (1985 through 1991 and, 2012 through 2018) and represents a balanced period. For example, the average precipitation at the Buellton Fire Station is 16.6 inches per year for the period of 1955 through 2020 and 17.0 inches for the historical period (1982 through 2018), a difference of only 2%. Furthermore, this 37-year period also includes when the Santa Ynez River Water Conservation District (SYRWCD) began collecting self-reported groundwater pumping data in the Basin. This base period was also coordinated

86 Per SGMA regulations, all years refer to water years; start in October 1st of the previous year through September 30th of the current year.

87 23 CCR § 354.18(c).

with the two other management agencies (WMA and EMA) in the Basin. The historical water budget is presented below in Section 2c.2.

Water years 2011 through 2018, an eight-year subset of the historical data record, was used to represent current conditions. The period has "the most recent hydrology, water supply, water demand, and land use information,"[88] including data from January 1, 2015 to current conditions. This period is very dry, which is why 2011, a wet year, is included in this data set to provide some balance. The average annual precipitation for the 8-year period is 11.6 inches per year (70% of average). The current water budget is presented in Section 2c.3-2.

The projected water budget for the period of 2018 through 2072 extends 50 years past the 2022 submittal of this Groundwater Sustainability Plan (GSP), for a total of 55 years. The projected water budget is presented in Section 4.

2c.1-3 Surface Water and the Santa Ynez River Alluvium

In addition to groundwater inflows and outflows, GSP regulations state that the "total surface water entering and leaving a basin by water source type" must also be accounted for.[89] This will include the Santa Ynez River, tributaries, and State Water Project (SWP) imports. In addition, as discussed in the HCM (Section 2a.3), the Santa Ynez River Alluvium is part of the subflow of the river, which is regulated by SWRCB. Because subflow is considered surface water and not groundwater, the Santa Ynez River Alluvium would not be classified as a principal aquifer or managed by a GSP under SGMA. Therefore, the Santa Ynez River Alluvium is considered part of the underflow of the Santa Ynez River and is treated as part of the surface water in the historical, current, and projected water budgets.

2c.1-4 Water Budget Data Sources

The historical and current water budgets were developed using various publicly available data. The projected water budget was developed using the SGMA guidance, further described below. **Table 2c.1-2**

88 23 CCR § 354.18(c)(1). Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information.

89 23 CCR § 354.18(b).

presents a summary of the data sources employed for developing the historical and current water budgets and a description of each data set's qualitative data rating. Data that is measured is usually rated at a high quality, and data that is estimated is rated as from low to medium depending upon the data source of the estimate. Each of these data sets is described in further detail in the following sections.

Table 2c.1-2
Water Budget Data Sources

Water Budget Component	Data Source(s)	Comment(s)	Qualitative Data Rating
Surface Water Inflow Components			
Santa Ynez River Inflow	USGS	Solvang Gage	Gaged – High
Tributary Inflow	Correlation with gaged data	Methods described in text	Calibrated Model – Medium
Imported: SWP	Central Coast Water Authority	—	Metered – High
Groundwater Inflow Components			
Deep Percolation of Precipitation: Overlying and Mountain Front Recharge	USGS BCM Recharge	BCM calibrated to Basin precipitation station data	Calibrated Model – Medium
Streamflow Percolation	Santa Ynez RiverWare Model, USGS BCM	Collaborative Modeling effort: Stetson and GSI	Calibrated Model – Medium
Subsurface inflow	Darcian flux calculation	Collaborative Modeling effort: Stetson and GSI	Estimated – Medium
Irrigation Return Flows	Land use surveys, self-reported pumping data	Basinwide Collaborative Estimation: Stetson and GSI	Estimated – Low
Percolation of Treated Wastewater	City of Solvang and City of Buellton	Received from cities	Metered – High
Percolation from Septic Systems	SYRWCD self-reported data, Santa Barbara County Water Agency return estimates	Methods described in text	Estimated – Low
Surface Water Outflow Components			
Santa Ynez River Outflow	USGS	Methods described in text	Calibrated Model - Medium
Streamflow Percolation	Santa Ynez RiverWare Model, USGS BCM	Collaborative modeling effort: Stetson and GSI	Calibrated Model - Medium
Riparian Evapotranspiration	Aerial photography, NCCAG/NWI data sets, CIMIS weather station	Methods described in text	Estimated – Medium/Low

Table 2c.1-2 (continued)
Water Budget Data Sources

Groundwater Outflow Components			
Agricultural Irrigation Pumping	Land use surveys, self-reported pumping data	Methods described in text	Estimated – Medium/Low
Municipal Pumping	City of Buellton self-reported pumping data	Methods described in text	High/Medium
Rural Domestic/Small Public Water Systems Pumping	SYRWCD self-reported data, DRINC	Methods described in text	Estimated – Medium/Low
Riparian Evapotranspiration	Aerial photography, NCCAG/NWI datasets, CIMIS weather station	Methods described in text	Estimated – Medium/Low
Subsurface Outflow	Darcian flux calculations, groundwater model	Methods described in text	Estimated – Medium

Notes: USGS = U.S. Geological Survey; SWP = State Water Project; BCM = Basin Characterization Model; Stetson = Stetson Engineers; GSI = GSI Water Solutions, Inc.; SYRWCD = Santa Ynez River Water Conservation District; NCCAG = The Natural Communities Commonly Associated with Groundwater (NCCAG) Wetland dataset; NWI = National Wetlands Inventory; CIMIS = California Irrigation Management Information System; DRI.NC = Drinking Water Information Clearinghouse.

A numerical groundwater model (Appendix 2c-A) was constructed to support and verify the water budgets for the Groundwater Sustainability Plans for the WMA and CMA. The model was developed as an analysis and planning tool for the sustainable management of groundwater resources within the basin.

The areal extents of the WMA/CMA Model (Figure 1 in Appendix 2c-A) cover about 110 square miles (72,000 acres) from east of Buellton (upstream) to the Pacific Ocean (downstream). Seven groundwater subareas (Figure 2) are represented within the model: CMA Santa Ynez River alluvium, CMA Buellton Upland, WMA Santa Ynez River alluvium, WMA Santa Rita Upland, WMA Lompoc Plain, WMA Lompoc Upland, and WMA Lompoc Terrace). Please see Appendix 2c-A for more information presented in a Technical Memorandum that documents the construction and calibration of the WMA/CMA Modflow Groundwater Model.

2c.1-4-1 Sources of Surface Water Inflows

2c.1-4-1-1 Santa Ynez River

Surface water inflows include both local and imported water entering the CMA. As discussed in Section 1.3, all of the inflow into the Santa Ynez River Alluvium is considered as part of the surface water inflow.[90] The Santa Ynez River Alluvium includes fluxes that are associated with groundwater data sources (e.g., subflow, recharge from precipitation), but in Sections 2c.2, 2c.3, and 2c.4, all Santa Ynez River Alluvium fluxes will be accounted for as part of the total surface water in the water budget.

The U.S. Geological Survey (USGS) Solvang gage (USGS ID 11128500) measures the flow of Santa Ynez River water entering the CMA. Figure 2a.3-7 (HCM) shows the location of the gage, Figure 2a.3-8 (HCM) shows annual flow totals, and Figure 2b.6-2 (GC) shows average monthly flows. Santa Ynez River flows in the CMA are substantially influenced by upstream dam and reservoir operations. Downstream releases and spillway flows from Lake Cachuma are controlled and monitored by the U.S. Bureau of Reclamation at Bradbury Dam. Flows at the Solvang gage are the outflow from the Basin's Eastern Management Area (EMA).

2c.1-4-1-2 Tributaries

Watershed drainage areas and average precipitation for Santa Ynez River tributaries to the Santa Ynez River within the CMA are summarized in **Table 2c.1-3**. Figure 2a.3-2 (HCM) shows the aerial distribution of precipitation in the CMA watershed. In general, the tributaries to the south of the Santa Ynez River receive more precipitation and are on steeper slopes compared with the tributaries to the north of the Santa Ynez River.

90 The Santa Ynez River Alluvium subarea corresponds to Zone A in the SYRWCD management and annual reports (Figure 2a.2-4, HCM). This alluvium is included as part of the Above Narrows area in the SWRCB Order WR 2019-0148 (SWRCB 2019).

Table 2c.1-3
Tributary Creeks of the CMA

	Drainage Area (mi²)	Average Annual Precipitation (in/year)[A]
North of the Santa Ynez River		
Adobe Canyon Creek	2.5	19.2
Ballard Canyon Creek	5.1	19.4
Zaca Creek	36.6	20.7
Cañada de Laguna	4.1	18.7
Cañada de los Palos Blancos	5.2	18.4
Santa Rosa Creek	8.3	18.6
Unnamed Tributaries	6.0	18.4
South of the Santa Ynez River		
Nojoqui Creek	15.9	25.1
Unnamed Tributaries	9.5	23.4
Salsipuedes Creek USGS Gage	47.10	23.0

Notes: CMA = Central Management Area. [A] PRISM 2014.

Tributary flow was estimated using stream gage data (if available) and correlation with nearby stream gage data. Zaca Creek has a USGS gage (USGS ID 11129800; Figure 2b.6-1, Groundwater Conditions) upstream of the CMA inflow boundary with data available for water years 1990–1992, 1995–2004, and 2006–present. For years with missing data, the USGS gage on nearby Alamo Pintado Creek, in the EMA, was used to estimate flows by regression analysis (Stetson 2008). The tributary in the Lower Santa Ynez River with the longest period of record is Salsipuedes Creek (USGS ID 11132500), located in the WMA. Flows in ungaged areas are estimated based on the Salsipuedes Creek gage prorated by drainage area and average annual precipitation, as shown in **Table 2c.1-3**.

2c.1-4-1-3 State Water Project Imports

Imported SWP water deliveries were provided by the Central Coast Water Authority for August 1997 through present. These volumes include imported SWP water to the City of Buellton in the CMA. Prior to the completion of the Coastal Branch Pipeline in 1997, no water was imported into the Basin (HCM Figure 2a.3-10).

2c.1-4-2 Sources of Groundwater Inflows

The data sources used for the groundwater budget inflow terms are described below.

2c.1-4-2-1 Recharge from Precipitation

Precipitation that infiltrates into the soil zone and eventually recharges the regional groundwater table can be broken into two components: overlying recharge and mountain front recharge (also referred to as mountain block recharge). Overlying recharge occurs on the land surface that directly overlies the principal aquifer. Mountain front recharge occurs from subflow from the adjacent bedrock or the older consolidated formations that are not part of the basin. Both types of recharge relate to the amount of precipitation in the drainage basin that infiltrates into the soil and drains to the groundwater aquifer. As is typical of a Mediterranean climate, the CMA experiences many months in the summer and fall with no precipitation. The area also goes through periodic dry cycles, with as many as seven consecutive years with below normal precipitation.

Recharge to groundwater from deep percolation of precipitation was determined using the USGS Basin Characterization Model (BCM) for California (Flint and Flint 2017). BCM uses a soil budget based on monthly climate data and soils information to estimate the recharge, as shown on **Figure 2c.1-3**.

The BCM data are provided statewide on roughly 20-acre cells (**Figure 2c.1-4**). This BCM recharge data set is the same data set being used in the EMA (GSI 2020) and WMA. As described in GSI 2020, the BCM recharge data set has been adjusted based on comparison to monthly precipitation records at weather stations across the entire Basin. A correction was applied to the BCM values for each monthly timestep such that the adjusted BCM data exactly matched all recorded weather station monthly precipitation values. These monthly adjustments were also applied to the BCM-generated recharge data sets. The timing of overlying recharge was modified from the BCM output. The BCM recharge output was very concentrated in wet years, but local well hydrographs indicate a more attenuated recharge flux across many years. The average annual recharge from the BCM was utilized and disaggregated based on percentage of rainfall at Buellton for any particular year compared to the average rainfall for the historical period (1982 through 2018).

The BCM does not route flows downstream. For areas outside the Basin and not within the major tributaries (i.e., Nojoqui, Zaca, and Santa Rosa Creeks), mountain front recharge areas are estimated based on the Salsipuedes Creek gage prorated by drainage area and average annual precipitation.

2c.1-4-2-2 Percolation of Streamflow to Groundwater

Streamflow percolation, or the deep percolation of surface water to groundwater through the Santa Ynez River streambed, was estimated using the calibrated Santa Ynez River RiverWare flow model (Stetson 2008) for percolation in the Santa Ynez River Alluvium subarea. Percolation occurring in the tributary channels in the Buellton Upland was estimated using the studies from the Buellton Upland Groundwater Management Plan (SYRWCD 1995).

2c.1-4-2-3 Subsurface Inflow from Adjacent Aquifers

Subflow is estimated using Darcy's Law for two areas into the CMA, along the Santa Ynez River and in the Buellton Upland. Darcy's law is an equation that quantifies the flow of fluid through a porous medium (groundwater geologic materials like sand and gravel). The flow rate calculated by the law depends on three main variables, including the permeability of the medium, the cross-sectional area of the medium through which the fluid flows, and gradient (change in elevation) that is present over a given distance as shown in the equation below:

$$\mathbf{Q = K * I * A}$$

where

Q = flow in ft^3/sec (cfs)
K = hydraulic conductivity in ft/sec
I = hydraulic gradient in ft/ft
A = cross-sectional area in ft^2

The subflow at the CMA/EMA boundary is estimated at 1,800 acre-feet per year (AFY) along the Santa Ynez River. This estimate was coordinated with the water budget of the EMA. This subflow includes the underflow in the Santa Ynez River gravels and alluvium.

The Buellton Upland subarea (CMA) is separated from the Santa Ynez Upland subarea (EMA) by older non-water bearing deposits. Groundwater is likely discharged from the Santa Ynez Upland through creeks draining the upland and underflow in shallow deposits of the aquifer material between bedrocks outcrops. The subflow at the CMA/EMA boundary in the Buellton Upland is estimated at 85 AFY, which has also been coordinated with the water budget of the EMA.

2c.1-4-2-4 Irrigation Return Flows

Irrigation return flow is the excess water from water applied to crops that percolates below the root zone and returns back to the groundwater aquifer. Irrigation return flow is related to the irrigation efficiency. The portion of applied water that is utilized to satisfy crop demand for water (evapotranspiration [ET]) is equivalent to the irrigation efficiency, expressed as a percentage. The remaining percentage of applied water is equivalent to the irrigation return flow. For example, if the irrigation efficiency is 60%, then 60% of the applied water would be used by the crops and 40% could be assumed as return flows. Irrigation return flows can either recharge the groundwater or leave the field as surface water in drains or tail water and discharge to a nearby creek or river. It is assumed that most of the irrigation return flow percolates to groundwater within the CMA. Similar to basin wide assumptions in other parts of the Basin (Yates 2010), an irrigation efficiency of 80% is assumed for all crops except vineyards, which are assumed to be irrigated using drip at an efficiency of 95%. The total inefficiency of 20% for all crops except vineyards and 5% for vineyards is assumed to recharge the groundwater. The urban landscape irrigation efficiency is assumed to be 70% but only 15% is assumed to return to groundwater based on historical estimates (Stetson 1992). Irrigation return flow volumes have been calculated using these efficiencies multiplied by the calculated annual volumes of irrigation water applied to each crop type, based on self-reported pumping data and assumed crop-specific water duty factors.

Based on self-reported pumping and parcel coverage, this analysis assumes 5% of the agricultural water pumped from the Santa Ynez River Alluvium is applied to lands in the Buellton Upland where the irrigation return flows would be inflow to the Buellton Upland groundwater. Of this 5% pumped from the River and applied to the Buellton Upland, 10% is assumed as return flow to the Buellton Aquifer in the Buellton Upland. For the City of Buellton, all of the return flows from urban irrigation are assumed to return to the Santa Ynez River Alluvium based on the City boundary and the wide alluvial boundary in this reach.

2c.1-4-2-5 Percolation of Treated Wastewater

There are two wastewater treatment plants within the CMA (Figure 2a.3-4, HCM Section). The City of Solvang and a portion of the township of Santa Ynez, west of Highway 154, are connected to sewer service. Wastewater flows are collected by the City of Solvang and the Santa Ynez Community Services District and are transmitted to the Solvang wastewater treatment plant, which is within the CMA near the boundary with the EMA. The treated wastewater is held in percolation ponds that subsequently recharge the Santa Ynez River alluvium and become subflow.

Similarly, City of Buellton has a wastewater treatment plant downstream of the confluence of Zaca Creek and the Santa Ynez River. The treated wastewater is held in percolation ponds that subsequently recharge the Santa Ynez River alluvium and become subflow. The measured treated wastewater quantities were obtained from the City of Solvang and City of Buellton, respectively, for the historical period (1982 through 2018).

2c.1-4-2-6 Percolation from Septic Systems

Outside of the sewer service areas within the CMA, domestic wastewater is discharged to septic systems. Return flows from the septic systems recharge the groundwater. The recharge from septic systems is calculated using estimates from previous SYRWCD and County studies (Stetson 1992). These previous analyses assumed that 40% of domestic water is used indoors and that 87% of this water will return to the groundwater. After accounting for the 60% for urban irrigation (outdoor water use) with 15% return flow, the total return flow from domestic/rural residential pumping for both indoor and outdoor use is estimated at 44%.

2c.1-4-3 Surface Water Outflows

The data sources used for the surface water budget outflow terms are described below.

2c.1-4-3-1 Santa Ynez River Outflow

Santa Ynez River surface water outflows were calculated as the sum of the Santa Ynez River inflows plus tributary inflows minus streamflow infiltration to groundwater. Each of these terms are described in the sections above.

2c.1-4-3-2 Percolation of Streamflow to Groundwater

The calculation of streamflow percolation to groundwater is discussed in Section 2c-1.4.2.2.

2c.1-4-4 Groundwater Outflows

The data sources used for the groundwater budget outflow terms are described below.

2c.1-4-4-1 Agricultural Irrigation Pumping

The largest source of water for irrigating crops in the CMA is pumped groundwater. The entire CMA is within the boundaries of the SYRWCD. Groundwater pumpers located within the SYRWCD boundaries are required to self-report their estimated pumping volumes to SYRWCD for each 6-month period. These estimates are based on multiple methods, including application of water duty factors specified in SYRWCD's Groundwater Production Information and Instructions pamphlet (SYRWCD 2010); metered pumping records; and metered electricity records. The groundwater users specify which type of water they are using (agricultural, special irrigation [parks, schools, and golf courses], or other [municipal and industrial]). This reported pumping was checked against available land use surveys in 1985, 2014, and 2016 from sources provided by the California Department of Water Resources (DWR).[91] For example, in 2016 a total of 2,730 acre-feet (AF) was reported to the SYRWCD for agricultural pumping from the Buellton Upland. DWR identified 1,373 acres of irrigated land in the Buellton Upland in 2016, which would total 2,747 AF using an average crop duty of 2.0 AF per acre. Monthly irrigation pumping was disaggregated from the biannual (6-month) totals using monthly multipliers based on historical average monthly irrigation, precipitation, temperature and monthly crop water demands (HCI 1997). Pumpage for

[91] LandIQ delineated the data for years 2014 and 2016 from imagery provided by the National Agriculture Imagery Program. The data are derived from a combination of remote sensing, agronomic analysis, and ground verification. The data set provides information for resource planning and assessments across multiple agencies throughout the state and serves as a consistent base layer for a broad array of potential users and multiple end-uses.

rural domestic and small public water systems are reported to SYRWCD as derived from the Santa Ynez River Alluvium (surface water) or the Lower Aquifer (Paso Robles Formation and Careaga Formation).[92]

2c.1-4-4-2 Municipal Pumping

Municipal pumping includes all pumping for municipal, industrial, and domestic use that occurs within the City of Buellton, including water used for urban landscape irrigation. The measured monthly pumping quantities were obtained from the City of Buellton for the historical period (1982 through 2018). This pumping by the City combines the two categories reported to the SYRWCD: “other” water, which includes municipal, industrial, small public water systems, and domestic use, and “special irrigation” water, which refers to urban landscape irrigation. These municipal pumping volumes are reported by SYRWCD in the annual reports. Pumpage for municipal pumping is derived from the Santa Ynez River Alluvium (surface water) and the Lower Aquifer (Paso Robles and Careaga Sand formations).

2c.1-4-4-3 Rural Domestic and Small Public Water Systems Pumping

Besides the City of Buellton, the “other” water reported in the SYRWCD annual reports includes all other domestic uses, including rural domestic and small public water systems in the CMA. The biannual pumping quantities of rural domestic and small public water systems were disaggregated using the City of Buellton monthly average pumping distribution. Groundwater pumping for rural domestic and small public water systems are reported to SYRWCD as derived from the Santa Ynez River Alluvium (surface water) or the Lower Aquifer (Paso Robles and Careaga Sand formations).

2c.1-4-4-4 Riparian Vegetation Evapotranspiration

Riparian evapotranspiration was calculated using three sources to determine acreages of riparian vegetation types occurring within the CMA:

- The Natural Communities Commonly Associated with Groundwater (NCCAG) Wetland data set.[93]

92 In the CMA, pumping is reported to the SYRWCD for the Santa Ynez River Alluvium (Zone A) or the Buellton Lower Aquifer (Zone D). Again, for the purposes of SGMA, pumpage from the Santa Ynez River Alluvium is considered a surface water diversion and is not subject to management by SMGA or the GSAs.

93 Natural Communities Commonly Associated with Groundwater (NCCAG) dataset. Web Application. https://gis.water.ca.gov/app/NCDatasetViewer/ Accessed 2021-08-10

- The National Wetlands Inventory (NWI) dataset.[94]
- An analysis of color-infrared aerial photos from 2012 (NAIP 2012) that was completed for this study by Stetson Engineers.

Color-infrared aerial photography captures a band of near infrared in addition to bands for visible light (red, green, and blue). Near infrared is a range of electromagnetic waves that are longer than the human eye can see and is widely used for interpretation of natural resources. The spectrum is effectively blueshifted (near infrared as red, red as green, and green as blue) which creates a 'pseudocolor' image. In this pseudocolor image very intense reds indicate dense, vigorously growing vegetation. Dense vegetation is commonly associated with riparian evapotranspiration related to groundwater use. The infrared aerial photos were the primary method of detecting vegetation along the Santa Ynez River. In the upland areas, the combination of the NCCAG and NWI data sets were relied on. Surface geology and topography data were used to avoid acreage on hillsides, which would be above the regional water table.

The riparian acreage analysis is multiplied by a monthly riparian water duty based on a weather station operated by the California Irrigation Management Information System (CIMIS). The station closest to the CMA is the Santa Ynez station (HCM Figure 2a.3-2). CIMIS has daily evaporation data for the station located near the township of Santa Ynez since November 1986. **Table 2c.1-4** shows the monthly average CIMIS data. The riparian water duty factor used is 4.2 feet per year, which is similar to the 4.5 and 3.7 feet per year rates used in the EMA and WMA, respectively.

94 National Wetlands Inventory (NWI). Website. https://www.fws.gov/wetlands/Data/Data-Download.html Accessed 2021-08-10.

Table 2c.1-4
CIMIS Monthly Average Reference Evapotranspiration (2010 through 2019)

Month	Reference Evapotranspiration (inches)
January	1.9
February	2.4
March	3.9
April	5.1
May	6.0
June	.6.4
July	6.6
August	6.1
September	4.9
October	3.7
November	2.3
December	1.7
Total **inches**/year	51.0
Total **feet**/year	4.2

Note: CIMIS = California Irrigation Management Information System.

2c.1-4-4-5 Subsurface Groundwater Outflows

Subsurface groundwater outflows (or subflow) occur at the southwestern corner of the CMA along the border with WMA. Because of the constriction by the bedrock north and south of the river, this site was previously chosen for the proposed Santa Rosa Dam on the Santa Ynez River, which was never built. The magnitude of the subflow has been calculated using Darcy's law, with estimated values for hydraulic conductivity, the average hydraulic gradient, and outflow plane cross-sectional area (based on saturated thickness estimates). This estimate was made in coordination with the downstream WMA and verified with results from the numerical groundwater model.

Subsurface outflow from the Buellton Upland occurs along the southern boundary with the Santa Ynez River Alluvium subarea. Based on the length of this contact and low permeability of the Paso Robles and

Careaga Formations, the subflow was estimated using Darcy's law. The flows estimate was verified with results from the numerical groundwater model.

The amount of subflow between the Santa Rita Upland (CMA) and Buellton Upland (WMA) is unknown. The USGS (Hamlin 1985) estimated groundwater flow following the surface topography (e.g., south along Santa Rosa Creek) with no subflow estimated between Santa Rosa Creek and Santa Rita Creek. Locally there are anecdotes about groundwater levels being higher within the Santa Rosa Creek drainage compared to the Santa Rita Creek drainage, which indicates that there might be some structural impediment to flow near the surface divide between the two upland subareas. Results from the AEM geophysics study currently being compiled for the project area is expected to provide additional data. Currently no subflow is assumed in the upland area.

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2c.2 HISTORICAL WATER BUDGET

SGMA regulations require that the historical surface water and groundwater budget be based on at least the most recent 10 years of data.[95] The period of 1982 through 2018 was selected as the period for the historical water budget (also referred to as the historical base period) because it represents average conditions with several different dry and wet periods.

Estimates of the surface water and groundwater inflows and outflows, and changes in storage for the historical base period, are summarized in this section.

2c.2-1 Historical Surface Water Component

SGMA regulations require that the water budget include the total annual volume of surface water entering and leaving the basin.[96] The surface water component of the water budget quantifies important sources of surface water and evaluates their historical and future reliability.

The CMA relies on two surface water source types identified in DWR's Best Management Practices (DWR 2016): local supplies and State Water Project (SWP).

2c.2-1-1 Inflows: Local Surface Water (Santa Ynez River and Tributaries) and Imported Surface Water

Local surface water supplies include surface water flows that enter the CMA from precipitation runoff within the watershed and Santa Ynez River inflow to the CMA, regulated by SWRCB as outflows from Lake Cachuma. In addition, as discussed in the HCM (Section 2a.2), the Santa Ynez River Alluvium is part of the subflow of the river, which is regulated by SWRCB.

95 23 CCR § 354.18 (c)(2)(B) A quantitative assessment of the historical water budget, starting with the most recently available information and extending back a minimum of 10 years, or as is sufficient to calibrate and reduce the uncertainty of the tools and methods used to estimate and project future water budget information and future aquifer response to proposed sustainable groundwater management practices over the planning and implementation horizon.

96 23 CCR § 354.18 (a) Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.

Imported surface water through the SWP became available after completion of the Coastal Branch pipeline in 1997. The City of Buellton has an SWP allocation of 578 AFY and a drought buffer of 58 AFY.

Table 2c.2-1 summarizes the average, minimum, and maximum inflow from surface water from all sources. The estimated average annual total inflow over the historical base period is approximately 100,200 AFY. The large difference between the minimum and maximum inflows reflects the climatic variability between dry and wet years. The largest components of this average local inflow are releases from Bradbury Dam and flow in the Santa Ynez River upstream of the CMA, which represent about 86% of the average annual surface inflow. Inflow from the Buellton Upland and the Santa Ynez Mountains contributes 9% of the total surface water inflow. The remaining surface flow components make up 5% of the total surface water inflow (Table 2c.2-1).

The annual average, minimum, and maximum volumes of imported local surface water during the historical base period (1982 through 2018) are presented **Table 2c.2-1**. The average value of 230 AFY does not represent the typical SWP imports by the City of Buellton because deliveries did not start until 1997. The average amount of SWP imports for the shorter time period of 1998–2018 was approximately 400 AFY. The imported water supply provides approximately zero to 2% of the total volume of surface water that enters the CMA.

Table 2c.2-1
Annual Surface Water Inflow, Historical Period (1982 through 2018)

Surface Water Inflow Component	Average	Minimum	Maximum[1]
	(Acre-Feet per Year)		
Santa Ynez River Inflow from EMA	85,720	630	655,470
Santa Ynez River Tributary Inflow	9,060	70	61,820
Imported SWP	230	0	670
Santa Ynez River Alluvium Subarea (Surface Water Underflow)			
Subflow[A]	2,490	1,970	2,920
Recharge from Precipitation (Overlying and Mountain Front)	880	530	1,490
Recharge from Agricultural Return Flows to Underflow	480	340	710
Recharge from Municipal Return Flows to Underflow[B]	1,240	1,000	1,460
Recharge from Domestic Return Flows to Underflow	100	30	170
TOTAL	**100,200**	**4,570**	**724,710**

[A] Includes subflow in from the Santa Ynez River Alluvium in the EMA and Buellton Upland.

[B] Includes percolation return flow from both City of Buellton and City of Solvang wastewater treatment plants.

2c.2-1-2 Surface Water Outflows

The estimated annual average total surface water outflow leaving the CMA as flow in the Santa Ynez River, within the Santa Ynez River Alluvium Upper Aquifer, and percolation into Lower Aquifer over the historical base period is summarized in **Table 2c.2-2**. Similar to inflows, the Santa Ynez River surface outflow represents the majority (91%) off the average annual surface flow out of the CMA.

Table 2c.2-2
Annual Surface Water Outflow, Historical Period (1982 through 2018)

Surface Water Outflow Component	Average	Minimum	Maximum[1]
	(Acre-Feet per Year)		
Santa Ynez River Outflow to WMA	91,320	40	699,280
Net Channel Percolation to Groundwater[A]	360	10	1,470
Santa Ynez River Alluvium Subarea (Surface Water Underflow)			
Santa Ynez River Underflow Out	800	800	800
River well pumping – Agriculture[B]	2,720	1,920	3,690
River well pumping – Municipal[B]	470	80	1,020
River well pumping – Domestic[B]	225	70	380
Riparian Vegetation Evapotranspiration	4,165	4,165	4,165
TOTAL	**100,070**	**7,085**	**710,805**

A Does not include percolation to Santa Ynez River Alluvium, which is part of the surface water component.

B River well pumping occurs from wells in the Santa Ynez River Alluvium. The wells pump from the subflow of the Santa Ynez River and are administered by the SWRCB as a surface water diversion.

2c.2-1-3 Summary

As indicated in **Tables 2c.2-1** and **2c-2-2**, the average surface flow in and out averaged 100,200 AFY and 100,070 AFY, respectively, for the historical period (1982 through 2018). The surface water inflow exceeded outflow by 130 AFY.

The surface water budget for the historical period in the CMA is presented on **Figure 2c.2-1** and **Table 2c.2-3**. The inflows and outflows for the Santa Ynez River Alluvium shown in Tables 2c.2-1 and 2c.2-2 are totaled in Figure 2c.2-1 and Table 2c.2-3. The figure shows how flashy the hydrologic system is, with ten wet years showing orders of magnitude more flux of surface water than the other, drier, years. In these wet years, surface water inflows and outflows are extremely large in response to precipitation, compared with the drier years.

Table 2c.2-3

Annual Surface Water Components, Historical Period (1982 through 2018), AFY

		Inflows					Outflows				
Water Year	Hydrologic Year Type	Santa Ynez River	Tributary	Imported SWP	River Alluvium Total Inflows	Total Inflows	Santa Ynez River	Net Percolation to Groundwater	River Alluvium Total Outflows	Total Outflows	Inflow - Outflow
1982	Dry	3,916	1,403	0	5,125	10,445	3,402	161	9,239	12,801	-2,357
1983	Wet	511,215	35,305	0	5,721	552,242	539,648	1,137	8,890	549,675	2,566
1984	Below normal	24,859	2,955	0	5,236	33,049	26,082	262	9,126	35,470	-2,421
1985	Dry	2,677	937	0	5,129	8,742	562	139	8,656	9,358	-615
1986	Above normal	12,297	10,412	0	5,034	27,742	14,906	451	8,144	23,501	4,241
1987	Dry	1,853	1,374	0	4,735	7,961	1,392	124	8,228	9,743	-1,782
1988	Dry	4,119	720	0	4,995	9,834	1,320	114	8,209	9,643	191
1989	Critically Dry	1,758	155	0	4,765	6,677	109	34	8,568	8,712	-2,035
1990	Critically Dry	629	84	0	4,702	5,416	39	12	8,771	8,821	-3,406
1991	Below normal	12,361	5,477	0	4,816	22,654	11,091	227	8,429	19,747	2,907
1992	Above normal	40,134	8,366	0	5,085	53,585	43,968	446	8,039	52,453	1,132
1993	Wet	364,086	18,499	0	5,258	387,844	377,397	757	7,857	386,011	1,833
1994	Below normal	9,390	2,468	0	5,193	17,050	10,416	203	7,806	18,425	-1,375
1995	Wet	533,933	61,822	0	5,641	601,396	590,940	1,470	7,670	600,081	1,315
1996	Below normal	15,892	3,624	0	5,206	24,722	17,646	292	7,900	25,838	-1,116
1997	Above normal	15,294	6,532	74	5,584	27,484	19,711	424	8,042	28,176	-692
1998	Wet	655,470	49,154	609	5,905	711,137	699,276	1,361	7,199	707,836	3,301
1999	Above normal	10,953	5,491	569	5,522	22,535	14,156	408	7,914	22,478	57
2000	Above normal	24,183	9,991	602	5,579	40,356	32,004	488	8,170	40,662	-306
2001	Wet	157,890	22,082	384	5,825	186,181	176,979	771	7,867	185,617	564
2002	Dry	8,544	1,222	584	5,234	15,584	7,722	164	7,841	15,727	-143
2003	Below normal	7,711	3,344	530	5,409	16,994	9,747	270	7,970	17,987	-993
2004	Dry	10,147	1,484	511	5,521	17,663	6,017	121	8,674	14,812	2,851
2005	Wet	373,556	33,659	511	5,984	413,710	404,441	1,046	8,583	414,069	-359
2006	Above normal	96,498	5,477	641	5,528	108,144	98,411	364	8,332	107,108	1,036
2007	Critically Dry	10,885	469	665	5,173	17,192	7,714	65	8,632	16,411	781
2008	Above normal	49,596	10,337	513	5,238	65,684	57,782	451	8,497	66,730	-1,046
2009	Critically Dry	4,753	481	293	4,908	10,435	2,362	71	8,345	10,779	-344
2010	Below normal	18,594	4,572	226	5,091	28,483	18,906	259	8,246	27,411	1,071
2011	Wet	120,436	15,004	394	5,008	140,841	130,640	629	7,994	139,264	1,577
2012	Dry	4,862	763	582	5,003	11,210	3,107	118	8,734	11,959	-748
2013	Critically Dry	11,520	250	216	4,591	16,577	6,378	35	8,923	15,335	1,242
2014	Critically Dry	6,118	165	32	4,632	10,947	4,433	23	8,974	13,429	-2,483
2015	Critically Dry	9,518	73	0	4,633	14,224	3,370	10	8,719	12,099	2,125
2016	Critically Dry	8,006	116	82	4,638	12,842	3,823	16	8,649	12,488	354
2017	Above normal	18,652	10,820	293	5,255	35,020	24,538	410	9,026	33,974	1,046
2018	Critically Dry	9,315	162	224	5,035	14,735	8,527	22	9,239	17,788	-3,053
Average 1982 - 2018		**85,720**	**9,060**	**230**	**5,190**	**100,200**	**91,320**	**360**	**8,380**	**100,070**	**130**

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2c.2-2 Historical Groundwater Budget

The historical groundwater budget (1982 through 2018) includes a summary of the estimated groundwater inflows and, groundwater outflows, followed by the change of groundwater in storage and discussion about the sustainable yield of the CMA.

2c.2-2-1 Groundwater Inflows

Groundwater inflow components include subsurface inflow, deep percolation of direct precipitation and mountain front recharge, streamflow percolation, and return flows from agricultural irrigation and, municipal, and domestic water uses. The annual groundwater inflows during the historical base period are summarized in **Table 2c.2-4**. During the historical base period, an average of 3,550 AFY of total groundwater inflow occurred. During this time, the groundwater inflow ranged from 1,990 AFY to 6,570 AFY, due to differences in rainfall in dry and wet years. The largest groundwater inflow component was recharge from precipitation overlying the Buellton Upland, which accounts for approximately 53% of the total annual average inflow.

Table 2c.2-4
Annual Groundwater Inflow, Historical Period (1982 through 2018)

Groundwater Inflow Component	Average	Minimum	Maximum[1]
	(Acre-Feet per Year)		
Subflow	90	90	90
Recharge from Precipitation – Overlying	1,870	890	3,560
Recharge from Precipitation – Mountain Front	770	770	770
Net Channel Percolation from Surface Water	360	10	1,470
Agricultural Return Flows	380	210	530
Municipal/Domestic Return Flows	80	20	150
TOTAL	**3,550**	**1,990**	**6,570**

2c.2-2-2 Groundwater Outflows

Groundwater outflow components include total groundwater pumping from all water use sectors, subsurface flow out of the Buellton Upland, and phreatophyte (riparian vegetation) evapotranspiration. The estimated annual groundwater outflows for the historical base period are summarized in **Table 2c.2-5**

Table 2c.2-5
Annual Groundwater Outflow, Historical Period (1982 through 2018)

Groundwater Outflow Component	Average	Minimum	Maximum[1]
	(Acre-Feet per Year)		
Pumping – Agriculture	2,220	1,070	3,240
Pumping – Municipal	370	80	790
Pumping – Domestic	170	40	350
Total Pumping	2,760	1,190	4,380
Riparian Vegetation Evapotranspiration	90	90	90
Subflow	690	170	1,120
TOTAL	**3,540**	**1,450**	**5,590**

Groundwater pumping was the largest groundwater outflow component, totaling 78% of the total groundwater outflow. The estimated annual groundwater pumping by water use sector for the historical base period is summarized in **Table 2c.2-5** and on **Figure 2c.2-2**. Agricultural and municipal pumping were the largest components of groundwater pumping, accounting for approximately 63% (agricultural) and 10% (municipal) of total pumping over the historical base period. As indicated on Figure 2c.2-2, pumping fluctuated over time but increased overall during the historical base period. From 1998 to 2018, total pumping increased from 1,500 to 3,000 AFY. Domestic and small mutual water companies accounted for 5% of total pumping during the historical base period.

2c.2-2-3 Summary and Change in Storage

Annual changes in groundwater in storage were calculated for each year of the historical base period of 1982 through 2018 (37 years). A summary of the average annual inflows and outflows within the groundwater for the CMA for the historical base period are presented graphically on **Figure 2c.2-3AB**. Figure 2c.2-3AB shows the magnitude of the average annual flow for each individual water budget component. Recharge from precipitation and agricultural pumping are the two largest fluxes for inflow and outflow, respectively. The results of the water budget during the historical period show that the CMA has same amount of total inflow as total outflow. As shown on Figure 2c.2-3A, the average total inflow of approximately 3,500 AFY is the same as the average total outflow of approximately 3,500 AFY. The variability of the average inflow and outflow components are presented for each year of the historical period on **Figure 2c.2-4**, which presents groundwater inflow components above the zero line and outflow components below the zero line. The annual variation on Figure 2c.2-4 shows that the amount of recharge will fluctuate widely depending on precipitation (also shown in Table 2c.2-4). Figure 2c.2-4 also shows the increase in groundwater pumping in the Buellton Upland (also shown in Figure 2c.2-2). These data are also presented in **Table 2c.2-6**.

As shown on **Figure 2c.2-5**, the cumulative change of groundwater in storage during each year and during the overall historical base period indicates no net change in storage.

There was zero accumulated water supply deficiency over the entire 37-year period, which is equal to an average surplus/deficit of zero AFY. The cumulative change in storage increased in the wet period from 1993 through 2006 for a net surplus, but then decreased from 2007 to 2018, for a net change of zero for the entire period.

The cumulative change in storage based on the water budget components is different in magnitude than the cumulative change in storage in SYRWCD's annual reports (Figure 2b.2-1 and Figure 2b.2-4, Groundwater Conditions) because the annual report data is based on the eastern portion of the Buellton Upland, which represents only about 20% of the entire Buellton Upland groundwater basin. However, the trends shown in both analyses are the same in that there is a zero change in the cumulative groundwater storage over the 37-year period. The average annual groundwater storage increase or decline during the historical base period—or the difference between outflow and inflow to the CMA—is approximately zero AFY.

Table 2c.2-6

Annual Groundwater Inflows, Outflow, and Change in Storage, Historical Period (1982 through 2018), AFY

		Inflows						Outflows						
Water Year	Hydrologic Year Type	Subflow In	Precipitation Recharge-Overlying	Mountain Front Recharge	Net Stream Percolation	Agricultural Return Flows	Urban Return Flows	Agricultural Pumping	Municipal Pumping	Domestic Pumping	Phreatophytes	Subflow Out	Change in Storage	Cumulative Change in Storage
1982	Dry	85	1,873	768	161	466	23	2,364	221	53	88	700	-51	-51
1983	Wet	85	3,557	768	1,137	442	19	2,240	266	44	88	700	2,670	2,619
1984	Below normal	85	2,088	768	262	510	21	2,582	405	48	88	683	-72	2,547
1985	Dry	85	1,998	768	139	527	19	2,659	335	43	88	673	-264	2,283
1986	Above normal	85	2,115	768	451	457	23	2,308	426	53	88	609	414	2,697
1987	Dry	85	1,463	768	124	482	26	2,438	487	60	88	504	-628	2,068
1988	Dry	85	1,779	768	114	464	28	2,347	326	63	88	610	-197	1,871
1989	Critically Dry	85	1,267	768	34	512	32	2,590	205	72	88	526	-783	1,089
1990	Critically Dry	85	1,044	768	12	531	40	2,683	288	91	88	483	-1,155	-66
1991	Below normal	85	1,634	768	227	465	44	2,357	90	100	88	504	84	18
1992	Above normal	85	2,321	768	446	367	45	1,859	315	103	88	483	1,184	1,201
1993	Wet	85	2,654	768	757	280	39	1,427	223	89	88	526	2,230	3,431
1994	Below normal	85	1,584	768	203	255	37	1,302	436	84	88	801	220	3,651
1995	Wet	85	2,834	768	1,470	208	39	1,068	385	88	88	780	2,993	6,645
1996	Below normal	85	1,668	768	292	242	38	1,241	301	86	88	695	681	7,326
1997	Above normal	85	1,677	768	424	250	39	1,280	374	88	88	1,056	356	7,682
1998	Wet	85	3,216	768	1,361	241	39	1,226	115	89	88	907	3,285	10,967
1999	Above normal	85	2,171	768	408	342	72	1,739	138	165	88	886	831	11,798
2000	Above normal	85	2,124	768	488	396	85	2,014	173	192	88	865	613	12,412
2001	Wet	85	2,676	768	771	429	91	2,232	362	206	88	928	1,004	13,415
2002	Dry	85	1,568	768	164	388	101	2,104	318	230	88	780	-446	12,969
2003	Below normal	85	1,757	768	270	291	107	1,676	325	243	88	844	102	13,071
2004	Dry	85	1,540	768	121	365	114	2,130	226	260	88	971	-682	12,390
2005	Wet	85	3,394	768	1,046	334	109	1,960	89	248	88	1,119	2,231	14,620
2006	Above normal	85	2,069	768	364	259	116	1,717	79	264	88	1,056	457	15,077
2007	Critically Dry	85	1,281	768	65	321	129	2,133	442	294	88	907	-1,215	13,862
2008	Above normal	85	2,119	768	451	444	154	2,729	663	351	88	632	-441	13,421
2009	Critically Dry	85	1,417	768	71	483	139	2,988	788	317	88	695	-1,913	11,507
2010	Below normal	85	2,056	768	259	403	118	2,617	718	268	88	441	-444	11,063
2011	Wet	85	2,075	768	629	310	120	2,194	667	272	88	399	367	11,430
2012	Dry	85	1,585	768	118	338	113	2,573	331	258	88	526	-768	10,663
2013	Critically Dry	85	1,236	768	35	397	112	2,925	546	255	88	165	-1,347	9,315
2014	Critically Dry	85	1,077	768	23	467	123	3,173	527	279	88	314	-1,839	7,476
2015	Critically Dry	85	968	768	10	437	122	3,244	786	278	88	504	-2,510	4,966
2016	Critically Dry	85	997	768	16	365	110	2,868	625	249	88	526	-2,016	2,950
2017	Above normal	85	1,552	768	410	360	112	2,856	296	255	88	886	-1,095	1,855
2018	Critically Dry	85	890	768	22	276	109	2,415	350	249	88	844	-1,796	60
Average 1982 - 2018		**90**	**1,870**	**770**	**360**	**380**	**80**	**2,220**	**370**	**170**	**90**	**690**	**0**	

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2c.2-3 Sustainable Perennial Yield Estimate of the Basin

The water budget for the CMA during the base period indicates that total groundwater outflow was the same as the total inflow on average for the historical period years (1982 through 2018, 37 years). This indicates that there is not a net deficit occurring, which indicates that most likely a state of overdraft does not currently exist in the CMA.

Perennial yield is a long-term average annual amount of water which can be withdrawn from a basin under specified operating conditions (i.e., legal, economic, environmental, and management parameters) without inducing a long-term progressive drop in water levels. The estimated perennial yield for the base period is calculated as follows:

Perennial Yield = Average Annual Pumping + Average Annual Change in Storage

The average annual pumping total of 2,760 AFY (Table 2c.2-5) for the historical period (1982 through 2018, 37 years) resulted in zero net change in groundwater storage in the Buellton Aquifer, so this water budget analysis indicates that the perennial yield of the basin is approximately 2,800 AFY. It should be recognized that the definitions of safe/perennial/sustainable yield and overdraft reflect conditions of water supply and use over a long-term period. The historical period (1982 through 2018) is representative of long-term average conditions.

While safe yield is difficult to estimate due to the inherent uncertainties in the estimates of recharge and discharge, this independent analysis corroborates the safe yield estimate in the SYRWCD annual reports of 2,800 AFY and the range of perennial yields in the Buellton Uplands Groundwater Management Plan (Santa Ynez Water Conservation District and City of Buellton 1995) of 2,650 to 2,900 AFY. This estimate of sustainable perennial yield will be refined and revisited through the implementation phase of the SGMA process as more water level data becomes available in the CMA.

The sustainable yield of 2,800 AFY does not include any imported water. All of the return flows from Central Coast Water Authority water imported by the City of Buellton are assumed to return to the Santa Ynez River Alluvium. This yield estimated also does not include any potential conjunctive use programs to store river water in the Buellton Aquifer.

When relating the perennial yield estimate of 2,800 AFY and the concept of sustainable yields, an evaluation of undesirable results must be performed. The undesirable results as defined in SGMA covers a broader range of criteria than the lowering of water levels and groundwater storage addressed by perennial yield, and also includes degraded groundwater quality, seawater intrusion, land subsidence, and depletion of interconnected surface water and groundwater dependent ecosystems.

2c.2-4 Reliability of Historical Surface Water Supplies

The long-term reliability of the surface water from the local sources, including Bradbury Dam outflows and tributary runoff from the Buellton Upland, is subject to climatic variability and is affected by exports out of the Santa Ynez River watershed to the Santa Barbara County south coast. The most recent drought, from 2012 through 2018, was very severe. The variability of the surface water flow from local and imported sources is summarized in Section 2c.2-1-1 and Table 2c.2-1.

The City of Buellton has a State Water Project (SWP) allocation of 578 AFY and a drought buffer of 58 AFY. This SWP supply is not as reliable as the local groundwater supplies in the CMA. The average import amount for the period of 1998 through 2018 was approximately 400 AFY. During the dry "current period" of 2011 through 2018, the City was only able to import approximately 230 AFY, which is a 44% reduction. However, overall, imported water represents only a small fraction of the total water deliveries in the CMA (less than 6%).

2c.3 CURRENT WATER BUDGET

SGMA regulations require that a current water budget be developed based on the "most recent hydrology, water supply, water demand, and land use information."[97] For the GSP, the period selected to represent current conditions is water years 2011 through 2018. This period is a subset of the historical base period (1982 through 2018) described in Section 2c.2.

The current water budget period is dominated by a drought period when annual precipitation averaged about 70% of the historical average. As a result, the current water budget period represents drought conditions and is not representative of long-term, balanced conditions needed for sustainability planning purposes. The current water budget is used to project the future baseline and is based on current water demands and land use information.

Estimates of the surface water and groundwater inflow and outflow, and changes in storage for the current water budget period, are provided in this section.

2c.3-1 Current Surface Water Component

Similar to the historical surface water inflow and outflow component, the current surface water component includes two surface water source types: State Water Project (SWP) and local supplies.

2c.3-1-1 Inflows: Local and Imported

Local surface water supplies include surface water flows that enter the CMA from precipitation runoff within the watershed and Santa Ynez River inflow to the CMA, regulated by SWRCB as outflows from Lake Cachuma. In addition, as discussed in the HCM (Section 2a.3), the Santa Ynez River Alluvium is part of the subflow of the Santa Ynez River, which is regulated by SWRCB. Imported surface water through the SWP became available after completion of the Coastal Branch pipeline in 1997. The City of Buellton has an SWP allocation of 578 AFY and a drought buffer of 58 AFY.

97 23 CCR § 354.18(c)(1)

Table 2c.3-1 summarizes the average, minimum, and maximum inflow from surface water for all sources. The estimated average annual total inflow over the current period is approximately 32,040 AFY. The largest components of this average local inflow are releases from Bradbury Dam and flow in the Santa Ynez River upstream of the CMA, which represents about 74% of the average annual surface inflow for this period. Inflow from the Buellton Upland and the Santa Ynez Mountains contributes 11% of the total surface water inflow.

Table 2c.3-1
Annual Surface Water Inflow, Current Period (2011 through2018)

Surface Water Inflow Component	Average	Minimum	Maximum [A]
	(Acre-Feet per Year)		
Santa Ynez River Inflow from EMA	23,550	4,860	120,440
Santa Ynez River Tributary Inflow	3,420	70	15,000
Imported State Water Project	230	0	580
Santa Ynez River Alluvium Subarea (Surface Water Underflow)			
Subflow [A]	2,320	1,970	2,690
Recharge from Precipitation (Overlying and Mountain Front)	670	530	950
Recharge from Agricultural Return Flows to Underflow	480	420	500
Recharge from Municipal Return Flows to Underflow [B]	1,220	1,130	1,330
Recharge from Domestic Return Flows to Underflow	150	150	170
TOTAL	**32,040**	**9,130**	**141,660**

[A] Includes subflow in from the Santa Ynez River Alluvium in the EMA and Buellton Upland.

[B] Includes percolation return flow from both City of Buellton and City of Solvang wastewater treatment plants.

2c.3-1-2 Surface Water Outflows

The estimated annual surface water outflows in the CMA over the current water budget period is summarized in **Table 2c.3-2**.

Table 2c.3-2
Annual Surface Water Outflow, Current Period (2011 through 2018)

Surface Water Outflow Component	Average	Minimum	Maximum [A]
	(Acre-Feet per Year)		
Santa Ynez River Outflow to WMA	23,100	3,110	130,640
Net Channel Percolation to Groundwater[1]	160	10	630
Santa Ynez River Alluvium Subarea (Surface Water Underflow)			
Santa River Underflow Out	800	800	800
River Well Pumping – Agriculture	3,040	2,580	3,220
River Well Pumping – Municipal	420	100	700
River Well Pumping – Domestic	350	330	380
Riparian Vegetation Evapotranspiration	4,170	4,170	4,170
TOTAL	**32,040**	**11,100**	**140,540**

[A] Does not include percolation to Santa Ynez River Alluvium, which is part of the surface water component.

2c.3-1-3 Summary

During this current period (2011 through 2018), precipitation was well below average, which resulted in very little surface water flow. The current period (2011 through 2018) had 32% of the total surface flows in the historical period (1982 through 2018). The imported water supplies were still a minor component of the overall surface water inflows, 0.2% in the historical period (1982 through 2018) and 0.7% in the current period (2011 through 2018).

2c.3-2 Current Groundwater Budget

The current water budget includes a summary of the estimated groundwater inflows, groundwater outflows, and change in groundwater in storage.

2c.3-2-1 Groundwater Inflows

Groundwater inflow components include subsurface inflow, deep percolation of direct precipitation and mountain front recharge, streamflow percolation, and return flows from agricultural irrigation and, municipal, and domestic water uses. The annual groundwater inflows during the current period are summarized in **Table 2c.3-3**. During the current period, an average of 2,810 AFY of total groundwater inflow occurred. During this time, the groundwater inflow ranged from 2,150 AFY to 4,160 AFY, due to differences in rainfall in dry and wet years. The largest groundwater inflow component was recharge from precipitation overlying the Buellton Upland, which accounts for approximately 46% of the total annual average inflow. The current period (2011 through 2018) had 79% of the total groundwater inflows in the historical period (1982 through 2018).

Table 2c.3-3
Annual Groundwater Inflow, Current Period (2011 through 2018)

Groundwater Inflow Component	Average	Minimum	Maximum [A]
	(Acre-Feet per Year)		
Subflow	90	90	90
Recharge from Precipitation – Overlying	1,300	890	2,080
Recharge from Precipitation – Mountain Front	770	770	770
Net Channel Percolation from Surface Water	160	10	630
Agricultural Return Flows	370	280	470
Municipal/Domestic Return Flows	120	110	120
TOTAL	**2,810**	**2,150**	**4,160**

A Does not include percolation to Santa Ynez River Alluvium, which is part of the surface water component.

2c.3-2-2 Groundwater Outflows

Groundwater outflow components include total groundwater pumping from all water use sectors, subsurface flow out of the Buellton Upland, and phreatophyte (riparian vegetation) evapotranspiration. The estimated annual groundwater outflows for the current period are summarized in **Table 2c.3-4**.

Table 2c.3-4
Annual Groundwater Outflow, Current Period (2011 through 2018)

Groundwater Outflow Component	Average	Minimum	Maximum
	(Acre-Feet per Year)		
Pumping – Agriculture	2,780	2,190	3,240
Pumping – Municipal	520	300	790
Pumping – Domestic	260	250	280
Riparian Vegetation Evapotranspiration	90	90	90
Subflow	520	170	890
TOTAL	**4,170**	**3,000**	**5,290**

For the current water budget period, estimated total groundwater outflows ranged from 3,000 to 5,290 AFY, with an average outflow of 4,170 AFY. This is 118% more than the total average groundwater outflows estimated for the historical base period (3,540 AFY average).

Total average annual groundwater pumping in the current period was 3,560 AFY, an increase of 29% compared with the historical baseline period, which was 2,760 AFY. Agricultural, municipal, and domestic sectors accounted for 78%, 15%, and 7% of total pumping, respectively, during the current period.

2c.3-2-3 Summary and Change in Storage

Average groundwater inflows and outflows for the current water budget period are presented on **Figure 2c.3-1A. Figure 2c.3-1B** shows the magnitude of the average annual flow for each individual water budget component during the current period. Precipitation from recharge and agricultural pumping are two largest fluxes for inflow and outflow, respectively. More details regarding the data for each year in the current period (2011 through 2018) are presented in **Table 2c.2-6**.

The current groundwater budget is directly influenced by the drought conditions from 2012 to 2018, which is one of the driest periods on historical record in the Santa Ynez River Valley. The results of the water budget during the current period show that the CMA experienced more total outflow than inflow. As shown on Figure 2c.3-1A, the average total inflow of 2,810 AFY is 1,360 AFY less than the average total outflow of 4,170 AFY. During the current period, the amount of percolation of direct precipitation was diminished and at the same time, total groundwater pumping increased. During the current water budget period (2011 through 2018), an estimated net decline of groundwater in storage of approximately 10,880 AF occurred (Figure 2c.2-5). The annual average groundwater storage decline during the current water budget period (2011 through 2018) was approximately 1,360 AFY.

The short-term depletion of groundwater in storage indicates that the total groundwater outflows exceeded the total inflows during the current period. As summarized in Table 2c.3-4, total groundwater pumping averaged approximately 3,560 AFY during the current period. Due to the drought conditions and short period analyzed (8 years), the current water budget period is not appropriate for long-term sustainability planning.

2c.4 PROJECTED WATER BUDGET

SGMA regulations require the following regarding projected water budgets:

> "3. Projected water budgets shall be used to estimate future baseline conditions of supply, demand, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components."
>
> "(A) Projected hydrology shall utilize 50 years of historical precipitation, evapotranspiration, and streamflow information as the baseline condition for estimating future hydrology..."
>
> "(B) Projected water demand shall utilize the most recent land use, evapotranspiration, and crop coefficient information as the baseline condition for estimating future water demand..."
>
> "(C) Projected surface water supply shall utilize the most recent water supply information as the baseline condition for estimating future surface water supply. The projected surface water supply shall also be applied as the baseline condition used to evaluate future scenarios of surface water supply availability and reliability as a function of the historical surface water supply identified in Section 354.18(c)(2)(A), and the projected changes in local land use planning, population growth, and climate." [98]

2c.4-1 Projected Estimation Methodology

The future water budget in the CMA was estimated utilizing estimated future population forecasts and future factors prescribed by DWR for future hydrology projection of climatic conditions through 2030 and 2072. The effects of climate change were evaluated using DWR-provided climate change factors. This section describes the estimated components of the future water budget that includes land use, water demand, and climate change.

The 2030 and 2070 precipitation and ET climate change factors are available on 6-kilometer resolution grids. The climate data sets have been routed to the subbasins defined by 8-digit Hydrologic Unit Codes (HUCs), and the resulting downscaled hydrologic time series are available on the DWR SGMA Data

98 23 CCR § 354.18 (c)(3)

Viewer.[99] Precipitation and ET data used in this analysis were downloaded from the DWR SGMA Data Viewer for climate grid cells covering the CMA within HUC 18060010, which is the HUC for the Santa Ynez River. These change factors are available monthly from 1915 to 2011 for the Santa Ynez River watershed. The monthly change factors for the Santa Ynez River watershed were applied to the historical hydrology for the CMA. Mean monthly and annual values were then computed from the subbasin time series to show projected patterns of change under 2030 and 2070 conditions.

2c.4-1-1 Projected Hydrology and Surface Water Supply

DWR has provided SGMA Climate Change Data and published a guidance document, "Guidance for Climate Change Data Use for Groundwater Sustainability Plan Development" (DWR 2018), as the primary source for developing the future water budget.

A common approach to forecast the new water resources balance under climate change conditions in the future is the use of global circulation model (GCM) outputs, downscaled to local geographic scales. There are more than 30 GCMs, each with different ways of representing aspects of the climate system. DWR's Climate Change Technical Advisory Group (CCTAG) has identified the most applicable and appropriate GCMs for water resource planning and analysis in California. Key future climate projection scenarios identified by DWR are summarized in **Table 2c.4-1**.

Table 2c.4-1
Summary of Climate Scenarios

Year	Type	Scenario Name	Description
2030	Average	Central Tendency	Central tendency of the ensemble of 10 GCM and two RCPs (high and middle emissions scenarios).
2070	Average	Central Tendency	Central tendency of the ensemble of 10 GCM and two RCPs (high and middle emissions scenarios).
2070	Extreme	Drier/Extreme Warming (2070DEW)	Single GCM, HadGEM2-EM model for RCP 8.5 (high emissions scenario)
2070	Extreme	Wetter/Moderate Warming (2070WMW)	Single GCM, CNRM-CM5 model for RCP 4.5 (middle emissions scenario)

Source: DWR (2018) Guidance for Climate Change Data Use for Groundwater Sustainability Plan Development
GCM = general circulation models, RCP = representative concentration pathway

99 SGMA Data Viewer. Web resource. https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer Accessed 2021-02-15.

The Central Tendency scenarios are based on an average of 20 GCMs to project change in precipitation and evapotranspiration around 2030 and 2070 and used for projecting future conditions for the water budget. The Central Tendency scenarios were developed using an ensemble of climate models such that the entire probability distribution at the monthly scale was transformed to reflect the mean of the 20 climate projections[100] (DWR 2018). The DWR data set also includes two additional simulation results for extreme climate scenarios under 2070 conditions: Drier/Extreme Warming (2070DEW) and Wetter/Moderate Warming (2070WMW). Use of the extreme scenarios in GSPs is optional. Due to the concentration of greenhouse gases in the atmosphere, temperatures under the Central Tendency are estimated to rise by 3 to 7^{o} Fahrenheit between 2020 and 2070 as shown in **Figure 2c.4-1** showing the range of the GCMs forecasted maximum daily temperatures for Buellton.[101] Generally, change factors under the Central Tendency scenario have a seasonal pattern with wetter conditions in the winter months, and drier during the spring and fall months when compared to historical conditions. Within the Basin, streamflow is projected to increase slightly by 0.5% in 2030 and 3.8% in 2070.

Crops require more water to sustain growth in a warmer climate, and this increased water requirement is characterized in climate models using the rate of ET. Under 2030 conditions, the CMA is projected to experience average annual ET increases of 3.8% relative to the baseline period. Under 2070 conditions, annual ET is projected to increase by 8.3% relative to the baseline period.

The seasonal timing of precipitation in the CMA is projected to change. Sharp decreases are projected early fall and late spring precipitation accompanied by increases in winter and early summer precipitation. The CMA is projected to experience minimal changes in total annual precipitation. No changes for annual precipitation are projected under 2030 conditions relative to the baseline period. Under 2070 conditions, small decreases in annual precipitation are projected by 3%.

100 10 GCMs selected are combined with two emission scenarios for a total of twenty scenarios utilized. The two emissions scenarios include a “middle” scenario (RCP 4.5) with emissions peaking around 2040 and a “business as usual” scenario with emission peaking around 2080 (RCP 8.5).

101 Local Climate Change Snapshot. Web Resource https://cal-adapt.org/tools/local-climate-change-snapshot/ Accessed 2021-02-15.

2c.4-1-2 Projected Water Demand for CMA

Based upon the historical and current water budget, the total water demands within the CMA were estimated for the future period extending for 20 years through the implementation period (2022-2042) and further through 50 years into the future, through 2072.

The average annual pumping for agricultural irrigation in 2018 was 2,415 AFY. For this analysis of projected water demand, no changes in future irrigated acres and type of crops are assumed. However, based on the climate change Central Tendency scenario, described above, irrigation demands will increase by 3.8% by 2030 and 8.3% by 2070. Using these same increases in crop water demand, future projection of agricultural demand in the Buellton Upland will increase to 2,507 AFY in 2042 and 2,615 AFY in 2072.

Future Municipal and Industrial (M&I) and rural domestic demands were estimated based on demand to satisfy the non-agricultural demand for the City of Buellton, small mutual water companies, and rural domestic users. The Santa Barbara County Association of Governments Regional Growth Forecasts estimate large increases in population for the Buellton area (SBCAG 2012). For example, the population of the City of Buellton (City) is forecasted to increase to 7,400 by the year 2040, which represents a 45% increase from the current population of 5,100 in 2020. However, current water use demand by the City has been relatively steady compared with population increases. For example, the population of the City grew by about 6% between 2010 and 2020, but the water use by the City was about the same.

This analysis assumes an increase in water use by the City of 15% by 2042, which is about a third of the SBCAG population projected percentage increase but more in-line with the 2010 to 2020 population trend. Assuming build-out conditions would be approached after 2040, an increase in water use by the City of only 20% by 2072 compared with 2018 levels is assumed for this analysis. Based on 2018 pumping from the Buellton Upland of 350 AFY, future projection of the City demand from the Buellton Upland will increase to 403 AFY in 2042 and 420 AFY in 2072. These same percentage increases are also assumed for the rural domestic water users who pump from the Buellton Upland. Based on 2018 pumping from the Buellton Upland of 250 AFY for domestic use, future projection of the rural domestic demand from the Buellton Upland will increase to 288 AFY in 2042 and 293 AFY in 2072.

The total demand from the CMA Buellton Upland groundwater during 2018 and projected values for 2042 and 2072 are presented on **Table 2c.4-2**. By 2042, at the end of the GSP implementation period, total demand in the CMA may increase by 6% relative to 2018 to 3,198 AFY, and further by a total of 10% by 2072 to 3,328 AFY due to a combination of increased temperatures due to climate change and increases in population. Using the same increase in demands for each sector, the surface water demands in the Santa Ynez River Alluvium subarea are similarly projected to increase by 7% in 2042 and 11% in 2072, as shown in Table 2c.4-2.

Table 2c.4-2
Projected Water Demand for CMA

	2018 Demand	Estimated 2042 Demand	Estimated 2072 Demand
	(Acre-Feet per Year)		
Groundwater Demand			
Pumping – Agriculture	2,415	2,507	2,615
Pumping – Municipal	350	403	420
Pumping – Domestic	250	288	293
TOTAL Groundwater Demand	**3,015**	**3,198**	**3,328**
Santa Ynez River Alluvium Subarea Surface Water Demand			
River well pumping – Agriculture	3,223	3,345	3,491
River well pumping – Municipal and SWP Imports	897	1,033	1,076
River well pumping – Domestic	376	434	441
TOTAL Surface Water Demand	**4,497**	**4,812**	**5,008**
TOTAL	**7,512**	**8,010**	**8,336**

2c.4-2 Projected Water Supply

The water demands in Table 2c.4-2 will be supplied from the same historical sources of groundwater in the Buellton Upland and surface water in the Santa Ynez River Alluvium subarea. Based on current planning from the Central Coast Water Authority and DWR's 2019 Delivery Capability Report (DWR 2020), a 58% delivery allocation for SWP to the CMA for the projected future period has been assumed. Based on the City's current SWP allocation of 578 AFY and a drought buffer of 58 AFY, the total imports to meet future demands is assumed at 432 AFY. The remaining demand for surface water supplies by the City (601 and 644 AFY, respectively for 2042 and 2072) is assumed to come from river well pumping similar to historical conditions.

The source for surface water supplies, the Santa Ynez River, is projected to continue to be a reliable source of water for the Santa Ynez River Alluvium subarea due to Cachuma Reservoir operations located about 11 miles upstream of the CMA. The ability to store water in Cachuma Reservoir will help attenuate the effects of the flashier runoff forecasted to occur under the Central Tendency scenario. Downstream water rights releases and releases for endangered steelhead (*O. mykiss*) from Bradbury Dam pursuant to WR 2019-0148 are assumed to be able to mitigate impacts downstream caused by climate change. Detailed climate change studies and impacts to the operations of Cachuma Reservoir are currently not available. However, releases from Cachuma Reservoir did sustain Santa Ynez River underflow during the recent critical drought of 2012-2018 and is expected to provide similar mitigation during future droughts. However, if climate change does not continue under the Central Tendency scenario but rather is more like the Drier/Extreme Warming Climate scenario, then the water supply for the entire region will be affected and re-evaluated.

The source for groundwater supplies in the Buellton Upland is primarily recharge from precipitation which will be affected by climate change to an uncertain degree. Because recharge is the resultant after three key processes including precipitation, runoff, and evapotranspiration, which among themselves have associated uncertainty, the combined uncertainty is compounded. Under the Central Tendency scenario in the CMA, no changes for annual precipitation are projected under 2030 conditions relative to the baseline period (1982 through 2018), and under 2070 conditions, small decreases in annual precipitation are projected by 3%. Recharge from precipitation to the Buellton Upland groundwater aquifer is assumed to be affected by climate change by these same percentages of zero percent by 2042 and 3% reduction by 2072. Recharge from streamflow infiltration is assumed to be similar to the projected increases in runoff by 0.5% in 2042 and 3.8% increase by 2072. The net effect of decreased recharge and increased runoff by these small percentages is that the current estimate of the perennial yield of 2,800 AFY for the Buellton Upland is assumed to be roughly the same for this analysis under climate change conditions.

2c.4-3 Summary of Projected Water Budget

Groundwater supplies are projected to be about the same under projected future conditions, while overall demand is projected to increase up to 11% by 2072 to 4,223 AFY resulting from a combination of increased temperatures due to climate change and increases in local population. **Table 2c.4-3** summarizes the projected total groundwater budget and average change in storage in the future.

Average groundwater inflows and outflows for the projected future water budget period are presented on **Figure 2c.4-2AB** for years 2042 and 2072, respectively. The results of the water budget during the future period show that the CMA has more total outflow than inflow. As shown on Figure 2c.4-2A, in the year 2042 the average total inflow of 3,644 AFY is 395 AFY less than the average total outflow of 4,039 AFY. Similarly, as shown on Figure 2c.4-2B, in the year 2072 the average total inflow of 3,596 AFY is about 600 AFY less than the average total outflow of 4,223 AFY. The next steps in the GSP process will be to discuss the potential undesirable results from potential future losses of approximately 400 to 600 AFY in groundwater storage in the Buellton Upland and developing a monitoring system for the CMA.

Table 2c.4-3
Projected Groundwater Budget for CMA

	Baseline Hydrology and 2018 Demands	Estimated 2042 Hydrology and Demands	Estimated 2072 Hydrology and Demands
Subflow	85	85	85
Recharge from Precipitation- Aerial (Overlying)	1,870	1,871	1,814
Recharge from Precipitation- Mountain Front	770	770	747
Net Channel Percolation from Surface Water	360	362	374
Agricultural Return Flows	413	429	447
Municipal/ Domestic Return Flows	110	127	129
TOTAL Inflows	**3,610**	**3,644**	**3,596**
Pumping - Agriculture	2,415	2,507	2,615
Pumping - Municipal	350	403	420
Pumping - Domestic	250	288	293
Riparian Vegetation Evapotranspiration	88	91	95
Subflow to Santa Ynez River Alluvium	690	750	800
TOTAL Outflows	**3,793**	**4,039**	**4,223**
TOTAL Inflows - Outflows	**-183**	**-395**	**-627**

CHAPTER 3: MONITORING NETWORKS AND SUSTAINABLE MANAGEMENT CRITERIA

The chapter consist of the following two related sections which describe the monitoring of the basin.

Section 3a. Monitoring Networks

The section summarizes the monitoring done in the CMA, as well as identifies representative sites for monitoring for each of the six SGMA sustainability indicators.

Section 3b. Sustainable Management Criteria

This section discusses the Sustainable Management Criteria (SMC). It identifies the stainability goal of the CMA, conditions of undesirable results for each of the six SGMA sustainability indicators, Minimum Thresholds at the representative sites, and Measurable Objectives.

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Section 3 A – MONITORING NETWORKS

This section of the GSP describes the existing monitoring networks within the CMA that are currently used to collect groundwater levels and water quality data and the recommended CMA monitoring networks that will be used to monitor the monitor five of the applicable sustainability indicators in accordance with SGMA and the SMCs described above. The remaining sustainability indicator, seawater intrusion, does not apply to the CMA, as presented in the Section 2a and Section 2b (Hydrogeologic Conceptual Model (HCM) and Groundwater Conditions (GC)) due to the inland location of the CMA from the ocean (greater than 20 river-miles). The recommended CMA monitoring networks were developed to support GSA decision making to achieve groundwater sustainability goals and objectives outlined in Section 3b.1.

Existing monitoring networks within the CMA for groundwater levels and water quality are described, and the wells from those existing networks that are part of the *California Statewide Groundwater Elevation Monitoring* (CASGEM) and the *Groundwater Ambient Monitoring and Assessment Program* (GAMA) are identified. Using the existing groundwater level and water quality monitoring networks within the CMA, recommended CMA monitoring networks were developed, and a subset of those wells were selected for representative monitoring.

Data gaps identified in Chapter 2 and discussed as part of the SMCs in Section 3b, were considered during development of the recommended CMA monitoring networks. Those data gaps are described, followed by a brief description of how they will be addressed. Detailed approaches to address the identified data gaps are included in Plan Implementation (Chapter 5).

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3A.1 MONITORING NETWORKS OBJECTIVES

The objectives of the CMA monitoring networks are to identify and select representative monitoring wells to collect data to support monitoring of groundwater conditions and detection of potential undesirable results, and to achieve sustainability goals. As stated in the SGMA regulations[102], the monitoring networks will support:

- Demonstrate progress toward achieving measurable objectives described in the GSP;
- Monitor impacts to the beneficial uses or users of groundwater;
- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds; and
- Quantify annual changes in water budget components.

The recommended monitoring network presented herein for the CMA GSA, is intended to monitor for the five applicable sustainability indicators[103] and their associated undesirable results, listed below:

1. Chronic lowering of groundwater levels
2. Reduction of groundwater storage
3. Seawater intrusion (not applicable to CMA)
4. Degraded water quality
5. Land subsidence
6. Depletion of interconnected surface water

102 23 CCR § 354.34(b)
103 23 CCR § 354.26. Undesirable Results

As described in Section 2a (HCM) and Section 2b (GC), seawater intrusion is not applicable in the CMA and an associated monitoring network was not developed.

3a.1-1 CMA Basin Conditions

The CMA Basin Setting is described in detail in Chapter 2, (Hydrogeologic Conceptual Model (HCM), Groundwater Conditions (GC), and Water Budget) of this GSP. A summary of CMA conditions that were considered during the development of the monitoring networks are described below, including hydrogeologic conditions, land uses and historical groundwater conditions.

The CMA covers an area of 21,020 acres, split between two subareas: the Santa Ynez River Alluvium (SYRA) and the Buellton Upland. The SYRA comprises an area of approximately 6,800 acres of mostly flat land adjacent to the Santa Ynez River. The Buellton Upland comprises approximately 14,220 acres of rugged hills located north of the Santa Ynez River, underlain by the Buellton Aquifer.

The principal aquifer within the CMA is the Buellton Aquifer. The Buellton Aquifer, as described in the 3D Geologic Model and HCM, is comprised of relatively coarse-grained sedimentary rocks identified as the Paso Robles Formation, and the Careaga Sandstone. Locally, these two geologic formations are compressed into a wide synclinal fold. The Buellton Aquifer varies in spatial distribution and vertical thickness within the CMA and hydraulic conductivity within the principal aquifer ranges from 1 to 10 feet per day, with an average thickness of 1,325 feet in the Buellton Upland, and 825 feet in areas that underlie the Santa Ynez River Alluvium subarea.

Water is also observed in the Santa Ynez River channel, alluvium, and adjacent terrace deposits (alluvium), herein referred to as the SYRA. Water observed in the SYRA has been managed by the SWRCB as part of the Santa Ynez River streamflow the same as surface water pursuant to various SWRCB orders and decisions dating back to at least 1973. In accordance with WR 73-37, 89-18, 2019-0148 and the SGMA, the water observed in the SYRA is not considered a principal aquifer of the CMA. Although the SYRA is not considered groundwater as defined by SGMA or a principal aquifer within the CMA, SYRA wells are considered in the CMA monitoring network to collect data to support sustainable groundwater management decision making by the CMA GSA, and to evaluate sustainable management criteria.

The primary groundwater users within the CMA are agricultural (80% of the volume of groundwater pumped) and municipal and domestic use (20% of the volume of groundwater pumped).[104] The aerial extent of agricultural users within the CMA are shown on HCM Figure 2a.4-2. Agriculture land uses comprise approximately 3,180 acres (15%) of the CMA; approximately 1,380 acres (10%) of which are located in the Buellton Upland subarea; and approximately 6,800 acres (27%) are located in the SYRA subarea.

104 Five-year averages for Fiscal Year (FY) 2015-16 through FY2019-20 for Santa Ynez River Water Conservation District Zone D corresponding to the Buellton Aquifer. Source is Stetson (2021) Forty-Third Annual Engineering and Survey Report on Water Supply Conditions of the Santa Ynez River Water Conservation District 2020-2021.

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3A.2 EXISTING MONITORING NETWORKS

Groundwater level and water quality networks are actively monitored within the CMA and these data are used to evaluate changes in groundwater levels, calculate estimates of groundwater in storage, assess changes in groundwater quality and understand surface water conditions. The details of those existing monitoring networks are presented below. Additionally, the existing networks were evaluated and used to develop the recommended CMA monitoring networks to support GSA decision making to sustainably manage groundwater in accordance with established sustainable management criteria (SMC), within the CMA. The following subsections summarize the existing monitoring networks for the period of 2015 through 2021.

3a.2-1 Groundwater Levels

The County of Santa Barbara (COSB)[105] , the United States Bureau of Reclamation (USBR), the City of Buellton (City) currently collect groundwater elevation data (groundwater levels) from their respective monitoring networks within the CMA. The monitored wells are shown in aerial view on **Figure 3a.2-1** and summarized below in **Table 3a.2-1**.

Table 3a.2-1
Summary of Existing Groundwater Elevation Monitoring Network Wells
Spring 2015 through Spring 2021

Monitoring Network	Monitoring Frequency	Buellton Aquifer	SYRA Subflow	Total
COSB (formerly USGS)[106]	Semi-annual / annual	3	5	8
USBR	Monthly	0	10	10
City of Buellton	Monthly	1	3	4
	Totals:	**4**	**18**	**22**

105 Groundwater levels are collected by the Santa Barbara County Water Agency which is one of five divisions of the Santa Barbara County Public Works Department, which in turn is one of several departments under the County of Santa Barbara.
106 Prior to 2019, the COSB monitoring network data was collected by the United States Geological Survey (USGS).

Of the wells monitored within the CMA for groundwater levels, as summarized above in **Table 3a.2-1**, data collected from some of them are also submitted to the CASGEM program. The CASGEM wells are summarized below in **Table 3a.2-2**, including the principal aquifer their data represent, their assigned State identification (ID) number, their USGS ID, CASGEM ID and CASGEM type (mandatory or voluntary monitoring).

Table 3a.2-2
List of CMA CASGEM Wells (10 wells)
Spring 2015-Spring 2021

Principal Aquifer	State ID	CASGEM Well ID	Voluntary Monitoring	Master Site ID	USGS Well ID
SYRA	6N/32W-11L4	49137	Voluntary	346120N1202200W001	343644120131101
SYRA	6N/32W-16P3	38300	Voluntary	345955N1202570W001	343544120151801
SYRA	6N/32W-18H1	24991	Voluntary	346036N1202812W001	343613120164501
Buellton Aquifer	7N/32W-31M1	23681	Voluntary	346392N1202953W001	343821120173601
Buellton Aquifer	7N/33W-36J1	23895	Voluntary	346400N1202998W001	343824120175201
SYRA	6N/31W-17F1	38798	Voluntary	346025N1201720W001	343609120101201
SYRA	6N/31W-17F3	49121	Voluntary	346020N1201690W001	343608120101001
Buellton Aquifer	6N/31W-7F1	49120	CASGEM	346150N1201870W001	343655120111201
SYRA	6N/32W-2Q1	49119	Voluntary	346220N1202140W001	343719120124901
Buellton Aquifer	6N/32W-12K2	--	--	-	343649120114401

Additional historical groundwater elevation data exists for wells not included in the existing groundwater monitoring network, i.e. for wells that may have been monitored in the past but are no longer part of the current monitoring network[107]. Available data from those wells have been incorporated into the Data Management System (DMS), as described in Section 1e[108]. Additionally, detailed summaries and analysis of available historical groundwater elevation data are included in Section 2b.1 discussions of CMA groundwater condition.

107 Wells may be removed from monitoring programs over time due to land development, change in ownership or access, well destruction, well redundancy, lack of well completion or screen interval information, or other applicable criteria.
108 The DMS and the associated Data Management Plan (DMP) describe available CMA data and resources considered.

3a.2-2 Groundwater Storage

The existing groundwater level monitoring network (described above) and the collected data are used to estimate annual changes to groundwater in storage within the Santa Ynez River Water Conservation District (SYRWCD). The estimated changes to groundwater in storage are included in the SYRWCD annual reports, which are available for public access at the Buellton, Lompoc, and Solvang Public Libraries and on the SYRWCD website (SYRWCD.com). Groundwater in storage estimates utilize the data collected from the groundwater level monitoring network shown on **Figure 3a.2-1** and is summarized in Table 3a.2-1 and Table 3a.2-2.

3a.2-3 Groundwater Quality

Groundwater quality refers to the measurement of naturally occurring and anthropogenically influenced chemical compounds in groundwater. These compounds have the potential to adversely affect groundwater chemistry (groundwater quality). As described in Chapter 2, the groundwater quality in the Buellton Aquifer is generally of better quality than the groundwater quality in the SYRA which is present at shallower depths (closer to the ground surface).

Groundwater quality data is currently collected from wells within the CMA as part of Public Water System Reporting and the California Irrigated Lands Reporting Program (ILRP). Some of the data collected from these wells are also reported to the GAMA Program. The CMA wells included in these programs and monitored for groundwater quality are shown on **Figure 3a.2-2** and summarized below in Table 3a.2-3.[109]

[109] Sites are included if there were at least one or more Total Dissolved Solids measurements during the period 2015-2021. ILRP are grouped by reporting site.

Table 3a.2-3
Summary of Existing CMA Groundwater Quality Monitoring Networks
Spring 2015 through Spring 2021

Monitoring Network	Monitoring Frequency	Buellton Aquifer	SYRA Subflow	Total Participating Wells
Public Water Systems Report	Quarterly	3	5	8
Irrigated Lands Regulatory Program[110]	Annual or Biannual	12	23	35
Subtotal of Principal Aquifers:		**60**	**15**	**28**

Municipal water systems, including the City of Buellton and other small public water companies, also report the collected groundwater quality data to the Safe Drinking Water Information System (SDWIS) and Drinking Water Information Clearinghouse (DRINC), which are the federal (EPA) and state (SWRCB) websites, respectively. In the CMA, the Public Water System wells provide representative data for both the Buellton Aquifer and the SYRA. Commercially irrigated agricultural lands are required to periodically submit groundwater quality data to the ILRP and within the CMA there are participating wells that provide data for both the Buellton Aquifer and the SYRA, as listed above in Table 3a.2-3.

3a.2-4 Seawater Intrusion

Seawater intrusion is not applicable to the CMA due to the inland location and distance between the CMA and the Pacific Ocean (greater than 20 Santa Ynez River miles), as described in both the HCM and GC portions of the basin setting.

3a.2-5 Land Subsidence

Land subsidence monitoring has been conducted recently (since 2015) for the CMA using remote sensing Interferometric Synthetic Aperture Radar (InSAR) data which tracks vertical elevation changes to an accuracy of approximately 0.61 inches[111] (Towill 2020). These satellite data are collected by the European Space Agency and processed by TRE ALTAMIRA Inc. under contract with the DWR. Since June 2015, data has been collected and made publicly available monthly (TRE ALTAMIRA 2020). These data are used to

110 ILRP values here represent reporting groups.
111 95% Confidence of within 15.50 millimeters (0.05 feet) when compared to continuous global positioning system (CGPS) data for the period January 1, 2015 through September 19, 2019.

evaluate and estimate monthly and annual land surface elevation changes since data collection was initiated in 2015.

In addition to the available InSAR data, a USGS continuous global positioning system (CGPS) station (BUEG) was installed near the city of Buellton and has been collecting vertical displacement data since January 2015 as shown on **Figure 3a.2-3**. Land subsidence has not been observed within the CMA by any of the GSA member agencies; nor has subsidence affected any of the existing water infrastructure within the CMA, as indicated in Chapter 2 (HCM and GC).

3a.2-6 Surface Water Monitoring

Surface water monitoring within the Basin is conducted through stream gages placed along the Santa Ynez River and confluences of key tributaries. Currently there are no active USGS stream gages within the CMA boundaries, however there are three active USGS stream gages located up and downstream from the CMA (GC Figure 2b.6-1) which allow for estimation of streamflow or surface water conditions within the CMA. **Table 3a.2-4** summarizes the existing stream gauges that provide data contributing to the evaluation of CMA surface water conditions. Locations for USGS stream gages within the immediate vicinity of the CMA are shown in Chapter 2b, GC Figure 2b.6-1.

Table 3a.2-4
USGS Stream Gages relevant to the CMA

Status	USGS Gage Name	Gage Number	Start Year	End Year	Upstream of or Within the CMA
Active	SANTA YNEZ R A SOLVANG CA	11128500	1929	2021 (active)	Upstream
Active	ZACA C NR BUELLTON CA	11129800	1964	2021 (active)	Upstream
Active	SANTA YNEZ R A NARROWS NR LOMPOC CA	11133000	1952	2021 (active)	Downstream

Additionally, as described in Chapters 1 and 2, SWRCB Orders WR 73-37, 89-18, 2019-0148 determined that water observed in the SYRA is Santa Ynez River subflow and is considered the same as surface water flows. Wells screened in the SYRA are considered subflow wells and are monitored by the USBR on a monthly basis. The data collected from the SYRA wells by the USBR are reported to the SYRWCD and used to manage surface water flows in accordance with the SWRCB Order WR 73-37 and subsequent orders.

A variety of data sources are available for the CMA. They are used to estimate current surface water conditions within the CMA, and to assist with compliance with SWRCB Order WR 73-37, 89-18, 2019-0148. The available data sources and their uses are listed below.

- Upstream conditions of Lake Cachuma and Bradbury Dam operations, including imports from State Water Project water, are monitored by USBR daily.
- The Central Coast Water Authority (CCWA) which operates the pipeline transporting State Water Project (SWP) water (HCM Figure 2a.3-9) to the Basin, monitors the SWP deliveries to the watershed.
- Precipitation in the CMA is measured at the Buellton Fire Station. Data for Water Year 1955-present (2021) is published by the Santa Barbara County Flood Control & Water Conservation District (Figure 2a.3-2 and Figure 2a.3-3).

3A.3 RECOMMENDED MONITORING NETWORKS

The recommended CMA monitoring network is discussed in the following subsections. The recommended monitoring network was developed to facilitate data collection to support early identification of groundwater changes that could potentially result in undesirable results and to guide the CMA GSA toward their established groundwater sustainability goals over the implementation horizon. The recommended monitoring network, including filling identified data gaps, is intended to identify temporal trends in groundwater conditions. The data collected from the recommended monitoring networks will support the established Sustainable Management Criteria (SMC) and guide the CMA GSA in decision making on projects and management actions within the CMA, as warranted. **Table 3a.3-1** is a summary of the representative monitoring wells.

3a.3-1 Groundwater Levels

As described above, the groundwater level monitoring network is focused on the Buellton Aquifer and not the Santa Ynez River Alluvium, in accordance with SWRCB Order WR 2019-0148.[112] The existing wells monitored for groundwater levels by the various agencies will continue, and of those, a subset being selected as representative monitoring wells within the CMA, as discussed in Section 3a.1.

3a.3-1-1 Representative Monitoring Wells Selection

Existing groundwater level monitoring wells located within the CMA were evaluated for selection as representative monitoring wells using the tiered approach outlined below. Each well was evaluated for each tier of criteria. If Tier 1 data was known or available for a well, the well would then be screened for Tier 2 criteria, and so on for Tiers 3 and 4. If Tier 1 and 2 criteria were met, the well was considered potentially suitable for inclusion in the monitoring networks for the CMA. If Tiers 1 through 4 criteria were met, the well was evaluated for potential suitability as a representative monitoring well for one of the established SMCs. Tier 4 evaluation was only conducted if a well was determined potentially suitable to monitor multiple SMCs.

112 SWRCB Order WR 73-37 and other orders and decisions of the SWRCB provide for the management of both River surface and subflow as surface water flows by the SWRCB.

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Table 3a.3-1
Representative Monitoring Wells

RMW Name	WQ Well ID	DB Well ID	Subarea	Principal Aquifer	Screen Interval (ft bgs)	Sustainability Indicator(s) Monitored
7N/33W-36J1	NA	82	Buellton Upland	Buellton Aquifer	Unknown	GW level, GW in Storage
7N/32W-31M1	NA	75	Buellton Upland	Buellton Aquifer	Unknown	GW level, GW in Storage
6N/31W – 7F1	NA	90	Santa Ynez River Alluvium	Buellton Aquifer	Unknown	GW level, GW in Storage
6N/32W-12K1, 12K2	Buellton Well 09	909	Santa Ynez River Alluvium	Buellton Aquifer	Unknown	GW level, GW in Storage, WQ
7N/32W-35	AGL020014946	3337	Buellton Upland	Buellton Aquifer	Unknown	WQ, GW Level (Future), GW in Storage (Future)
6N/32W - 7	AGL020036041	3220	Buellton Upland	Buellton Aquifer	120 -300	WQ, GW Level (Future), GW in Storage (Future)
7N/33W-36	AGL020021622	3173	Buellton Upland	Buellton Aquifer	Unknown	WQ
7N/32W-31	AGL020001355	3137	Buellton Upland	Buellton Aquifer	330 – 810 (Multiple)	WQ
6N/32W-3	AGL020008330	3076	Santa Ynez River Alluvium	Buellton Aquifer	280 - 480	WQ
6N/31W-8	AGL020028450	3139	Buellton Upland	Buellton Aquifer	Unknown	WQ (Future?)
6N/32W – 9G1			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	NA	Interconnected Surface Water
6N/32W – 13G2			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	NA	Interconnected Surface Water
6N/32W – 17R1			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	8 - 28	Interconnected Surface Water

NA - Not Applicable

The tiering criteria utilized to select CMA representative monitoring wells is shown below.

Tier 1

- part of an existing monitoring network
- access available for monitoring
- existing DWR databases (CASGEM, GAMA, SWIS, etc.)

Tier 2

- xyz well location data
- well boring log
- total boring depth
- well screen interval
- principal aquifer screened

Tier 3

- historical data
- spatial location and consideration of upgradient and downgradient conditions

Tier 4

- suitable to monitor multiple SMCs

Table 3a.3-2 below, summarizes the existing wells in the primary Buellton Aquifer identifying whether the monitored wells are part of the existing State of California Department of Water Resources CASGEM program, identifying well names (includes CASGEM names or State well IDs), the principal aquifer each well is screened in and the frequency of monitoring. Locations of the wells are shown on **Figure 3a.3-1.**

Table 3a.3-2
Buellton Aquifer Wells Groundwater Level Data
Spring 2015 through Spring 2021

Subarea	Principal Aquifer	DBID	State ID	USGS ID	CASGEM ID	CASGEM Type	Frequency
Buellton Upland	Buellton Aquifer	82	7N/33W-36J1	343824120175201	23895	Voluntary	Biannual
Buellton Upland	Buellton Aquifer	75	7N/32W-31M1	343821120173601	23681	Voluntary	Biannual
Santa Ynez Alluvium	Buellton Aquifer	90	6N/31W-7F1	343655120111201	49120	CASGEM	Biannual
Santa Ynez Alluvium	Buellton Aquifer	909	6N/32W-12K2	343649120114401	-	n/a	Monthly

The distribution of existing wells across the principal aquifer indicates sufficient monitoring is feasible by utilizing the existing wells, with a few exceptions in the Buellton Upland subarea, as described below.

3a.3-1-2 Groundwater Levels Data Gaps

Alluvial canyons within the Buellton Upland subarea of the CMA are not currently included in the existing Groundwater Level monitoring network, as shown by the polygons lacking well locations on Figure 3a.3-1. Obtaining access to existing groundwater wells in these areas and adding them to the recommended Groundwater Level monitoring program could potentially fill these identified data gaps. Efforts to determine whether wells exist in these areas, and if so, how public outreach would be conducted to gather well information is included in Chapter 5 (Plan Implementation).

In addition, data gaps exist on the well construction information for the representative monitoring wells. This data gap will be addressed in Chapter 5 (Plan Implementation) by performing video surveys in representative monitoring wells to confirm well construction.

3a.3-2 Groundwater Storage

The data collected from the Groundwater Level monitoring network will be used to evaluate changes in groundwater levels within the Buellton Aquifer and to estimate changes in groundwater in storage. Therefore, the Groundwater Level and Groundwater Storage monitoring networks are considered equivalent so the collected data will be used to evaluate both sustainability indicators for identification of potential undesirable results. If additional wells are added to the groundwater level network, the estimated groundwater in storage calculations will be modified to include those wells, as appropriate.

3a.3-3 Groundwater Quality

It is recommended to continue to use the existing Groundwater Quality well monitoring network, well monitored by the public water systems and by commercial irrigation within the CMA. The GSA will collect data from these programs annually to support evaluation of groundwater quality trends and tracking groundwater management progress to reach CMA sustainability goals. Figure 3a.3-2 shows the representative monitoring wells along with all wells in the current monitoring network. The distribution of existing wells across the principal aquifer indicates sufficient monitoring is feasible by utilizing the existing wells. Because the monitoring wells already provide adequate spatial distribution, additional monitoring wells are identified as an improvement, not a data gap.

3a.3-4 Seawater Intrusion

Seawater intrusion is not applicable to the CMA and therefore a monitoring network is not needed or recommended in the CMA.

3a.3-5 Land Subsidence

As described in Section 2b, Groundwater Conditions, land subsidence has not been historically observed in the CMA, existing water infrastructure have not been affected by land subsidence, and geologic properties of the aquifer indicate that land subsidence due to groundwater withdrawal in the CMA is unlikely. Based on these findings, a direct-measurement monitoring network for potential land subsidence is not recommended within the CMA. However, a remote-sensing option for land subsidence monitoring using InSAR data will be implemented. Available InSAR coverage for the CMA are deemed sufficient and will be evaluated for indications of ongoing or permanent land subsidence. InSAR uses radar returns to measure total vertical displacement of the land surface.

In addition to the available InSAR data, a USGS continuous global positioning system (CGPS) station (BUEG) was installed near City of Buellton and has been collecting vertical displacement data since January 2015, as shown on Figure 3a.2-3. Data from this site will be used to supplement the InSAR data.

Additionally, it is recommended that CCWA periodically be contacted. Since 1997 CCWA has operated the large-scale water supply infrastructure in the basin: the pipeline which carries SWP water through the CMA to the City of Buellton and Lake Cachuma (Figure 2a.3-9, HCM). CCWA would likely be able to affirm if negative outcomes are occurring such as differential settling.

3a.3-6 Surface Water Depletions and Groundwater Dependent Ecosystems

The SGMA Regulations, 23 CCR § 354.28 (b), states that,

> *(6) Depletions of interconnected surface water. The minimum threshold for depletions of interconnected surface water shall be the volume of surface water depletions caused by groundwater use that has significant and unreasonable adverse impacts on beneficial uses of the surface water. The minimum threshold established for depletions of interconnected surface water shall be supported by the following:*
>
> *(A) The location, quantity, and timing of depletions of interconnected surface water.*
>
> *(B) A description of the groundwater-surface water model used to quantify surface water depletion.*

Item (6)(B) requires a numerical model to estimate the depletions of interconnected surface water, not the use of a monitoring network to measure depletions of interconnected surface water. Therefore, the Surface Water Depletion monitoring network will include two primary elements.

- Use of groundwater level monitoring as presented on **Figure 3a.3-3** as a proxy to evaluate potential Surface Water Depletions, and

- Continued use of stream gage data from within the CMA to support numerical modeling estimates.

Additionally, data from existing stream gages located upstream in the EMA and downstream in the WMA (Figure 2b.6-1, GC) will be utilized to assess potential surface water depletions and relationships to groundwater conditions changes. These monitoring data will be used to guide the CMA in groundwater management decisions to support the sustainability goals outlined in Section 3b.1.

For the entire Santa Ynez River Valley Groundwater Basin (all three management areas), a streamflow gage is proposed near the mouth of the Santa Ynez River near the estuary in order to measure the total surface water outflow from the entire system. Previously the USGS had a gage called “Santa Ynez River at Barrier near Surf” (USGS Gage ID 11135500) but this gage was discontinued in 1965. By restarting measurements at this historical site, the total surface water budget can be tracked from Bradbury Dam to the Pacific Ocean.

3A.4 MONITORING PROTOCOLS

To fulfill the additional monitoring recommended below, monitoring protocols will be conducted in accordance with DWR's *Monitoring Networks and Identification of Data Gaps BMP*, which uses DWR's 2010 publication of *California Statewide Groundwater Elevation Monitoring (CASGEM) Program Procedures for Monitoring Entity Reporting* (**Appendix 3a-A**) for the groundwater level sampling protocols. This publication includes protocols for equipment selection, setup, use, field evaluation, and sample collection techniques.

3a.4-1 Identified CMA Data Gaps for Monitoring Network

Data gaps for groundwater levels are identified within the CMA for the Buellton Aquifer in the Buellton Upland subarea. The limited number of wells screened in the Buellton Aquifer in the Buellton Upland limit the GSA ability to evaluate current and historical groundwater levels conditions and associated groundwater management decisions or actions. Plans to fill the identified data gap are discussed in detail in Chapter 5, Implementation, and are briefly summarized below.

Additionally, an identified data gap exists near the confluence of Santa Rosa Creek and the Santa Ynez River, where GDEs are mapped at the boundaries of the Buellton Upland and the Santa Ynez River Alluvium subareas. The lack of well data or a stream gage at this location limits the GSA ability to evaluate current conditions related to the groundwater-surface-water connection and the associated GDEs in this area.

3a.4-2 Plans to Fill Identified CMA Data Gaps in Monitoring Network

Ideal spatial locations for monitoring within the Buellton Upland are identified on Figure 3a.3-1 where access to non-production wells screened in the Buellton Aquifer would provide useful data to the GSA to evaluate current groundwater level conditions and support sustainable groundwater management decisions in alignment with the Sustainability Goals described in Section 3b.1.

Generally, the project would identify parcels within the specific portions of the Buellton Upland subarea where data would be useful to fill the identified data gaps. The project will describe outreach efforts to engage the parcel owners to better understand whether groundwater wells exist, and their condition, in the target areas. If groundwater wells do exist, access to the well completion information will be requested from well owners, if available. If well construction information is unavailable and parcel owners agree, well inspection activities may be conducted to evaluate well construction. If groundwater wells do not exist or are not completed in a manner that would provide useful data, the GSA may consider the potential to install new groundwater wells in the target areas in an effort to close the identified data gaps.

For the identified data gap near the confluence of Santa Rosa Creek and the Santa Ynez River, installation of a piezometer may be appropriate if an existing well is not present or available, to evaluate the groundwater-surface-water connection and the associated GDEs identified in this area.

Section 3 B – SUSTAINABLE MANAGEMENT CRITERIA

The Central Management Area Groundwater Sustainability Agency (CMA GSA) has defined the sustainability goal with consideration of the beneficial uses and users and in coordination with the entire Santa Ynez River Valley Groundwater Basin (Basin or SYRVGB). This section of the GSP presents the sustainability goal for the CMA, including a description of how the sustainability goal was determined, how sustainability will be achieved and maintained, and how sustainability will be monitored and assessed through the 50-year planning and implementation horizon. Each component of the Sustainable Management Criteria (SMC) is presented below as it applies to the specific conditions of the CMA, beginning with the sustainability goal (Section 3b.1),[113] followed by the undesirable results pertaining to the sustainability indicators (Section 3b.2), minimum thresholds used as indicators of potentially undesirable conditions (Section 3b.3), and, where appropriate, measurable objectives marking specific benchmarks on the way to achieving sustainability (Section 3b.4), and the effects of sustainable management criteria on neighboring basins (Section 3b.5). The sustainable management criteria defined in this GSP will be periodically re-evaluated through the SGMA-required annual reports and periodic updates and adjusted as needed to achieve and maintain sustainability in accordance with the sustainability goal (Section 1a).

113 A sustainability indicator refers to "any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results" (23 CCR § 351(ah)).
A minimum threshold means "a numeric value for each sustainability indicator used to define undesirable results" (23 CCR § 351(t)).
A measurable objective means "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin" (23 CCR § 351(s)).

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3B.1 SUSTAINABILITY GOAL

In accordance with the Sustainable Groundwater Management Act (SGMA), the sustainability goal for the Santa Ynez River Valley Groundwater Basin (Basin) is to sustainably manage the groundwater resources in the Western, Central, and Eastern Management Areas to ensure that the Basin is operated within its sustainable yield for the protection of reasonable and beneficial uses and users of groundwater. The absence of undesirable results, as defined by SGMA and the Groundwater Sustainability Plans (GSPs), will indicate that the sustainability goal has been achieved. Sustainable groundwater management as implemented through the GSPs is designed to ensure that:

(1) Long-term groundwater elevations are adequate to support existing and future reasonable and beneficial uses throughout the Basin,
(2) A sufficient volume of groundwater storage remains available during drought conditions and recovers during wet conditions,
(3) Groundwater production, and projects and management actions undertaken through SGMA, do not degrade water quality conditions in order to support ongoing reasonable and beneficial uses of groundwater for agricultural, municipal, domestic, industrial, and environmental purposes.

Groundwater resources will be managed through projects and management actions implemented under the GSPs by the respective Groundwater Sustainability Agencies (GSAs). Management of the Basin will be supported by monitoring groundwater levels, groundwater in storage, groundwater quality, land surface elevations, interconnected surface water, and seawater intrusion. The GSAs will adaptively manage any projects and management actions to ensure that the GSPs are effective and undesirable results are avoided.

The sustainability criteria for the CMA was developed using historical data, including groundwater elevations, groundwater quality, and satellite imagery. These data are discussed in detail in Chapter 2b, Basin Setting.

The Buellton Upland and Santa Ynez River Alluvium are the two subareas that compose the CMA. Water levels and groundwater in storage within the Santa Ynez River Alluvium subarea fluctuate primarily in response to existing water rights and environmental regulations. Additional groundwater elevation is needed in the Buellton Upland subarea of the CMA. Existing groundwater elevation data in the CMA is limited to isolated areas in the western and southeastern one third of the subarea. The need for additional data has been identified as a data gap (Section 2b.1-3, Groundwater Conditions). Groundwater elevation data at the few locations has been collected since the 1940s. The direction of groundwater flow is from north to south across the subarea toward the Santa Ynez River (Section 2b.1-2, Groundwater Conditions). Although there is adequate aerial distribution of water quality monitoring wells within the Buellton Upland subarea, data gaps exist related to well construction information and historical trends of some constituents (Section 3a, Monitoring Network).

3b.1-1 The Santa Ynez River Alluvium

Water in the Santa Ynez River Alluvium upstream of the Lompoc Narrows is recognized as subflow of the Santa Ynez River since SWRCB Decision D 886 and WR 73-37 and regulated and managed by SWRCB the same as surface flows. Because subflow of the Santa Ynez River is considered the same as surface water, the Santa Ynez River Alluvium would not be classified as a principal aquifer or managed by a GSP under SGMA. As such, the sustainability indicators within the subarea are controlled by these State requirements and Cachuma Reservoir releases in accordance with applicable regulations. These include supporting Santa Ynez River base flow to support rearing juvenile steelhead (*O. mykiss*), monitoring for specific surface water pool depths, groundwater dependent ecosystems (GDEs), and other beneficial uses of Santa Ynez River streamflow. Although the Santa Ynez River Alluvium subarea is within the DWR defined Santa Ynez River Valley Groundwater Basin (DWR Basin No. 3-15), the CMA GSA has no authority to regulate conditions within the alluvial subflow of the River as it is not considered groundwater as defined by SGMA.[114] The CMA GSA has authority over the groundwater in older formations below the alluvium which are continuous with the older formations in Buellton Upland subarea (Section 2a.2, HCM), which together are the Buellton Aquifer.

[114] CWC Section 10721 (g) "Groundwater" means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water that flows in known and definite channels.

3b.1-2 Buellton Aquifer Data Gaps

Data and information that is currently and historically available for the Buellton Aquifer is summarized in Section 2b (Groundwater Conditions) and Section 3a (Monitoring Network). Data gaps include temporal and spatial groundwater elevation data used to evaluate and monitor groundwater in storage, surface and groundwater connectivity, and GDEs. As part of GSP implementation, the CMA GSA will identify, additional existing wells that are suitable for reducing data gaps within the subarea (Section 3a, Monitoring Network and Chapter 5, Implementation). Wells for the monitoring program will be selected based on location, use, accessibility, and availability of construction information. Where possible, they will be non-producing wells to best obtain readings representative of static groundwater conditions within the aquifer. Wells fulfilling the appropriate requirements will be added to the GSA monitoring program along with the four existing volunteer wells included in the current CASGEM program within the Buellton Upland subarea. Where necessary to collect adequate data to evaluate the sustainability indicators, additional representative monitoring wells (RMWs) may be constructed. Such RMWs may include piezometers proximal to potential GDEs and monitoring wells in areas where none are available. Adding at least two more additional wells to the RMWs is scheduled to be implemented within two years of GSP submittal to DWR. Based on data and information obtained through the addition of monitoring capabilities within the CMA, the sustainable management criteria presented below will be modified as appropriate through the GSP periodic updates to achieve sustainability according to the stated Sustainability Goal (Section 3b.1).

The extent of the Buellton Aquifer underlying Santa Ynez River Alluvium, and exact number of wells pumping from which aquifer, in the Santa Ynez River Alluvium subarea is also a data gap. Where the Buellton Aquifer underlies the Santa Ynez River Alluvium, sustainable management criteria relevant to the Buellton Aquifer will apply to the wells that pump in part or in whole from the Buellton Aquifer. The current estimated extent of the Buellton Aquifer within the Santa Ynez River Alluvium Subarea is the reach east of Buellton Bend within the CMA and for wells deeper than 130 feet, which is estimated to represent roughly 15% of all wells within Santa Ynez River Alluvium subarea. As part of the implementation of this GSP, the CMA GSA will identify criteria to determine which aquifer is being pumped based on the current aerial geophysical study recently surveyed in November 2020 and aquifer properties described in the

HCM. A program will be established for well owners in this area to register their wells as either part of the Buellton Aquifer or totally within the Santa Ynez River Alluvium (Chapter 5, Implementation).

3B.2 UNDESIRABLE RESULTS

Under the Sustainable Groundwater Management Act (SGMA), undesirable results occur when groundwater conditions occurring throughout the CMA cause significant and unreasonable impacts to any of six sustainability indicators:

- Significant and Unreasonable Chronic Lowering of Groundwater Levels
- Significant and Unreasonable Reduction of Groundwater in Storage
- Significant and Unreasonable Seawater Intrusion (not applicable to CMA)
- Significant and Unreasonable Degradation of Water Quality Resulting from Groundwater Withdrawal
- Significant and Unreasonable Land Subsidence Resulting from Groundwater Withdrawal
- Significant and Unreasonable Reduction of Interconnected Surface Water and Groundwater Resulting from Groundwater Withdrawal

The CMA GSA is required to characterize undesirable results for each indicator unless "undesirable results to one or more sustainability indicators are not present and are not likely to occur in the basin."[115] Except for seawater intrusion, each of the six sustainability indicators has the potential to occur within the CMA and each has been evaluated regarding undesirable results. No undesirable results are currently occurring within the Buellton Upland subarea related to any of the sustainability indicators as a result of groundwater extraction. Because groundwater usage and conditions may lead to undesirable results, the CMA GSA has defined significant and unreasonable results for each applicable sustainability indicator. Each of the sustainability indicators for which there are data gaps or too little data to fully evaluate the

115 23 CCR § 354.26 (d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.

related undesirable results will be further defined by the development of additional monitoring capabilities through GSP implementation (Section 3b.1-2, Chapter 5).

3b.2-1 Chronic Lowering of Groundwater Levels – Undesirable Results

Chronic lowering of groundwater levels that indicate a depletion of supply[116] is an undesirable result applicable to, but not occurring within, the CMA. Chronic lowering of groundwater levels in the Buellton Upland would occur in the form of lowered groundwater elevations that significantly and unreasonably reduce the total volume of water in storage, eliminate or reduce the ability of production wells to economically access groundwater, or cause disconnection from surface water that sustains habitat or groundwater dependent ecosystems (GDEs). Beneficial uses within the CMA are presented in Section 2a.4 (HCM) and Section 2b.3-1 (GC) and include municipal and domestic supply, agriculture, and industry, and environmental uses, all of which are supplied, at least in part by groundwater. The primary cause of groundwater conditions that would lead to chronic lowering of groundwater levels is groundwater production more than natural and artificial recharge over a period that contains both wet and dry water years. Groundwater elevations in the CMA will be used to determine whether significant and unreasonable reduction of groundwater storage occurs. Historical data indicates there has not been any loss in total groundwater in storage over the last 49 years, a period containing both wet and dry climate cycles (Section 2b, GC)

In the Buellton Upland subarea, groundwater extractions, monitored since 1994, peaked in 2015 with recent drought conditions at approximately 4,600 AFY (Section 2b, Groundwater Conditions). Groundwater elevation hydrographs from monitoring wells in the Buellton Upland subarea generally indicate historical low elevations during previous drought periods including the early 1970s, late 1990s (Figures 2b.1-4AB, GC). Groundwater elevation generally recovers readily from low levels in response to wet or average precipitation (7N/33W-36J1, 7N/32W-31M1, 6N/32W-06K1, **Appendix 3b-A** Hydrographs) indicating that there has not historically been chronic lowering of groundwater levels. Throughout the period, groundwater extractions correlated approximately with climate, increasing during dry periods and decreasing during wet periods (Figure 2b.2-4, GC).

116 23 CCR § 354.28(c)(1)

There is not current or historical evidence of widespread undesirable results related to declining groundwater levels including groundwater elevations dropping below well design capacity or impacts to or loss of GDEs. In accordance with the Santa Ynez River Water Conservation District (SYRWCD) policy, groundwater production and well status (active or inactive) is reported by groundwater users including for agriculture, municipal, and domestic well owners (Stetson 2021). **Figure 3b.2-1** illustrates that the number of inactive wells has remained relatively constant throughout the period of record including through historical and recent droughts, suggesting that wide-spread undesirable results resulting from chronic groundwater level decline have not occurred. The historical groundwater pumping presented in Water Budget (Section 2c) also indicates no decrease in groundwater pumping over time, also suggesting that wide-spread undesirable results resulting from chronic groundwater level decline have not occurred. This is also consistent with input from water users in the CMA during the GSA and CAG meetings that no significant and unreasonable effects associated with groundwater level decline have been observed historically in the CMA.

Based on historical groundwater elevation data, the undesirable result related to water level decline is the groundwater level at which beneficial uses may be disrupted by groundwater levels dropping below the tops of screens. Conditions that threaten long-term groundwater accessibility for agricultural, municipal, and domestic supply correspond to static water levels that stabilize within the perforated sections of a groundwater extraction well. Static groundwater elevations that reside within the perforated sections of an extraction well may lead to pump failure from entrained air or insufficient net positive suction head (Driscoll, 1986; Roscoe Moss, 1990). In addition, the introduction of entrained air may increase well screen fouling from increased biological activity and geochemical reactions that lead to mineral precipitation (Driscoll, 1986; Schneiders, 2003).

Figure 3b.2-2 is a well impact analysis (**Appendix 3b-B**) indicating that groundwater levels that drop 10 feet below 2020 conditions result in about 30 percent of the top of municipal and domestic well screens becoming exposed. This remains the case to about 20 feet below 2020 water levels. The criteria for undesirable results related to declining groundwater is the level at which about one third of municipal and domestic well screens become exposed with consideration of historical low groundwater levels and allowance for operational flexibility. This well impact analysis along with agreement with historical low water elevations was accepted by the CMA GSA Committee as the basis for establishing undesirable results and minimum thresholds. Data Gaps related to groundwater levels and groundwater in storage in the Buellton Upland will be addressed with implementation of an expanded monitoring program (Section 3b.1-2).

(b) (1) Cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results

Chronic lowering of groundwater levels in the CMA may occur if groundwater extractions exceed the sustainable yield over a period that contains both wet and dry water year types. In addition, chronic lowering of groundwater elevations may be caused by reductions in surface water releases from the Cachuma Reservoir and reduced surface flows in the Santa Ynez River. Surface water releases through the Cachuma reservoir through the CMA to the Pacific Ocean are managed by the State Water Resources Control Board under Order WR 2019-0148.

(b) (2) Criteria used to define when and where the effects of groundwater conditions cause undesirable results. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

Undesirable results associated with chronic lowering of groundwater levels will be defined in the CMA by collecting semi-annual (spring and fall) groundwater elevation measurements at representative monitoring wells completed in the Buellton Aquifer (Figure 3a.3-1, Monitoring Network). Undesirable results associated with chronic declines in groundwater elevations will be characterized by comparing groundwater elevations at each well to established minimum threshold groundwater elevations. Spring groundwater elevations that drop below the established groundwater elevation minimum thresholds in more than 50% of the representative monitoring wells for two consecutive, non-drought[117] years would correspond to an undesirable result associated with chronic lowering of groundwater elevations. The criteria of 50% of the monitoring wells addresses the potential cumulative effects from pumping and GSA management on basin-scale water level conditions. Requiring two or more consecutive non-drought years of minimum threshold exceedances provides confirmation that the chronic lowering of groundwater

117 Two or more consecutive years that are classified as Dry or Critically Dry (Section 2b, GC) will be defined for this purpose as drought years. All other year types and combination of year types will be defined as non-drought years for the purpose of defining undesirable results under a groundwater sustainability plan.

elevations is not drought related, making it more likely attributed to groundwater pumping.[118] GSA management actions (Chapter 4) will be planned to accommodate drought periods and ensure short-term impacts can be offset by increases in groundwater levels or storage during normal or wet periods.

(b) (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur from undesirable results

Chronic lowering of groundwater elevations may lead to an undesirable result in the CMA if groundwater elevations drop to a level that significantly and unreasonably reduces the total volume of groundwater in storage, eliminates or reduces the ability of production wells to economically access groundwater, or causes a disconnection from surface water that sustains habitat or groundwater dependent ecosystems (GDEs). Conditions that threaten long-term groundwater accessibility for agricultural, municipal, and domestic supply correspond to static water levels that stabilize within the perforated sections of a groundwater extraction well. Static groundwater elevations that reside within the perforated sections of an extraction well may lead to pump failure from entrained air or insufficient net positive suction head (Driscoll, 1986; Roscoe Moss, 1990). In addition, the introduction of entrained air may increase well screen fouling from increased biological activity and geochemical reactions that lead to mineral precipitation (Driscoll, 1986; Schneiders, 2003).

3b.2-2 Reduction of Groundwater in Storage – Undesirable Results

Reduction of groundwater in storage is an undesirable result to, but not occurring within, the CMA. The undesirable result for decline in storage is less water available for beneficial users, meaning that the water is physically not present to be extracted. Reduction of groundwater in storage is also associated with undesirable results established for chronic lowering of groundwater levels and may be associated with undesirable results associated with land subsidence. The primary cause of reduction of groundwater in storage would be groundwater production in excess of natural and artificial recharge during a climate period containing both wet and dry water years. Significant and unreasonable reduction of groundwater

118 CWC Section 10721(x): "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods."

in storage would impact beneficial uses and users of groundwater in the Buellton Upland subarea by limiting the volume of groundwater available for domestic, municipal, industrial, and agricultural supplies.

Groundwater elevation is used as a proxy for groundwater in storage in this GSP. Based on well construction information, historical groundwater production, and water level data, the undesirable result for groundwater in storage is equivalent to that for groundwater levels, i.e., the groundwater level at which about thirty percent of the top of domestic and municipal well screens become exposed (Appendix 3b-B). A review of groundwater elevation data in the CMA indicates that groundwater in storage in the Buellton Upland has rebounded after each dry period since the mid-1980s and increased during wet periods. An indicator of undesirable results related to reduction of storage would be a net decline in storage over a period containing both wet and dry cycles. There was no net change in groundwater in storage during the historical period from 1982 through 2018 (Section 2b, GC; Figure 2c.2-4, Water Budget). There is no historical evidence of widespread negative impacts related to diminished water in storage even during extended dry periods. In addition, the availability of imported water to the City of Buellton from the State Water Project provides operational flexibility for reduction of groundwater in storage to the extent that it remains available during drought conditions occurring in Central California (Chapter 2).

Data Gaps related to groundwater levels and groundwater in storage in the Buellton Upland will be addressed with implementation of an expanded monitoring program (Section 3b.1-2; Chapter 5)

(b) (1) Cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results

Significant and unreasonable reduction of groundwater in storage may occur if groundwater production exceeds the sustainable yield of the CMA over a period containing both wet and dry water year types. In addition, chronic lowering of groundwater elevations may be caused by reductions in surface water releases from the Cachuma Reservoir and reduced surface flows in the Santa Ynez River. Indirectly this could occur if reductions in Santa Ynez River water result mean water production is transferred to the Buellton Aquifer. Surface water releases through the Cachuma reservoir to the CMA are managed under the State Water Resources Control Board Order WR 2019-0148.

(b) (2) Criteria used to define when and where the effects of groundwater conditions cause undesirable results. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

Undesirable results associated with a reduction of groundwater in storage will be defined in the CMA by collecting semi-annual (spring and fall) groundwater elevation measurements at wells completed within the Buellton Aquifer. Undesirable results associated with reduction of groundwater in storage will be characterized by comparing groundwater elevations at each well to established minimum threshold groundwater elevations. Spring groundwater elevations that drop below the established groundwater elevation minimum thresholds in more than 50% of the representative monitoring wells for two consecutive non-drought years would correspond to an undesirable result associated with a significant and unreasonable reduction of groundwater in storage.

(b) (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur from undesirable results

Reduction of groundwater in storage can lead to an undesirable result in the CMA if the total volume in storage drops to levels that eliminates or reduces the ability of production wells to economically access or produce groundwater. Conditions that threaten long-term groundwater accessibility for agricultural, municipal, and domestic supply correspond to static water levels that stabilize within the perforated sections of a groundwater extraction well. Static groundwater elevations that reside within the perforated sections of an extraction well may lead to pump failure from entrained air or insufficient net positive suction head (Driscoll, 1986; Roscoe Moss, 1990). In addition, the introduction of entrained air may increase well screen fouling from increased biological activity and geochemical reactions that lead to mineral precipitation (Driscoll, 1986; Schneiders, 2003).

3b.2-3 Seawater Intrusion – Undesirable Results

Seawater intrusion is a sustainability indicator that is not applicable to the CMA. The western boundary of the CMA is over 15 miles inland from the coast and groundwater elevations have remained above 200 feet msl for the period of record (GC, Figures 2b.1-3 through 2b.1-5CD). Because sea water intrusion is a sustainability indicator that is not applicable to the CMA, there are no undesirable result defined for its occurrence.

Seawater intrusion is a sustainability indicator is applicable to the WMA. If this sustainability indicator in the WMA indicates an issue, this may affect basin wide water balance. This would include uses in the CMA and EMA.

3b.2-4 Degradation of Water Quality – Undesirable Results

Degradation of water quality is an undesirable result applicable to the CMA but not occurring in the Buellton Aquifer. Water quality is monitored throughout the Buellton Upland subarea and within the Santa Ynez River Alluvium subarea where wells are completed within the Buellton Aquifer (Figure 3a.3-2, Monitoring Network). Groundwater quality data within the Buellton Upland is geographically sufficient but limited temporally to the recent past (**Table 3b.2-1**). The relationship between pumping and water quality is a data gap. There could be multiple causes for possible future degraded water quality besides groundwater pumping, including wastewater treatment and agricultural and industrial sources (Haas et. al. 2019).

Groundwater served by the City of Buellton for municipal supply is treated in compliance with Title 22 of the California Code of Regulations. The sustainable management criteria for groundwater quality are based primarily on the Central Coast Basin Water Quality Control Plan (CCWQCP) prepared by the California State Water Boards (Section 2b.3, GC). Water quality within the Buellton Upland subarea meets most Water Quality Objectives (WQOs) established by the CCWQCP. Undesirable results related to groundwater quality are defined as water quality for any constituent of concern that is not sufficient for the beneficial uses within the Basin.

3b.2-4-1 Point Source Pollutants

All known point sources of contamination related to industrial releases have been managed in compliance with applicable State laws and regulations. All but two sites within the CMA have been remediated and closed per the applicable regulations (Section 2b.3, GC). The two remaining sites are within the Santa Ynez Alluvial subarea and not subject to CMA GSA oversite (Figure 2b.3-1, GC). Undesirable results associated with point sources of contamination is overseen by the State Water Resources Control Board and are not established as part of this GSP. Any project management or actions under this GSP will not influence plume migration and negatively influence groundwater quality.

3b.2-4-2 Constituents of Potential Concern

Constituents of potential concern within the CMA include TDS, chloride, sulfate, boron, sodium, and nitrate (Section 2b.3, GC). **Table 3b.2-1** lists the Water Quality Objectives (WQOs) established for each constituent according to the CCWQCP. Note that the WQOs are averages for monitoring well samples collected throughout the CMA for the period 2015 to 2018 and are designated according to the beneficial uses within the CMA (Section 2b.3-1-1, GC). Median water quality concentrations for individual constituents are calculated for the years 2015 to 2018. Time-series graphs of historical groundwater quality data for relevant constituents by well are included as **Appendix 3b-C** and summarized in **Table 3b.2-2**.

3b.2-4-2-1 Total Dissolved Solids (TDS) Undesirable Results

Agriculture use is the predominant beneficial use of groundwater within the CMA (Section 2a.4, HCM). Based on crop types and crop sensitivities within the CMA, the undesirable result for TDS is evaluated based on the SMCL of 1,000 mg/L instead of WQO of 1,500 mg/L (Section 3b.3-4). This more restrictive threshold allows for future crop types that may be more sensitive to salinity and reduces the need to extract and apply additional water to flush soils.

Table 3b.2-1
Median Groundwater Quality Objectives (mg/L) and average 2015-2018 salt and nutrient concentrations (mg/L) in the Buellton Aquifer CMA

Salinity as Total Dissolved Solids (TDS)			Chloride		Sulfate		Boron		Sodium		Nitrate as N		
Objective (mg/L)	SMC (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	MCL (mg/L)	Average 2015-2018
1,500	1,000	379	150	58	700	77	0.5	NA	100	41	1	10	3.5

Table 3b.2-2
Historical Water Quality Summary, Representative Monitoring Wells

				Salinity as Total Dissolved Solids (TDS)			Chloride (Cl)			Sulfate (SO_4)			Sodium (Na)			Nitrate as Nitrogen		
DMS ID	**Well ID**	**State ID**	**Approximate**	**Approximate TDS Range**	**Most Recent TDS**	**Currently Exceeds TDS MO?**	**Approximate Cl Range**	**Most Recent Cl**	**Currently Exceeds Cl MO?**	**Approximate SO_4 Range**	**Most Recent SO_4**	**Currently Exceeds SO_4 MO?**	**Approximate Na Range**	**Most Recent Na**	**Currently Exceeds Na MO?**	**Approximate N Range**	**Most Recent N**	**Currently Exceeds N MO?**
3173	AGL020021622	7N/33W-36	2014 - 2018	200 - 520	200	No	30 - 90	30	No	15 - 175	15	No	26 - 70	28	No	2.0 - 11.5	?	?
3137	AGL020001355	7N/32W-31	2014 - 2018	180 - 240	180	No	30 - 40	30	No	15	15	No	32 - 31	31	No	2.5 - 3.1	2.5	No
3337	AGL020014946	7N/32W-35	2014 - 2018	380 - 650	440	No	40 - 70	40	No	90 - 220	120	No	32 - 58	35	No	0.5 - 18.5	0.5	No
3076	AGL020008330	6N/32W-3	2014 - 2018	990 - 1220	980	No	110 - 130	130	No	200 - 415	210	No	78 - 150	78	No	2.0 - 20	2	No
909	Buellton Well 09	6N/32W-12K02	1992 - 2019	660 - 780	740	No	45 - 60	60	No	180 - 250	225	No	42 - 60	58	No	0.2 - 4.8	1.7	No

Notes: All concentrations are mg/L,

TDS = Total Dissolved Solids, WQ Objective = 1,000

Cl = Chloride, WQ Objective = 150

SO_4 = Sulfate, WQ Objective = 700

Na = Sodium, WQ Objective = 100

N = Nitrate, WQ Objective = 10

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3b.2-4-2-2 Nitrates (NO_3) Undesirable Results

Sources of nitrate within the CMA may include septic systems, fertilizer, animal waste, and wastewater. Although the forms of nitrogen potentially found in groundwater include nitrate, nitrite, and ammonia, nitrate is the predominate concern within the CMA (Section 2b.3-4-6, GC). The maximum contaminant level (MCL) for nitrate in drinking water is 10 mg/L for nitrate as nitrogen. High levels of Nitrate are considered to be undesirable for other uses, including watering of livestock and sensitive crop irrigation, at concentrations exceeding 100 mg/L and 5 to 30 mg/L, respectively (Section 2b.3, GC). The CCWQCP WQO is for nitrate and nitrite as nitrogen is 1 mg/L for the Buellton Upland subarea. Because the most sensitive use of groundwater within the CMA is potentially untreated groundwater served through domestic wells, undesirable result for water quality degradation related to groundwater production is a nitrate concentration of 10 mg/L, the MCL for potable water. The median nitrate concentration in the Buellton Upland subarea was 3.5 from 2015 to 2018, below the 10 mg/L, threshold. Therefore, nitrate concentration does not present an undesirable result within the CMA.

3b.2-4-2-3 Other Constituents of Potential Concerns

Median groundwater quality concentrations for the relevant constituents are in all cases below the objectives or modified objectives for TDS and Nitrate (Table 3b.2-1). Constituent concentrations measured in individual representative wells for the period of available record indicate occasional exceedance of the objectives for isolated measurements in individual wells (Table 3b.2-2). In every well and for each constituent, the most recent sample analysis is below the objectives, except the TDS concentration which was near 1,000 mg/L for one well (Table 3b.2-2). Based on these data, undesirable results are not occurring within the Buellton Aquifer with respect to groundwater quality.

(b) (1) Cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results

Adverse water quality conditions in the CMA are driven by the use and discharge of treated wastewater within the Basin (RWQCB 2019), local agricultural practices, and Santa Ynez River water quality.

(b) (2) Criteria used to define when and where the effects of groundwater conditions cause undesirable results. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

Undesirable results associated with degradation of water quality will be quantified by collecting annual TDS, chloride, sulfate, boron, sodium, and nitrate concentration measurements from wells completed in the Buellton Aquifer. Salt and nutrient concentration measurements collected at each well will be compared to the established salt and nutrient concentration minimum thresholds (Section 3b.3-4). Groundwater management decisions and pumping can influence local well water quality. Hence, minimum threshold exceedances for individual constituents in more than 50% of the monitoring wells for 2 or more consecutive years is considered an undesirable result associated with degradation of water quality in the CMA. The criteria of 50% of the representative monitoring wells addresses the potential cumulative effects from management decisions and pumping on basin-scale water quality conditions. Requiring two or more consecutive non-drought years of minimum threshold exceedances provides confirmation that the degraded water quality is not drought related, making it more likely attributed to groundwater pumping and/or management actions

(b) (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur from undesirable results

Water quality degradation beyond current conditions in the CMA may impact municipal, domestic, and agricultural usage by exceeding salt and nutrient crop tolerances and drinking water standards and increase treatment costs by municipalities (Section 2b.3, GC). Undesirable results associated with point sources of contamination is overseen by the State Water Resources Control Board (Section 2b.3, GC) and are not established as part of this GSP.

3b.2-5 Land Subsidence – Undesirable Results

Inelastic land subsidence is an undesirable result not occurring or likely to occur in the future within the CMA. Undesirable results due to land subsidence are damage to surface infrastructure and collapsed pore space meaning reduced aquifer storage and hydraulic conductivity. There is little to no evidence of land subsidence within the CMA that has disrupted infrastructure, land use, or beneficial use of groundwater

(Section 2b.5, GC). Areas where minor land subsidence has been measured by remote sensing data is a small area of the Buellton Upland above Cañada de la Laguna, where there is little to no reported groundwater use (Section 2b.5, GC), which is an area not associated with active agriculture. There is no evidence of historical infrastructure failure attributable to inelastic land subsidence from groundwater extraction (Section 2b.5, GC). Note that land subsidence may occur from forces other than those related to groundwater extraction, including tectonic forces.

Land subsidence from groundwater extraction is not expected to become an undesirable result within the CMA due to hydrogeologic conditions that are not conducive to land subsidence and because SMCs for other sustainability indicators will preclude the lowering of groundwater levels significantly below the historical low elevation. The undesirable result is defined as land subsidence resulting from groundwater extraction that substantially interferes with surface land uses.

(b) (1) Cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results

Groundwater production in excess of the sustainable yield may result in significant and unreasonable land subsidence if the subsidence, "substantially interferes with surface land uses."[119] Subsidence related to groundwater extraction can occur with groundwater elevations maintained below previous historical low water levels and in the presence of extensive fine-grained sediments. Groundwater Conditions (Section 2b.5) found that extensive fine-grained sediments are not documented as occurring in the CMA.

(b) (2) Criteria used to define when and where the effects of groundwater conditions cause undesirable results. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

Groundwater production is not expected to induce land subsidence within the CMA. Land surface elevations will be continuously monitored using InSAR data and continuous GPS monitoring data (Figure 3a.2-3, Monitoring Network). Land subsidence associated with groundwater production that exceeds half a foot from 2015 conditions may impact infrastructure and land usage in the CMA.

119 CWC Section 10721(x)(5) Significant and unreasonable land subsidence that substantially interferes with surface land uses.

(b) (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur from undesirable results

Land subsidence from groundwater extraction is not expected to become an undesirable result within the CMA due to hydrogeologic conditions that are not conducive to land subsidence and because SMCs for other sustainability indicators will preclude the lowering of groundwater levels below the historical low elevation. Based on the potential for land subsidence resulting from groundwater withdrawal in the CMA, the undesirable result is defined as land subsidence resulting from groundwater extraction that causes half a foot of subsidence from 2015 conditions and interferes with land use or infrastructure.

3b.2-6 Interconnected Surface and Groundwater – Undesirable Results

Depletion of interconnected surface water and groundwater is an undesirable result applicable to the CMA. This occurs when potential surface flow instead enters the aquifer and replaces missing groundwater, resulting in streamflow depletion. There are no perennial rivers, creeks, or wetlands within the CMA (Section 2b.6, GC). Ephemeral channels include the Santa Ynez River, Zaca Creek, Santa Rosa Creek, and related tributaries (Section 2a, HCM; Section 2b, GC). The Santa Ynez River is the predominant interconnected surface water and groundwater system in the CMA and extends from the EMA to the WMA (**Figure 3b.2-3**).

Underflow within the Santa Ynez River Alluvium subarea (upstream of the Lompoc Narrows) is influenced and replenished by releases from Cachuma Reservoir. SWRCB manages and regulates this River subflow no different than River surface flows in accordance with SWRCB Order WR 2019-0148.[120] Because the Santa Ynez River Alluvium would not be classified as a principal aquifer or managed by a GSP under SGMA, interconnected surface and groundwater, and the groundwater dependent ecosystems (GDEs) within the Santa Ynez River Alluvium subarea is not within the purview of the CMA GSA. Therefore, sustainable management criteria have not been set for interconnected surface water and groundwater in the Santa Ynez River Alluvium subarea.

120 SWRCB Order WR 73-37 and other orders and decisions of the SWRCB provide for the management of both River surface and subflow as surface water flows by the SWRCB.

3b.2-6-1 Groundwater Dependent Ecosystems

For Groundwater Dependent Ecosystems (GDEs) the undesirable result is when groundwater levels drop below the ecosystem, such as the root zone. If the ecosystem is in surface water reliant on discharge from groundwater, lowering of groundwater levels below land surface would mean no more surface water.

The Natural Communities Commonly Associated with Groundwater Dataset mapped wetlands and vegetation within the CMA (Figure 2a.4-4, HCM), were screened to eliminate wetland and vegetation identified in the database that were not GDEs (Figure 2b.6-3, Groundwater Conditions). Screening was based, in part, on hydrographs from existing monitoring wells in which the depth to groundwater has historically exceeded the 30-foot depth identified by the Nature Conservancy as representative of groundwater conditions that may sustain common phreatophytes and wetland ecosystems (Rohde et al. 2018) The resulting locations of potential GDEs, those communities that could not definitely be eliminated from the NCCAG database, is shown on Figure 3b.2-3. Potential GDEs exist only within the Santa Ynez River Alluvium subarea and in a small area at the south end of Santa Rosa Creek. There is no indication of undesirable results related to this potential GDE at the downstream end of Santa Rosa Creek.

For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, there is no indication of undesirable results and that historical groundwater elevations in the overlying Santa Ynez River Alluvium subflow were sufficient to support habitat and ecosystem health along the Santa Ynez River due to managed releases from Cachuma Reservoir (Jones and Stokes, 2000).

(b) (1) Cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results

Undesirable results associated with a depletion of interconnected surface water and groundwater in the CMA may be caused by groundwater production in excess of the sustainable yield over a period that contains wet and dry water years. Extended periods of groundwater production in excess of the sustainable yield may lead to groundwater elevations that drop below historical low water levels. The lowering of groundwater elevations in areas along the Santa Ynez River may also be caused by surface water diversions from the Santa Ynez River Alluvium subflow and by reductions in water rights or other releases from the Cachuma Reservoir. Surface water releases through the Cachuma reservoir to the CMA are managed by the State Water Resources Control Board under Order WR 2019-0148. The lowering of groundwater levels below historical lows in the Santa Ynez River Alluvium subflow potentially impacts habitat and ecosystem health along the Santa Ynez River.

(b) (2) Criteria used to define when and where the effects of groundwater conditions cause undesirable results. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

Using groundwater levels adjacent to the Santa Ynez River, undesirable results associated with a depletion of interconnected surface water and groundwater will be quantified by measuring groundwater elevations semi-annually at three representative monitoring points located adjacent to the Santa Ynez River (Figure 3b.2-3) and maintaining water levels above historical low groundwater levels. Significant and undesirable results are defined as groundwater elevations that drop to 15 feet below channel thalweg elevations in two out of the three representative monitoring wells for two consecutive non-drought[121] years (Section 3b.3-6). Groundwater elevations measured at these wells will be compared to minimum threshold groundwater elevations (Section 3b.3-6) to characterize whether groundwater production is causing significant and unreasonable depletion of interconnected surface water.

(b) (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur from undesirable results

Undesirable results associated with a depletion of interconnected surface water would be groundwater elevations that impact habitat health and enhance surface water depletion rates along the Santa Ynez River. Groundwater conditions that may lead to this would be groundwater elevations in the SYRA subflow that drop to 15 feet below channel thalweg elevations in two out of the three representative monitoring wells for two consecutive non- (Section 3b.3-6).

[121] 2 or more consecutive years that are classified as Dry or Critically Dry (Section 2b) will be defined as drought years. All other year types and combination of year types will be defined as non-drought years for the purpose of defining undesirable results under a groundwater sustainability plan.

3B.3 MINIMUM THRESHOLD

This section describes the minimum thresholds established for chronic lowering of groundwater levels, significant and unreasonable reduction of groundwater in storage, degraded water quality, disconnected surface and groundwater, and land subsidence related to groundwater withdrawals that substantially interferes with surface land uses. The minimum thresholds of 15-feet below 2020 water levels is described below and avoids undesirable results related to the beneficial uses within the CMA. **Table 3b.3-1** summarizes the minimum thresholds established for each applicable sustainability indicator at the 13 RMWs. Data gaps are noted where applicable and will be filled with the implementation of the GSP described in Chapter 5. Because undesirable results are not currently occurring within the CMA, and interim milestones are not relevant to maintaining sustainability or avoiding undesirable results and therefore interim milestones are not established.

Table 3b.3-1
Minimum Thresholds at Representative Monitoring Wells

RMW	WQ ID	Chronic Decline in Groundwater Levels and Groundwater in Storage (ft MSL)	Chronic Decline in Groundwater Levels Trigger Point (ft MSL)	Reduction of Groundwater Storage (ft MSL)	Degradation of Water Quality (mg/L) TDS/Cl/SO_4/Na/N
7N/33W-36J1	NA	357	362	357	NA
7N/32W-31M1	NA	359	364	359	NA
6N/31W – 7F1	NA	292	297	292	NA
6N/32W-12K1, 12K2	Buellton Well 09	276	281	276	1,000/150/700/100/10
7N/32W-35	AGL020014946	TBD	TBD	TBD	1,000/150/700/100/10
6N/32W - 7	AGL020036041	TBD	TBD	TBD	1,000/150/700/100/10
7N/33W-36	AGL020021622	NA	NA	NA	1,000/150/700/100/10
7N/32W-31	AGL020001355	NA	NA	NA	1,000/150/700/100/10
6N/32W-3	AGL020008330	NA	NA	NA	1,000/150/700/100/10
6N/31W-8	AGL020028450	NA	NA	NA	1,000/150/700/100/10

Notes: All concentrations are mg/L, TBD - To Be Determined, NA - Not Applicable
TDS = Total Dissolved Solids, WQ Objective = 1,000
Cl = Chloride, WQ Objective = 150
SO_4 = Sulfate, WQ Objective = 700
Na = Sodium, WQ Objective = 100
N = Nitrate, WQ Objective = 10

3b.3-1 Chronic Lowering of Groundwater Levels – Measurable Thresholds

Minimum threshold groundwater elevations at the 4 RMWs (Appendix 3b-A) were established to: (i) protect municipal, agricultural, and domestic groundwater users and supply, (ii) prevent potential land subsidence, and (iii) maintain 2015 levels of water quality and surface water-groundwater connection along the Santa Ynez River. The rationale in choosing the minimum thresholds to prevent significant and unreasonable results in the CMA has two major components: 1) the minimum threshold water level will be set to limit the impact on existing groundwater well screen intervals; and 2) the minimum threshold should not be more than 15-feet below basin-wide current 2020 water levels.

Available data indicates that historical low groundwater elevations were about 15 to 20 feet below current 2020 levels with no undesirable results occurring at that time. In addition, a well impact analysis was developed to evaluate static water levels associated with the top of well screens for domestic, municipal, and agricultural beneficial uses. Based on the above considerations, the minimum threshold for chronic lowering of groundwater levels in the Buellton Upland Aquifer was chosen by the CMA GSA to be 15 feet below 2020 groundwater levels in half of the RMWs for a period of two consecutive non-drought years[122] (**Table 3b.3-1** and Appendix 3b-A). 15 feet below 2020 groundwater elevations is the level at which 30 percent of domestic and municipal wells would begin to entrain air into the screens and is established with consideration of operational flexibility and beneficial use types within the basin (Appendix 3b-B). About 10 percent of agricultural wells would be impacted at this level.

Groundwater levels within the Buellton Upland Aquifer respond readily to precipitation events. Therefore, the occurrence of the minimum threshold for two non-drought years was selected to allow for short term dry periods which would not result in the occurrence of undesirable results. GSA management actions (Section 4) will be planned to accommodate drought periods and ensure short-term impacts can be offset by increases in groundwater levels or storage during normal or wet periods. The criteria of half of the RMPs wells addresses the GSA management on basin-scale water level conditions.

[122] 2 or more consecutive years that are classified as Dry or Critically Dry (Section 2b, GC) will be defined as drought years. All other year types and combination of year types will be defined as non-drought years for the purpose of defining undesirable results under this groundwater sustainability plan.

Minimum threshold water levels for RMWs, 7N/32W-35, and 6N/32W-36 will be established with the collection of additional data and at least two additional RMPs will be established to fill existing data gaps within the Buellton Upland subarea in the areas shown on **Figure 3a.2-1** (Monitoring Network) and described in further detail in Chapters 4 and 5. Groundwater elevations measured at each of the RMPs will be reported to DWR in the annual reports that will follow the submittal of this GSP.

Chronic Lowering of Groundwater Levels Trigger Point

To allow adequate time for the implementation of projects and management actions to address declining water levels prior to the occurrence of minimum thresholds, an early warning "trigger point" has been established. The trigger point is activated with groundwater levels reaching five feet above the established water level minimum thresholds in half of the RMWs for a period of one year, (minimum thresholds are reported in **Table 3b.3-1**). In addition, another early management trigger will be when the capacity of municipal water supplies is impacted by greater than 20%. For example, for the Buellton Aquifer, this will occur when the City of Buellton's municipal total well pumping capacity is reduced by 20% due to groundwater level decline. This will trigger early management actions such as requesting water rights releases from the Cachuma Reservoir (see Section 4 for more details and discussion).

3b.3-2 Reduction in Groundwater Storage– Measurable Thresholds

Undesirable results related to groundwater storage is not occurring in the CMA and has not occurred historically (Section 3b.2-2). There is a direct correlation between the volume of groundwater in storage and groundwater levels at the RMWs. Therefore, groundwater levels in the Buellton Aquifer will be used as a proxy for significant and unreasonable loss of groundwater in storage with minimum thresholds defined as the decline of water levels to 15 feet below 2020 groundwater levels in half of the RMWs for a period of two consecutive non-drought years (Table 3b.3-1). The proposed Buellton Upland groundwater monitoring program will provide additional elevation data with which to implement this sustainable management criteria (Chapter 4).

Reduction in Groundwater Storage Trigger Point

As with the undesirable result of the chronic lowering of groundwater levels, a trigger point for the reduction of groundwater in storage has been established to begin preliminary management actions to mitigate loss of groundwater in storage. The trigger point is activated with groundwater levels reaching 15 feet below the 2020 groundwater levels in half of the RMWs for a period of one year (Table 3b.3-1). Projects and management actions appropriate to declining water levels and reduction of groundwater in storage will be implemented with the occurrence of the trigger point (Chapter 4).

3b.3-3 Seawater Intrusion – Measurable Thresholds

Seawater intrusion is a sustainability indicator that is not applicable to the CMA, therefore there is no CMA minimum threshold is established for its occurrence.

3b.3-4 Degraded Water Quality – Measurable Thresholds

Sustainable management criteria related to degraded groundwater quality are based largely on the WQOs from the CCWQCP (Section 3b.2-2). Undesirable results for degradation of groundwater quality are not currently occurring within the Buellton Upland Aquifer and available data indicates that recent concentrations of the identified constituents of concern are below the objectives set (Table 3b.3-1). With the exception of total dissolved solids and nitrate, the minimum thresholds applied to groundwater quality within the Buellton Upland are the Median Groundwater Quality Objectives from the CCWQCP. The minimum thresholds are the SMCL and MCL for total dissolved and nitrate, respectively (Section 3b.2-4). Undesirable results for water quality occur with exceedance of any of the relevant constituents at half of the RMWs (Monitoring Network Figure 3a.3-2; Table 3b.3-1). The criteria of half of the RMPs wells addresses the GSA management on basin-scale water level conditions.

3b.3-5 Land Subsidence – Minimum Thresholds

Inelastic land subsidence is not presently nor is it likely to become an undesirable result within the CMA (Section 3b.2-5). The CMA is at low risk for groundwater subsidence due to the absence susceptible fine-grained materials (Section 2b, GC). Minor changes in land surface elevations since the SGMA benchmark of 2015 likely result from forces unrelated to groundwater production because both land subsidence and rise have been noted and the hydrogeology does not include areas of thick, extensive clay that is typically prone to collapse. Localized lowering of land surface elevation may have occurred from causes other than groundwater withdrawal, including tectonic movement, slope failure, and excavation or grading for construction. In addition, the minimum threshold established for decline of water levels would preclude substantial land subsidence because thresholds are near historical low water elevations.

The GSA proposes to monitor publicly available land subsidence satellite and continuous GPS data and report changes on a three-year basis (Section 2b, GC). The land subsidence minimum threshold is a decline of six inches from the 2015 land surface elevation resulting from groundwater extractions and that interferes with land uses or infrastructure. Land use and infrastructure disruption will be determined by communication with relevant agencies and beneficial use representatives including the City of Buellton, Santa Ynez River Water Conservation District, CalTrans, and the Central Coast Water Authority.

3b.3-6 Depletion of Interconnected Surface and Groundwater –Measurable Thresholds

Interconnected ground and surface water and GDEs within the Buellton Upland subarea were screened as described in Section 3b.2-6. No undesirable results are currently occurring. The CMA GSA will fill data gaps related to groundwater elevation near the identified potential GDEs with the installation and monitoring of a piezometer proximal to the potential GDE at the lower end of Santa Rosa Creek. An adaptive management approach is proposed for this area consisting of evaluation of groundwater conditions and management of groundwater extractions and potentially nearby well construction. If the potential GDE is determined to be an actual GDE, the minimum threshold would be groundwater levels that drop below 15 feet below ground surface (bgs) at the GDE location for a period of one year and corresponding with a decline in GDE health. At a piezometer this means water levels that drop 15 feet below the channel thalweg.

For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, the minimum threshold would be groundwater levels in the Santa Ynez River Alluvium subflow that drop below 15 feet bgs at the GDE location for a period of one year and corresponding with a decline in GDE health (**Appendix 3b-D**).

3b.3-7 Relationship between Minimum Thresholds for all Sustainability Indicators

Groundwater levels are used as a proxy for the sustainability indicators of groundwater in storage and groundwater dependent ecosystems. The RMWs established for evaluating undesirable results related to declining water level and loss of groundwater in storage monitor groundwater level in the Buellton Aquifer. Those established to monitor groundwater dependent ecosystems are shallow wells that monitor groundwater level in the Santa Ynez Alluvial Aquifer. The minimum thresholds established for each are independent. Where there is a data gap in the connectivity between the two aquifers in the eastern part of the Santa Ynez Alluvial subarea, the projects and management actions described in Chapter 4 will contribute to an understanding of the degree and impact of connectivity. Based on this information, sustainability criteria may be revised.

In addition, water levels in the Santa Ynez Alluvium are influenced by the State regulations described in Section 1d, Plan Area. Groundwater elevation in RMWs in the aquifer has not historically declined below the minimum threshold established and is unlikely to do so in the future (Appendix 3b-D). Where a potential GDE exists outside of the Santa Ynez River Alluvial subarea, the data gap of groundwater level will be addressed through projects and management actions and the minimum threshold adjusted, if appropriate.

The source of applicable constituents and the relationship between them and groundwater level is a data gap for groundwater quality in the CMA. Therefore, it is not currently possible to evaluate the potential interaction between water quality and minimum thresholds set for the other sustainability indicators.

3B.4 MEASURABLE OBJECTIVES

Measurable objectives are "*quantifiable goals for the maintenance and improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.*"[123] Based on the sustainability goal (Section 3b.1) and undesirable results (Section 3b.2) for the CMA, measurable objectives were established for the relevant sustainability indicators (**Table 3b.4-1**). Monitoring for this groundwater management plan are primarily direct measurement of groundwater in wells.

Table 3b.4-1
Measurable Objectives at Representative Monitoring Wells

RMW	WQ ID	Chronic Decline in Groundwater Levels and Groundwater in Storage Measurable Objective (ft MSL)	Reduction of Groundwater Storage Measurable Objective (ft MSL)	Degradation of Water Quality (mg/L) TDS/Cl-/SO4/NA/N
7N/33W-36J1	NA	379	379	NA
7N/32W-31M1	NA	402	402	NA
6N/31W – 7F1	NA	307	307	NA
6N/32W-12K1, 12K2	Buellton Well 09	301	301	1,000/150/700/100/10
7N/32W-35	AGL020014946	TBD	TBD	1,000/150/700/100/10
6N/32W - 7	AGL020036041	TBD	TBD	1,000/150/700/100/10
7N/33W-36	AGL020021622	NA	NA	1,000/150/700/100/10
7N/32W-31	AGL020001355	NA	NA	1,000/150/700/100/10
6N/32W-3	AGL020008330	NA	NA	1,000/150/700/100/10
6N/31W-8	AGL020028450	NA	NA	1,000/150/700/100/10

Notes: All concentrations are mg/L, TBD - To Be Determined, NA - Not Applicable
TDS = Total Dissolved Solids, WQ Objective = 1,000
CL- = Chloride, WQ Objective = 150
SO4 = Sulfate, WQ Objective = 700
NA = Sodium, WQ Objective = 100
N = Nitrate, WQ Objective = 10

[123] 23 CCR § 351(s)

3b.4-1 Chronic Lowering of Groundwater Levels – Measurable Objectives

The measurable objective established for chronic lowering of groundwater levels is the spring 2011 groundwater elevation. Groundwater elevations in spring 2011 preceded recent drought conditions and followed a ten-year period of near normal climate (Section 2c, Water Budget). The 2011 groundwater levels ranged from near historical high to near historical mean elevations in Buellton Upland Aquifer representative monitoring wells (RMWs) (Section 2b, GC). Measurable objectives are achieved when the 2011 groundwater elevation is reached in half of the RMWs.

Current water levels in many of the existing RMWs are near the respective 2011 groundwater elevation (6N/31W – 7F1). At some RMW locations, the current groundwater level is approximately 30 feet below the 2011 groundwater elevation (7N/32W-31M1). Current water levels in three of the RMWs are within 10 feet of the measurable objective. Undesirable results are not occurring related to declining groundwater levels (Section 3.2) and trigger points have been established to prevent the occurrence of undesirable results. The sustainability goal for the CMA is currently being achieved with allowance for operational flexibility.

Interim milestones are not established for groundwater elevations because the sustainability goal is currently being met within the CMA (Section 3b.1) and the CMA is not experiencing undesirable results associated with any of the six sustainability indicators identified as part of SGMA.

With its implementation, the groundwater monitoring program for the Buellton Aquifer will provide adequate data to assess the measurable objective for chronic lowering of groundwater levels. Existing monitoring wells will be used to evaluate sustainable management criteria until additional wells are added through the proposed expansion of the monitoring (Chapter 4 and 5).

3b.4-2 Reduction of Groundwater in Storage – Measurable Objectives

Groundwater elevation is used as a proxy for groundwater in storage. Undesirable results of groundwater in storage have not occurred within the Buellton Upland even during historical drought periods (Section 3b.2-2). The measurable objective for groundwater in storage is the same as that for decline in groundwater levels, the 2011 groundwater level occurring in half of the RMWs (Table 3b.4-1). Interim milestones for the reduction of groundwater in storage have not been established because the sustainability goal for the CMA is currently being met (Section 3b.4-1).

3b.4-3 Seawater Intrusion – Measurable Objectives

There is no measurable objective established related to seawater intrusion for the CMA because it is a sustainability indicator that is not applicable to the CMA.

3b.4-4 Degraded Water Quality – Measurable Objectives

Undesirable results for degradation of groundwater quality are not currently occurring within the Buellton Aquifer and current water quality is well below applicable standards (Section 3b.2-5). Except for total dissolved solids and nitrate, the measurable objectives applied to groundwater quality within the Buellton Upland are the Median Groundwater Quality Objectives from the CCWQCP. The measurable objectives are the SMCL and MCL for total dissolved solids and nitrate, respectively. Measurable objectives are not specifically set for water quality but are understood to coincide with the minimum thresholds established. Distinct water quality minimum thresholds will be re-evaluated with annual and periodic updates of this GSP and may be established if, over the period of implementation, constituents of concern exhibit an increasing trend approaching the measurable objectives.

3b.4-5 Land Subsidence– Measurable Objectives

Undesirable results related to land subsidence have not occurred historically and are not likely to occur within the CMA. Land subsidence monitoring will rely on publicly available InSAR and continuous GPS data (Section 3b.2-5). The measurable objective is land subsidence of less than two inches as compared to 2015 InSAR data resulting from groundwater extraction.

3b.4-6 Depletions of Interconnected Surface Water and Groundwater – Measurable Objectives

Additional groundwater level data is needed proximal to the identified potential GDE (Section 3b.2-6-1) and is identified as a data gap for the CMA. As a mitigation, a potential project for the CMA is the installation of a piezometer in the vicinity of the GDE. The measurable objective would be set after determining existing conditions through filling of the data gap, if appropriate. For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, the measurable objective would be groundwater levels in the Santa Ynez River Alluvium subflow that drop below 5 feet below the channel thalweg elevation (Appendix 3b-D). Groundwater elevations 5 feet below the channel thalweg would ensure that the soil would be wet and be able to provide water for the GDEs along the riparian corridor.

3B.5 EFFECTS OF SUSTAINABLE MANAGEMENT CRITERIA ON NEIGHBORING BASINS

There are no neighboring groundwater basins that border the CMA. The CMA of the Santa Ynez River Valley Groundwater Basin is bounded to the north by the Purisima Hills and Purisima Anticline, which acts as a barrier between the principal aquifers in the CMA and the San Antonio Creek Valley Groundwater Basin to the north (Section 1d, Plan Area, and Section 2a, HCM). Along the southern boundary of the CMA, the Santa Ynez River Valley Groundwater Basin is bordered by the Santa Ynez Mountains (Section 1d, Plan Area, and Section 2a, HCM).

The CMA has limited connectivity to the EMA to the east and the WMA to the west. Because the three management areas are sub-areas of the larger Basin, the GSPs for each management area have been coordinated for consistency. Where CMA connectivity is through the Santa Ynez River, the shallow groundwater stored within the alluvium is treated as surface water. In these cases, sustainability indicators are subject to applicable state laws and regulations not within the jurisdiction of the CMA GSA (Section 3b.1-1).

An additional area of connectivity between the CMA and EMA is north of the City of Solvang (Section 2a, HCM). In these areas, groundwater subflow from the Careaga Sand formation may discharge to the CMA from the EMA (Section 2a, HCM). Average historical subflow to the CMA from the adjacent management areas is approximately 90 AFY, less than three percent of the average total groundwater inflow of 3,550 AFY (Section 2c, Water Budget). In addition, the EMA is hydrogeologically up-gradient of the CMA. Therefore, the CMA will not impact the EMA.

The CMA is hydrogeologically up-gradient from the WMA and the average historical outflow from the CMA is approximately 690 AFY, which is two percent of the average total groundwater recharge of 31,030 AFY to the WMA (WMA GSP). In addition, the water level minimum threshold within the Santa Rita Upland is five feet lower than the CMA, thereby maintaining a groundwater gradient toward the WMA.

Groundwater elevations have historically occurred several hundred feet lower in the Santa Rita Upland subarea of the WMA compared to the Buellton Upland subarea of the CMA. This difference in groundwater levels indicates a potential hydrogeologic barrier to groundwater movement between the

Santa Rita Upland and Buellton Upland. The extent and nature of this barrier is a data gap, which is currently being assessed with the Airborne Electromagnetic (AEM) geophysical survey performed in November 2020. Currently no subflow is assumed across the upland area boundary (Section 2c, Water Budget).

Groundwater within the CMA is of generally better quality than groundwater in the WMA (Chapter 2) and increased flows will not negatively impact groundwater quality in the WMA. There is minimal groundwater exchange between the EMA and CMA and the EMA is upgradient from the CMA. Therefore, groundwater quality within the CMA will not negatively impact that of the EMA.

CHAPTER 4: PROJECTS AND MANAGEMENT ACTIONS

4A.1 INTRODUCTION

As established in Chapters 2 and 3, based on historical and current data, undesirable results associated with chronic lowering of groundwater levels have not been observed, and are not currently occurring, within the CMA. Groundwater pumping estimates for current conditions (2011 through 2018) indicate that annual groundwater production within the CMA is within 10% of the estimated perennial yield of the CMA Basin

As established in Chapters 2 and 3, based on historical and current data, undesirable results associated with chronic lowering of groundwater levels have not been observed, and are not currently occurring, within the CMA. Groundwater pumping estimates for current conditions (2011 through 2018) indicate that annual groundwater production within the CMA is within 10% of the estimated perennial yield of the CMA (2,800 AFY). However, future water demands are projected to increase due to climate change and increases in agriculture and population (Section 2c- Water Budget). While not currently producing undesirable results, groundwater level declines in the Buellton Upland should be managed with Projects and Management Actions (PMAs) as soon as practical to maintain sustainability into the future. Overall, based on the Water Budget presented in Section 2c, PMAs are planned for the CMA to address drought-related declining groundwater level trends and to achieve a net gain of approximately 200 AFY in the Water Budget. Otherwise, groundwater storage could continue to decline by 200 AF each year, and water levels in some Representative Monitoring Sites may fall beneath their Minimum Thresholds. Similarly, additional PMAs are identified to adaptively address possible changes in water demand, climate changes, and achieve a net gain of up to 600 AFY in the Water Budget by the year 2072.

PMAs are employed to avoid or mitigate undesirable results. As stated in SGMA Regulations, the GSP must include "*a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing* *conditions in the basin*."[124] Implementation of the management actions and projects presented below are intended to respond to possible changes in basin conditions, and maintain operation of the CMA within its sustainable yield.

PMAs described in this chapter are designed to support sustainability goals, measurable objectives, and address potential future undesirable results identified for the Basin (Chapter 3). In general, there are two different categories of PMAs: PMAs that address water demand and PMAs that address water supply. Chapter 4 presents four groups of water demand and water supply PMAs, and implementation of each group is determined by current and projected future conditions. As explained below, the need and timing of a particular project within each group is determined by early warning triggers.

1. **General Management PMAs (Group 1 PMAs)**. Group 1 PMAs are planned under current and future Basin conditions. The primary objective of Group 1 PMAs is management of groundwater extractions and recharge to ensure that excessive lowering of groundwater levels during periods of drought is sufficiently offset by increases in groundwater levels and storage during the other periods. An additional Group 1 PMAs objective is to protect current water quality, groundwater dependent ecosystems, avoid impacts from land subsidence and depletion of surface water due to groundwater pumping. Implementation activities related to monitoring and initially identified data gaps are described in detail in the next Chapter, Plan Implementation (Chapter 5).

2. **Early Warning PMAs (Group 2 PMAs)**. The early warning trigger was established by the CMA GSA to act as an advisory indicator that conditions in the Basin are approaching Minimum Thresholds. Group 2 PMAs are implemented when the early warning trigger is reached, and at the latest if a Minimum Threshold has been reached (see Chapter 3b). Implementation of Group 2 PMAs also initiates planning for potential Group 3 PMAs to ensure timely project start-up should they be needed.

124 23 CCR §354.44 (a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.

3. **Minimum Threshold PMAs (Group 3 PMAs)**. Group 3 PMAs are implemented if conditions in the basin do not meet the Minimum Threshold for one or more of the six Sustainability Indicators (see Chapter 3b).

4. **Other PMAs (Group 4 PMAs).** Group 4 PMAs have been identified for use if the Groups 1, 2, and 3 PMAs are insufficient to maintain the sustainability goal for the Basin. In the future, additional PMAs may be identified and added to this list of PMAs as part of future GSP evaluations and updates. Additionally, the GSA may elect to implement one or more the projects in Group 4 PMAs at any time to achieve the sustainability goal for the Basin.

Table 4a.1-1 provides a list of the PMAs organized by the four groups and their supply/demand categories. Section 4a.4-2 discusses the General Management PMAs (Group 1 PMAs) planned for implementation under current conditions: Water Conservation Management Action, Tiered Fees and Well Meter Management Action, the Supplemental Imported Project, Increased Stormwater Recharge Project. Section 4a.4.3 discusses PMAs that would be implemented if the Early Warning Triggers or Minimum Thresholds are reached (Group 2 and 3 PMAs), including: Cachuma Reservoir Water Rights Releases Management Action, Supplemental Conditions on New Wells Management Action, the Annual Pumping Allocation Plan, and Voluntary Fallowing Management Action. Section 4a.4.4 discusses the other PMAs identified to date (Group 4 PMAs), including a Recycled Water Project, a Non-native Vegetation Removal Project, and Agricultural Land Retirement.

Table 4a.1-1
Summary of Project and Management Actions in the CMA to Achieve Current and Future Groundwater Sustainability

	Demand	**Supply**
Group 1	Water Conservation Tiered Fees and Well Meters	Supplemental Imported Water Program Increased Stormwater Recharge
Group 2	Supplemental Conditions on New Wells	Water Rights Releases Request
Group 3	Annual Pumping Allocation Plan	
Group 4	Non-native Vegetation Removal Agricultural Land Retirement/ Pumping Allowance Zaca Creek/ Santa Rosa Creek Recharge Pond Project	Recycled Water Project Drought Mitigation - by Pumping Optimization and Deepen Existing Wells

With the implementation of the Group 1 PMAs, it is anticipated that CMA groundwater production will be maintained at sustainable levels primarily through demand management. Combined, the Water Conservation and Tiered Fees and the Well Meters Management Actions are anticipated to meet the needs of the current and future CMA Water Budget which are estimated to be an additional 200 to 600 AFY. These programs will reduce the annual pumping demands on the CMA Principal Aquifer (Buellton Aquifer).

The SGMA Regulations[125] state the GSP shall include a description of the projects and management actions that include the following:

1. **A list of projects and management actions** proposed in the GSP with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The GSP shall include the following:
    a. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which an agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.
    b. The process by which an agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
2. If overdraft conditions are identified through the analysis required by Section 354.18, the GSP shall describe projects or management actions is being considered or has been implemented, including a description of the actions to be taken.
3. A summary of the **permitting and regulatory process** required for each project and management action.

125 23 CCR §354.44. Projects and Management Actions

4. The status of each project and management action, including a **time table** for expected initiation and completion, and the accrual of expected benefits.
5. An **explanation of the benefits** that are expected to be realized from the project or management action, and how those benefits will be evaluated.
6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of an agency, an explanation of the source and reliability of that water shall be included.
7. A description of the **legal authority** required for each project and management action, and the basis for that authority within an agency.
8. A description of the **estimated cost** for each project and management action and a description of how the Agency plans to meet those costs.
9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or deletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The proposed PMAs are supported by the best available information and best available science and have considered the level of uncertainty associated with the CMA setting during development. A summary of proposed PMAs and other potential PMAs that are planned for the CMA are discussed in the subsections below. The GSP is a planning document, and consequently, the level of detail provided for the proposed Projects and Management Actions reflect the necessary level of specificity. After the PMAs are fully developed, specific design and/or implementation plans will be prepared, as applicable and necessary. These plans will be made available to the public prior to any Board action for implementation. If one, or more, of the planned PMAs cannot be implemented, the CMA GSA will consider additional actions to reach sustainability. Table 4a.1-2 provides a summary sustainability benefits, timetable, permits required, estimated benefit and cost ratio for all PMAs.

Table 4a.1-2
Summary of Project and Management Actions in the CMA- Sustainability Benefits and Implementation Process

Timetable	Project and Management Action Title	Relevant Sustainability Indicators Affected: Groundwater Levels	Reduction in Storage	Water Quality	Land Subsidence	Interconnected Surface Water	Required Permits	Estimated Additional Water (AFY)	Estimated Benefit : Cost Ratio
Group 1- Initiated in first three years (see Table 4a.2-1)	**Water Conservation**	x	x	x	x	x	None	150-450	High
	Tiered Fees and Well Meters	x	x	x	x	x	Proposition 26 / 218 or Local Ballot Initiative	150-450	High
	Supplemental Imported Water Program	x	x	x	x	x	Santa Barbara County, DWR, CEQA	500-1,000	Low to Medium
	Increased Stormwater Recharge	x	x	x	x	x	Santa Barbara County, USACE, DWR, CDFW, CEQA	20-200	Low to Medium
Group 2 - Initiated if Early Warning Triggers	**Water Rights Releases Request**	x	x	x	x	x	None	0; minimal	High
	Supplemental Conditions on New Wells	x	x	x	x	x	None	20-200	High
Group 3 - Initiated if Minimum Thresholds Reached	**Annual Pumping Allocation Plan**	x	x	x	x	x	Proposition 26 / 218 or Local Ballot Initiative	300-900	Medium to High
Group 4 - Pending further	**Non-native Vegetation Removal**	x	x		x		Santa Barbara County, USACE, DWR, CDFW, CEQA	20-200	Low to Medium

Timetable	Project and Management Action Title	Relevant Sustainability Indicators Affected: Groundwater Levels	Reduction in Storage	Water Quality	Land Subsidence	Interconnected Surface Water	Required Permits	Estimated Additional Water (AFY)	Estimated Benefit : Cost Ratio
decision by GSA to initiate	**Agricultural Land Retirement/ Pumping Allowance**	x	x	x	x	x	CEQA	300-900	Low to Medium
	Santa Rosa/ Zaca Creek Recharge Pond Project	x	x	x	x	x	Santa Barbara County, USACE, DWR, CDFW, CEQA	50-300	Low to Medium
	Recycled Water Project	x	x	x	x	x	Santa Barbara County, RWQCB, DWR, CEQA	300 - 500	Low to Medium
	Drought Mitigation - Pumping Optimization and Deepen Existing Wells			x			Santa Barbara County, DWR, CEQA	0	Low to Medium

USACE = United States Army Corps of Engineers, DWR = Department of Water Resources, CDFW = California Department of Fish and Wildlife, CEQA = California Environmental Quality Act, RWQCB = Regional Water Quality Control Board

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4A.2 PLANNED PROJECTS AND MANAGEMENT ACTIONS – GENERAL MANAGEMENT (GROUP 1)

Project and Management Actions (PMAs) in Group 1 will be implemented under current conditions. This section does not cover monitoring, addressing data gaps, or the annual reporting, which are addressed in further detail in Chapter 5 Implementation.

The ongoing implementation of Group 1 PMAs, including groundwater pumping demand reductions through the Water Conservation and the Tiered Fee and Well Meter Programs, will maintain the sustainability of the Basin by balancing the possible future Water Budget deficits of up to 600 AFY resulting from demand increases and climate change. Additionally, Group 1 PMAs can also begin to increase groundwater recharge with in-lieu supplemental imported water and stormwater capture and infiltration projects. Table 4a.2-1 provides a summary of a proposed timeline for the completion of major milestones related to this group of projects.

Table 4a.2-1
5-Year Timeline of Sustainability Project and Management Actions – General Management (Group 1)

Water Year	2022			2023				2024				2025				2026				‘27
Fiscal Year	**2021-22**		**2022-23**				**2023-24**				**2024-25**				**2025-26**				**2026-27**	
Calendar Year	**2022**				**2023**				**2024**				**2025**				**2026**			
Quarter	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Water Conservation Plan																				
Strategic Plan																				
Implementation																				
Tired Extraction Plan																				
Water Rates Study																				
Implementation																				
Supplemental Imported Water																				
Develop Long Term Fund																				
Ongoing Implementation																				
Buellton Upland Bioswale																				
Study and Design																				
Permitting and Construction																				
Ongoing Implementation																				

4a.2-1 Project and Management Action No. 1: Basin-Wide Conservation Efforts

4a.2-1-1 Project Description

The municipalities and agricultural landowners in the CMA have previously adopted conservation measures within their respective service areas. For example, Senate Bill 7 of Special Extended Session 7 (SBX7- 7) of 2009 requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita water consumption within the state by 20% by the year 2020. Similarly, agricultural water users in the CMA have participated in existing conservation management programs as provided by the Cachuma Resource Conservation District (CRCD). For example, the CRCD's Mobile Irrigation Lab helps farmers and managers of schools and parks save water, energy, and money through onsite irrigation system analysis and technical assistance to improve water use efficiency.[126]

The CMA GSA will coordinate with the existing agencies and programs, and develop additional voluntary, rebate-based, or mandatory conservation efforts for domestic, municipal, and agricultural beneficial uses within the CMA. A Water Conservation Strategic Plan, or similar document, will be developed that considers CMA GSA stakeholder concerns, integrates with existing conservation programs, and meets the health and safety water requirements for communities that rely on groundwater within the CMA. As part of water conservation strategic plan development, the CMA GSA will confer with domestic and municipal groundwater producers (namely the City of Buellton and the small mutual water companies) to discuss historical and current conservation measures governing landscape irrigation, wash-downs, and other potential savings as a guide to establish new voluntary conservation measures on a basin-wide level. The CMA GSA will utilize the Strategic Plan to promote and coordinate priority conservation projects for implementation. The Water Conservation Strategic Plan will supplement and augment existing conservation programs. For municipal and domestic uses throughout the CMA, a goal in the Strategic Plan may be developed to achieve per-capita water consumption levels similar to the City of Lompoc, as shown in Table 4a.2-2.

126 Irrigation Evaluations. Cachuma Resource Conservation District. Web site. https://www.rcdsantabarbara.org/irrigation-evaluations Accessed 2021-08-10.

Table 4a.2-2
Current Year 2020 Water Use

	Per Capita Water Use (Gallons per Capita per Day)	
	Based on Total M & I	Based on Residential Water
City of Buellton	164	95
Mission Hills CSD	124	118
City of Lompoc	81	60
City of Solvang	189	134

Source: Santa Barbara County Water Agency. Website. http://waterwisesb.org Accessed 2021-08-18.
*** Per Capita Use is shown as (a) total Municipal & Industrial (M&I) water divided by population and
(b) Single & Multi-Family Residential use divided by population.
Lot size and landscape water usage are major factors affecting Gallons/Person/Day

The programs listed below may assist or expand urban water conservation in the CMA GSA:

1. High Water Use Outreach (High Use Reports)
2. Meter Audits to Proactively Detect Leaks (Leak Reports) and Leak Repair Programs
3. Rebates on Water-Saving Fixtures (e.g., clothes washers)
4. Rebates on Sustainable Landscape Conversion Programs
5. Water Awareness Outreach Events (Library/Outdoor Market events)

The CMA GSA can coordinate with Santa Barbara County to investigate the potential for, and feasibility of, water conservation in the industrial water uses in the CMA. For example, in conjunction with County staff, the CMA GSA can explore whether industrial water demands can be met by alternative non-potable supplies (e.g., recycled water and/or brackish water).

The CMA GSA can also coordinate with agricultural groundwater users to investigate the potential for, and feasibility of, additional water conservation in irrigation practices. The CMA GSA can coordinate with the existing agricultural conservation programs of the CRCD and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Conservation Technical Assistance (CTA) Program. In particular funding sources may be identified to support the free services of CRCD's Mobile Irrigation Lab that performs irrigation audits and promotes enhanced efficient irrigation. Best management practices for conservation can be implemented basin wide (e.g., conversion to non-water intensive methods for frost protection and increased use of soil amendments to reduce water use and improve crop yields). The CMA GSA can seek to partner with other programs to support new weather and crop water use monitoring stations, and employ remote sensing data acquisition and analysis to optimize irrigation scheduling and deliveries.

4a.2-1-2 Project Benefits

Increased water conservation has a direct benefit by reducing groundwater production. The decrease in demand from baseline conditions is estimated to be approximately 10% to 30% of current groundwater production, when considered together with well production metering (see Section 5a) and the new groundwater extraction fees (see Project and Management Action No. 2 – Tiered Fees). Based on 2018 total groundwater pumping for the Buellton Aquifer (3,000 AFY), the potential yield from water conservation is expected to be 300 to 900 AFY. This would meet the goal of achieving an additional 200 to 600 AFY needed to bring the water budget for the CMA into balance currently and in the future (Water Budget, Section 2c).

Management action benefits due to the reduction of groundwater pumping are anticipated to include the following:

- Increase in groundwater storage as compared to current trends and baseline conditions;
- Improved and rising groundwater levels;
- Improvements to water quality are due to reduction of irrigation return flows;
- Prevent depletions of surface water; and
- Prevention of land subsidence conditions.

The measures for assessing this management action's benefits, relative to the measurable objectives and minimum thresholds established in Section 3b, will be monitored groundwater levels, groundwater quality, and changes in groundwater storage in the CMA. Additionally, water savings can be documented for the water conservation efforts implemented.

4a.2-1-3 Justification

Due to the current lack of supplemental water supplies, conservation efforts are a necessary tool to achieve the CMA's sustainability goal. Furthermore, contrary to water conservation programs, there is a high cost to acquire and convey supplemental water supplies. When implemented, basin-wide conservation measures will reduce groundwater production and therefore reduce the necessity of supplemental water.

4a.2-1-4 Project Costs

CMA conservation efforts if implemented, are expected to cost $50,000 to $75,000 to plan and approximately $30,000 to $40,000 annually to implement. Tasks needed to develop a conservation plan include: evaluating current conservation measures, methods to augment existing conservation programs, determining opportunities for additional conservation, conducting public outreach, meeting with groundwater producers, and drafting and adopting conservation related ordinances.

The costs for implementing a conservation program may increase if rebate programs are also implemented. These costs include advertising, marketing, customer service, processing rebate applications, purchasing water-conserving fixtures and appliances, vendor coordination, and issuing rebates. Optional water audits for existing irrigation would include additional costs for expanding CRCD's Mobile Irrigation Lab, which performs irrigation audits and promotes enhanced efficient irrigation.

Costs may be funded through fees, grants, and pumping assessments, or combinations thereof.

4a.2-1-5 Permitting and Regulatory Process

This management action currently does not require the CMA GSA to obtain approved permits.

4a.2-1-6 Public Notice

Public Notices will be issued prior to the CMA GSA's adoption of any new conservation programs Additionally, materials will be available to the public describing opportunities for voluntary conservation and available rebate programs sponsored by the CMA GSA.

4a.2-1-7 Implementation Process and Timetable

Prior to implementing basin-wide conservation measures, the CMA GSA will determine acceptable conservation measures based on an analysis of historical and current conservation measures enforced by the CMA member agencies. Commencing in 2022, the CMA GSA will coordinate with existing water conservation program activities managed by the City of Buellton, small mutual water companies, and the Cachuma Resource Conservation District (CRCD) to assess the potential to expand or modify existing conservation programs to achieve the Basin's sustainability goal.

The CMA GSA will develop a Water Conservation Strategic Plan which will be implemented over the GSP planning and implementation horizon.

4a.2-1-8 Legal Authority

As the sole GSA for the CMA, the CMA GSA has the legal authority to manage groundwater within the CMA pursuant to SGMA. As such, SGMA grants the CMA GSA broad powers, including the legal authority to: conduct investigations; adopt rules, regulations, ordinances and resolutions; require registration of groundwater extraction facilities and measurement of groundwater extractions by a water-measuring device satisfactory to the GSA; enter into written agreements and funding with private parties to assist in, or facilitate the implementation of, a GSP or any elements of the GSP; provide for the measurement of groundwater extractions; regulate groundwater extractions; impose fees on the extraction of groundwater and to fund the costs of groundwater management; and perform any act necessary or proper to carry out the purposes of SGMA.[127]

In accordance with SGMA "Nothing in this part, or in any groundwater management plan adopted pursuant to this, part determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights."[128] Accordingly, this GSP does not determine or alter such surface water or groundwater rights.

127 CWC Section 10725, 10725.2, 10725.4, 10725.6, 10725.8, 10726.2, 10726.4, 10726.5, 10730, 10730.2
128 CWC Section 10720.5 (b)

More specifically, SGMA grants the CMA GSA authority to "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells."[129] SGMA statute authorizes[130] the CMA GSA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. Accordingly, SGMA grants the CMA GSA the legal authority to implement basin-wide conservation measures as a GSP management action. The legal authority granted to the CMA GSA under SGMA statutes does not preclude other governing agencies from participating in or contributing to the implementation of basin-wide conservation measures. As such, the CMA GSA will coordinate and cooperate with the appropriate stakeholders and governing agencies in implementing basin-wide conservation measures.

4a.2-2 Project and Management Action No. 2: Implement Tiered Groundwater Extraction Fees with Mandatory Well Metering and Update Well Registration

4a.2-2-1 Management Action Description

A charges framework is the fundamental structure for managing groundwater pumping and funding. A pump charge is just one of many things the GSA will consider in the future (e.g., parcel charge/ fee or both). By charging fees for various levels of pumping, the CMA GSA can both promote voluntary pumping reductions and provide a source of funding for GSA operations, monitoring, additional projects and management actions.

The charges framework can be developed in the first year of GSP implementation. Program details will be developed by the GSA with input from Basin Stakeholders, and multiple funding pathways can be utilized as permitted by SGMA regulations (e.g., parcel tax or pumping fees). Exempt groundwater users could include de-minimis pumpers or other classes of pumpers that are not managed by this GSP, who can be required to provide an alternate method to account for pumping.

If a pumping fee is established in the CMA, its rates and structure may be modified in the future and/or may be adjusted depending on groundwater conditions and program effectiveness.

129 CWC Section 10726.4 Additional Authorities of Groundwater Sustainability Agency
130 CWC Section 10725 Powers and Authorities

Alternatively, a tiered fee structure would promote conservation and voluntary pumping reductions, and would work in tandem with the water conservation measures. Groundwater users would have incentives to switch to less water-intensive activities, or implement water use efficiencies. Alternatively, a groundwater user may instead opt to pay higher tier groundwater extraction rates in order to produce more groundwater.

Implementation Actions Related to Tiered Groundwater Extraction Fees

Objectives for tiered extraction fees are to utilize well metering and up-to-date well registrations to accurately track and manage groundwater production (see Section 5a.3). Plans for a well metering program and update to well registrations will begin development during the first year of GSP implementation. Well metering will support the Tiered Fee management action to promote voluntary water conservation and track performance of the Water Conservation actions. SGMA does allow de-minimis well users to be exempt from metering, but the CMA GSA may elect to require de-minimis users to report their water usage using other methods. The CMA GSA can develop additional guidelines for possible alternatives to well meters, including correlating energy usage with the volume of water pumped.

4a.2-2-2 Project Benefits

The effect of tiered fees will reduce groundwater production and reduce the likelihood of triggering minimum thresholds. In conjunction with metering and water conservation, demand is expected to be reduced by 10% to 30% from the current groundwater production[131]. Based on 2018 total groundwater pumping for the Buellton Aquifer (3,000 AFY), the potential yield from water conservation is expected to be 300 to 900 AFY. This would meet the goal of achieving an additional 200 to 600 AFY needed to bring the water budget for the CMA into balance currently and in the future (Water Budget, Section 2c). Management action benefits are anticipated to be the same as water conservation (Section 4a.2-1) including improved and rising groundwater levels due to reduction in groundwater pumping.

131 Research at the Irrigation Technology Center at Texas A&M University has demonstrated that water measurement by itself can reduce crop irrigation water use by 10 percent. When measurement was combined with education about proper on-farm irrigation management, water use was reduced by 20 to 40 percent (TWRI, 2001).

The corresponding cumulative gain of groundwater in storage, compared to no action conditions over the 50-year planning horizon, is estimated to be approximately 15,000 to 45,000 acre-feet. Additionally, the proposed management action will decrease the probability of requiring Group 3 or Group 4 PMAs. The combination of metering, conservation and tiered fees can potentially achieve the sustainability goal by reducing groundwater production in the CMA and reducing the potential for undesirable results.

The measures for assessing this management action's benefits, relative to the measurable objectives and minimum thresholds established in Section 3b, will be monitored groundwater levels and groundwater quality within the CMA. Additionally, groundwater production by groundwater users will be reported to the CMA GSA to monitor anticipated reductions in production.

4a.2-2-3 Justification

Due to the current unavailability of supplemental water supplies, providing incentives for voluntary reduction of groundwater pumping with tiered groundwater extraction fees, in tandem with metering, and expanding current conservation efforts can potentially maintain groundwater sustainability in the Basin. Furthermore, compared to the relatively low costs of water conservation, meters and tiered extraction fees, the high cost to acquire and convey supplemental water supplies would significantly impact all water users in the CMA.

4a.2-2-4 Costs

The CMA GSA will incur costs to develop the initial tiered groundwater extraction fee management action. The costs would include hiring a water rate and utility fee specialist to evaluate options and policies for the CMA GSA. Costs will include stakeholder outreach and conducting public workshops on what type and details of a groundwater extraction fee program the CMA should have. The administration overhead for these management actions combined (tiered fees, well meters, and well registration) is estimated at $100,000 to $175,000 in the first year of GSP implementation. After the initial set-up in the first year, administrative costs to run all program components are estimated to be $40,000 to $50,000 annually. The costs to set up groundwater extraction fees will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof.

4a.2-2-5 Permitting and Regulatory Process

Development and implementation of the tiered groundwater extraction fees would be developed in accordance with all applicable laws. The CMA GSA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

4a.2-2-6 Public Notice

Development of the groundwater extraction fees will include stakeholder outreach, public workshops, and public hearings to receive input from the Basin groundwater users. The public and interested parties will be given the opportunity to provide input to the CMA GSA. The CMA GSA will provide sufficient public notice of a public hearing to adopt the groundwater extraction fees and required well meter policies, as required by California Law.

4a.2-2-7 Implementation Process and Timetable

Prior to implementing tiered groundwater extraction fees, the CMA GSA will determine an acceptable fee structure based in part on an analysis of historical and current water production volumes. Commencing in 2022, the CMA GSA will compile pertinent information to use in the development of a tiered groundwater extraction fees structure. The CMA GSA will also develop a Water Rates Study with different alternatives. It is anticipated that the Water Rates Study could be completed by April 2023. After completion of the rate study, public hearings will be held such that the GSA can consider implementing the new groundwater extraction fee management action by October 2023 for water year 2024.

4a.2-2-8 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the authority to “perform any act necessary or proper” to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[132] Specifically, SGMA statue authorizes the CMA GSA to “propose and update fees” and to “monitoring compliance and enforcement” of the GSP.[133] Moreover, SGMA statue authorizes

[132] CWC Section 10725.2 Authority of Groundwater Sustainability Agency
[133] CWC Section 10725.4 Investigations

the imposition of fees on the extraction of groundwater to fund costs of groundwater management.[134] Accordingly, SGMA grants the CMA GSA the legal authority to implement the GSP management action set forth above.

4a.2-3 Project No. 3: Supplemental Imported Water Program

4a.2-3-1 Project Description

The City of Buellton currently imports State Water Project from the CCWA, ranging from 165 AF in 2018 to 345 AF in 2020. Because the CCWA pipeline delivery infrastructure is already set up for deliveries to the City of Buellton, the capital costs of delivering additional imported water from CCWA to the CMA local municipal distribution system should be evaluated. The purchase of supplemental water supplies would prolong the yield of t groundwater resources in lieu of the City's pumping of 300 AFY from the Buellton Aquifer.

The lack of availability of SWP and other external water supplies may be addressed through water banking. The CMA GSA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the CMA. Participation in a groundwater banking program would improve the reliability of the CMA GSA's purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries. Participation in a groundwater banking program may also allow the CMA GSA to purchase additional water supplies during wet periods.

4a.2-3-2 Project Benefits

The purchase of supplemental State Water Project water, would decrease the local groundwater pumping demand from the Buellton Aquifer. The reduced groundwater pumping would benefit the local groundwater levels and storage. Even a small purchase of 50 AFY on average would help meet the goal of achieving an additional 200 to 600 AFY needed to bring the water budget for the CMA into balance currently and in the future (Water Budget, Section 2c).

134 CWC Section 10730 and 10730.2

4a.2-3-3 Justification

The CMA GSA needs to utilize various strategies to maintain the sustainability of the Basin groundwater. Because the CCWA pipeline and delivery system is already in place for the CMA, developing a funding program to purchase supplemental imported water is a logical choice. Given the uncertainties associated with climate change and impacts to the natural recharge of the local groundwater, current domestic and municipal users may not be able to meet demands without an augmented water supply. Accordingly, the CMA GSA will work with potential water supply sellers and transfer partners to secure additional opportunities to purchase and convey imported water supplies to the CMA.

4a.2-3-4 Project Costs

The CMA GSA will dedicate an initial $100,000 to $120,000 to develop a fund dedicated to the purchase of supplemental imported water and potential banking opportunities. Costs for this project may be funded through fees, grants, State and Federal appropriations, pumping assessments, or combinations thereof.

4a.2-3-5 Permitting and Regulatory Process

Because the City of Buellton is already a Member Agency of the CCWA, the CMA GSA should partner with the City of Buellton for this management action to streamline any permitting processes. The CMA GSA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

4a.2-3-6 Public Notice

The public and relevant entities will be given the opportunity and time to participate in and provide feedback on the procurement of imported water supplies through the project's environmental review processes.

4a.2-3-7 Implementation Process and Timetable

The CMA GSA will work with potential water supply sellers and transfer partners to secure additional opportunities to purchase and convey imported water supplies to the CMA in the first year of GSP implementation (2022).

4a.2-3-8 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the legal authority to "perform any act necessary or proper" to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[135] Specifically, SGMA statue grants the CMA GSA authority to "appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface or groundwater into the agency, and conserve and store within or outside the agency that water for any purpose necessary or proper to carry out the provisions of this part, including, but not limited to, the spreading, storing, retaining, or percolating into the soil of the waters for subsequent use or in a manner consistent with the provisions of Section 10727.2."[136] Accordingly, SGMA grants the CMA GSA the legal authority to implement the development of imported water supplies as a GSP management action. The legal authority granted to the CMA GSA under SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of the imported water project(s). As such, the CMA GSA will coordinate and cooperate with the appropriate stakeholders and governing agencies in implementing the imported water project(s).

4a.2-3-9 Source and Reliability

The running long-term average of Table A deliveries for CCWA contractors is approximately 58% of the total Table A entitlement (DWR 2020). During droughts, the State Water Project (SWP) allocation can be at or near zero. However, the Santa Barbara County Integrated Regional Water Management Plan identified about 10,000 – 19,000 AFY of unused SWP water that could be used as a supplemental water supply (Dudek 2019).

The hydrologic variability of SWP and other external water supplies may be addressed through water banking. The CMA GSA may store wet-year deliveries of its purchased water supplies in a groundwater banking program and arrange for the stored deliveries to be withdrawn or exchanged for use in the CMA. Participation in a groundwater banking program would improve the reliability of the CMA GSA's

135 CWC Section 10725.2 Authority Of Groundwater Sustainability Agency; Notice

136 CWC Section 10726.2 Additional Authorities Of Groundwater Sustainability Agency Relating To Acquisitions; Augmentation Of Local Water Supplies; Transfers And Exchanges Of Water; And Treatment

purchased water supplies during dry years, periods of high demand, and disruptions in water deliveries. Participation in a groundwater banking program may also allow the CMA GSA to purchase additional water supplies during wet periods.

The CMA GSA's adaptive management approach to CMA management includes a periodic evaluation of the current feasibility of procuring imported water supplies. At a minimum, this periodic evaluation will be conducted at the scheduled 5-year report periods. The other Group 1 PMAs, not including the supplemental imported water program, are anticipated by themselves to maintain sustainability and if needed Group 2 and 3 PMAs will be enacted. Should it be determined with certainty that imported water supplies will be unavailable (or unavailable at a reasonable cost), the CMA GSA can consider modifications to the GSP to revise the Group 1 PMAs to the make implementation of the GSP more economical.

4a.2-4 Project Management Action No. 4: Increase Stormwater Recharge

4a.2-4-1 Project Description

The Water Quality, Supply, and Infrastructure Improvement Act (Proposition 1) was approved on November 4, 2014 to provide $200 million from the Stormwater Grant Program (SWGP) for matching grants to public agencies (among other stakeholders) to implement multi-benefit stormwater management projects in California (CMA Plan Area, Section 1d.4-2-4). As part of this program, the County of Santa Barbara Water Agency worked with local agencies to produce the "Santa Barbara County-Wide Integrated Stormwater Resource Plan" (Geosyntec 2018). This plan studied potential stormwater capture and infiltration projects as an option for recharging local groundwater supplies for use in Santa Barbara County GSPs.

As part of the implementation of this GSP, the CMA GSA will partner with the Santa Barbara County Water Agency and the City of Buellton to fund the next steps in implementing three stormwater capture and infiltration projects.

1. City of Buellton Avenue of the Flags Bioretention with Underdrains
2. City of Buellton Agricultural Runoff Detention Basin
3. New Bioretention Bioswale Project in the Buellton Upland

Because the 2018 County Stormwater plan already determined the conceptual project design and benefits of the City of Buellton projects, the next step is to develop the conceptual project design and benefits for a new bioswale project in the Buellton Upland, preferably in the boundary of a small mutual water company and submit the project for inclusion in the County's clean water stormwater program. The CMA GSA can then partner with the County and the City of Buellton to help permit and build these projects more swiftly than acting independently.

4a.2-4-2 Project Benefits

The Avenue of the Flags Bioretention Project was estimated to provide about 20 AFY of recharge on average and provide water quality benefits including reducing the nitrogen loading by 300 lbs/year. A bioswale project in the Buellton Upland would be expected to provide similar benefits. With the increased precipitation intensity predicted under climate change, the benefits of slowing urban runoff and increasing infiltration into the groundwater table would be greater than current conditions.

4a.2-4-3 Justification

Due to the current unavailability of supplemental water supplies, further developing and expanding local supplies is of paramount importance. It is feasible for the community to make immediate increases in groundwater supplies without extreme changes, alterations to the character of the community, loss of livelihoods, and great financial costs, among other negative impacts. Additionally, the high cost to acquire and convey supplemental water supplies will impact the financial status of the CMA's residents and local entities. Accordingly, the CMA GSA will benefit working with the County on the Proposition 1 clean water initiatives that include these stormwater capture and infiltration projects

4a.2-4-4 Project Costs

The CMA GSA will dedicate an initial $25,000 to $35,000 to develop a conceptual project design and benefits study for a new Bioretention Bioswale Project in the Buellton Upland for submittal to the County's master Stormwater Resources plan list. After all the projects have been accepted by the County, the CMA GSA will partner with the County on the next phase of developing a design build document that also addresses the requirements of all permits and environmental regulations.

4a.2-4-5 Permitting and Regulatory Process

The preparation of a conceptual project design and benefits study for a stormwater capture and infiltration project does not require any permits. In the next phase of a design build document, the CMA GSA will work with the County and City of Buellton on meeting all regulatory requirements associated with the stormwater capture and infiltration projects.

4a.2-4-6 Public Notice

The public and other interested parties will be given the opportunity and time to participate in and provide feedback on the stormwater capture and infiltration projects through the project's environmental review processes.

4a.2-4-7 Implementation Process and Timetable

The conceptual project design and benefits study for a new Bioretention Bioswale Project in the Buellton Upland will be completed in the first year of GSP implementation (2022). The project will be sent to the County for inclusion on the County's master Stormwater Resources plan list. After all the projects have been accepted by the County, the CMA GSA will partner with the County and City of Buellton on the next phase of developing a design build document that also addresses the requirements of all permits and environmental regulations. Construction of the infrastructure for the proposed stormwater capture and infiltration projects could begin in the second year of implementation (2023), pending partnership with the County program.

4a.2-4-8 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the legal authority to "perform any act necessary or proper" to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[137] Specifically, SGMA statue grants the CMA GSA authority to conserve and store waters by "spreading, storing, retaining, or percolating into the soil of the waters for subsequent

137 CWC Section 10725.2 Authority Of Groundwater Sustainability Agency; Notice

use" and "transport, reclaim, purify, desalinate, treat, or otherwise manage and control polluted water, wastewater, or other waters for subsequent use in a manner that is necessary or proper to carry out the purposes of this part."[138] Accordingly, SGMA grants the CMA GSA the legal authority to implement stormwater capture and infiltration projects as a GSP management action. The legal authority granted to the CMA GSA under the SGMA statute does not preclude other governing agencies from participating in or contributing to the implementation of stormwater capture and infiltration projects.

4a.2-4-9 Source and Reliability

The CMA GSA's stormwater capture and infiltration projects will rely on the availability of local precipitation.

[138] CWC Section 10726.2 Additional Authorities Of Groundwater Sustainability Agency Relating To Acquisitions; Augmentation Of Local Water Supplies; Transfers And Exchanges Of Water; And Treatment

4A.3 PLANNED PROJECTS AND MANAGEMENT ACTIONS – IF EARLY WARNING AND MINIMUM THRESHOLD EXCEEDED (GROUPS 2 AND 3)

Group 2 and 3 Project and Management Actions (PMAs) can be implemented when the early warning and Minimum Threshold triggers have been reached (see Chapter 3). If 50% of Representative Monitoring Wells reach the early warning trigger for low groundwater levels, the early warning Group 2 PMAs will be implemented. The Group 3 PMAs should also be developed at this stage to ensure timely implementation if and when needed. If 50% of Representative Monitoring Wells (RMWs) reach the Minimum Threshold in two consecutive non-drought years, then the Group 3 Annual Pumping Allocation management action will be implemented. The CMA GSA can also decide to implement the Groups 2 and 3 PMAs before reaching the early warning and Minimum Thresholds, if desired. Earlier implementation can improve groundwater conditions to reach the measurable objectives more quickly and ensure that the Minimum Thresholds for the Basin are not reached. Additional PMAs (Group 4 PMAs) can also be included into Groups 2 and 3 PMAs as needed for potential drought management in the future.

It is not expected that the Group 2 PMAs will be necessary to implement. The ongoing implementation of PMA's in Group 1, including groundwater pumping demand reductions up to 3,000 AFY through the Water Conservation and the Tiered Fee and Well Meter Programs, will maintain the current groundwater conditions and maintain the sustainability of the Basin by balancing the projected future Water Budget deficits (up to 3,000 AFY). If the projects and management actions required for maintaining sustainability in Group 1 PMAs either fails to be implemented or does not achieve expected results, the Annual Pumping Allocation (PMA No. 7 described below) can be implemented. This management action does not alter existing water rights but will provide a clear structure and strong incentive to reduce groundwater pumping to within the sustainable yield of the basin while funding potential replacement water if the basin users decide to pump more than the sustainable yield.

4a.3-1 Project and Management Action No. 5: Water Rights Release Request

4a.3-1-1 Project Management Description

If the early Minimum Threshold triggers are reached, the CMA GSA can make a request to the SYRWCD, a CMA member agency, for a water rights releases from upstream Cachuma Reservoir as described in Chapter 2.3-4. For the CMA, the only type of water rights releases that would provide groundwater recharge benefit is referred to as an "Above Narrows Account" (ANA) releases. This CMA action can only be a request to the SYRWCD because the SWRCB Order 2019-0148 gives the SYRWCD the authority to request ANA releases subject to and in accordance with the requirements of WR 2019-0148. The ANA releases would be subject to availability of ANA credits in storage in Cachuma Reservoir.

4a.3-1-2 Project Benefits and Justification

Percolation from the Santa Ynez River channel is an important source of recharge to the Santa Ynez River alluvium in the CMA. During ANA releases, water is released from Cachuma Reservoir which recharges the subterranean subflow of the river channel deposits. This water can help maintain groundwater dependent ecosystems in the reach between Solvang and the Buellton Bend. ANA releases have averaged about 4,300 AFY since 1990, and this has become a valuable source of water during periods of drought.

4a.3-1-3 Project Costs

There are no capital costs anticipated with requesting water rights releases.

4a.3-1-4 Permitting and Regulatory Process and Public Notice

This management action currently does not require the CMA GSA to obtain approved permits or provide public notice. The SYRWCD is the party responsible for notifying the public.

4a.3-1-5 Implementation Process and Timetable

This policy by the CMA GSA could be voted and implement in the first year of GSP implementation (2022).

4a.3-1-6 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the authority to "perform any act necessary or proper" to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[139] Accordingly, the GSA has sufficient authority to make said request to SYRWCD.

4a.3-2 Management Action No. 6: Supplemental Conditions on New Well

4a.3-2-1 Management Action Description

If the early Minimum Threshold triggers of low groundwater levels are reached, the CMA GSA can require supplemental conditions that would apply to new wells. The CMA GSA could create an ordinance limiting uses for new wells during times of extraordinary droughts and low groundwater levels.

4a.3-2-2 Project Benefits and Justification

If more than 50% of the representative monitoring wells have reached the early warning trigger (five feet above the Minimum Thresholds), the CMA GSA can take actions to reduce groundwater pumping demands. New uses of groundwater would further exacerbate the lowering of the groundwater levels at the expense of existing groundwater users. The benefits would be an increase in groundwater storage as compared to baseline conditions due to reduction in groundwater pumping

4a.3-2-3 Project Costs

There are no capital costs anticipated with establishing an ordinance temporarily prohibiting new wells for new projects during times of extraordinary droughts and low groundwater levels.

[139] CWC Section 10725.2 Authority Of Groundwater Sustainability Agency; Notice

4a.3-2-4 Permitting and Regulatory Process and Public Notice

This management action does not require the CMA GSA to obtain approved permits. The public and relevant entities will be given notice of the CMA GSA's ordinance temporarily prohibiting new wells for new projects during times of extraordinary droughts and low groundwater levels.

4a.3-2-5 Implementation Process and Timetable

This policy, if implemented by the CMA GSA, could be voted on and implemented in a year in which groundwater levels in more than 50% of the representative monitoring wells are within five feet of the GSP Minimum Thresholds (early warning triggers).

4a.3-2-6 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the authority to "perform any act necessary or proper" to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[140]

4a.3-3 Management Action No. 7: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program (If Necessary)

4a.3-3-1 Project Description

The Group 1 PMAs, including groundwater pumping demand reductions up to 3,000 AFY through the Water Conservation and the Tiered Fee and Well Meter Programs are expected to maintain sustainability of groundwater conditions. So, Group 2 PMAs are not expected to be necessary. However, if the Group 1 PMAs fail to be implemented or do not achieve the expected results, the GSA may elect to implement additional management actions to improve groundwater conditions above Minimum Thresholds. This could include the establishment of annual groundwater pumping allocations (Annual Pumping

140 CWC Section 10725.2 Authority Of Groundwater Sustainability Agency; Notice

Allocations) based on the sustainable yield of the CMA[141]. These Annual Pumping Allocations could be used for the purpose of assigning pumping fees (Augmentation Fees). The Augmentation Fees would in turn provide the funding for the development of supplemental water supplies and other projects and management actions to achieve sustainability. Accordingly, these Annual Pumping Allocations are not a determination of water rights in that they do not prohibit the pumping of groundwater. Rather, all groundwater pumpers continue to possess the right to produce groundwater provided they pay the Augmentation Fee. Groundwater production in excess of Annual Pumping Allocations would be subject to an Augmentation Fee in an amount that is determined to be sufficient for the acquisition of supplemental water supplies pursuant to this pumping allocation plan.

The details of this management action still need to be developed through public workshops by the GSA. Some optional components of this management action could include a transient pool and voluntary fallowing program which is used to phase out groundwater production over time.

4a.3-3-2 Project Benefits

The proposed management action will directly result in significantly less groundwater production and will help alleviate and mitigate any potential overdraft conditions if Minimum Thresholds are exceeded. Management action benefits due to reduced groundwater pumping are anticipated to include the following:

- Increase in groundwater storage as compared to current trends and baseline conditions;
- Improved and rising groundwater levels;
- Improvements to water quality are due to reduction of irrigation return flows;
- Prevent depletions of surface water ; and
- Prevention of land subsidence conditions.

The measurements for assessing the benefits of the proposed management actions, relative to the measurable objectives and minimum thresholds established in Chapter 3, will be monitored groundwater

141 The current estimate of the sustainable yield, defined by SGMA as the maximum quantity of water that can be withdrawn annually without causing undesirable results, is currently estimated to be 2,800 AFY for the CMA. The sustainable yield may change as projects and management actions are implemented that increase basin recharge and increase the volume of water that can be withdrawn annually without causing undesirable results.

levels and groundwater quality in the CMA. Additionally, groundwater production by groundwater users will be reported to the CMA GSA to monitor anticipated reductions in production.

4a.3-3-3 Justification

The Annual Pumping Allocation Program would be necessary to reach sustainability in the future if the Group 1 PMAs do not yield 200 to 600 AFY due to the current unavailability of a supplemental water supplies and the costs of obtaining the supplemental supplies if/when they become available. The estimated current sustainable yield of 2,800 AFY does not entirely support projected future groundwater production. Under this management action, the CMA GSA will work with groundwater users in the CMA to determine an equitable process for assigning allocations. The beneficial uses of groundwater will subsequently be evaluated based on water rights priorities. Accordingly, all groundwater users and uses will be equitably considered and prioritized, as required by SGMA.

4a.3-3-4 Costs

The CMA GSA will incur costs to develop the Annual Pumping Allocations and the Augmentation Fees. There will also be administrative costs and engineering costs for conducting hearings, verifying pumping documentation, and preparing the final report to the CMA GSA governing body with the recommendations, among other implementation tasks. The preliminary cost estimate for developing these allocation and fee programs is $225,000.

The CMA GSA will also incur administrative costs to implement and manage the Fallowing Program. Additionally, the CMA GSA may incur costs to purchase Transient Pool Allocations from groundwater pumpers electing to enroll in the Fallow Program estimated to be up to $300,000. Administrative costs to run all program components are estimated to be $40,000 annually.

The Annual Pumping Allocation Program costs will be funded through imposition of applicable fees and to the extent they can be obtained, grants, or a combination thereof.

4a.3-3-5 Permitting and Regulatory Process

Implementation of the Annual Pumping Allocation Program may be subject to environmental regulations and could require the preparation of environmental studies. The CMA GSA will follow all regulatory requirements associated with the environmental processes including public noticing and review requirements.

4a.3-3-6 Public Notice

Development of the Annual Pumping Allocation Plan will include stakeholder outreach, public workshops, and public hearings to receive input from the basin groundwater users. The public and relevant entities will be given the opportunity and time to present historical pumping documentation provided to the CMA GSA. The CMA GSA will provide sufficient public notice of a public hearing to adopt the Annual Pumping Allocation.

4a.3-3-7 Implementation Process and Timetable

The CMA GSA would determine each groundwater pumper's Annual Pumping Allocation and/or Transient Pool Allocation no later than when the Group 2 PMAs are in effect after early warning triggers have been reached. The CMA GSA could also decide to preemptively explore this management action earlier, if desired. All groundwater pumpers will be asked to submit records of their historical pumping and other relevant material to the CMA GSA. The CMA GSA Water Resources Manager would review the materials and provide a draft recommended Annual Pumping Allocation and/or Transient Pool Allocation of each groundwater pumper who submitted materials to the CMA GSA. All groundwater pumpers would submit comments on the draft recommendation to the Water Resources Manager. The Water Resources Manager would consider these comments and present a final report and recommendation to the CMA GSA Board for consideration. Those receiving a Transient Pool Allocation may elect to join the Fallowing Program.

4a.3-3-8 Legal Authority

As explained in Section 4a.2-1-8, SGMA grants the CMA GSA, as a groundwater sustainability agency, broad powers including the authority to "perform any act necessary or proper" to implement SGMA regulations and allows the CMA GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation.[142] Specifically, CWC Sections 10726.2 and 10726.4 provide the CMA GSA with the authority to develop and implement an Annual Pumping Allocation Plan, Transient Pool and Fallowing Program to meet the needs of the Basin. CWC Section 10725.4 authorizes the CMA GSA to "propose and update fees" and to "monitoring compliance and enforcement" of the GSP. CWC Sections 10730 and 10730.2 authorize the GSA to impose fees on extraction of groundwater to fund the costs of groundwater management. Accordingly, SGMA grants the CMA GSA the legal authority to implement the GSP management action set forth above.

Draft recommendations of each groundwater pumper's Annual Pumping Allocation will be prepared in accordance with existing California water rights laws, with consideration to beneficial uses of water in the CMA.

142 CWC Section 10725.2 Authority Of Groundwater Sustainability Agency; Notice

4A.4 OTHER PROJECTS AND MANAGEMENT ACTIONS (GROUP 4)

Group 4 Project and Management Actions (PMAs) are not current commitments by the CMA GSA for implementation. Group 4 PMAs will be considered in the future by the CMA GSA for further study and development. However, if one of the Project and Management Actions required for sustainability in Groups 1-3 either fails to be implemented or does not have the expected results, further actions will be required to achieve sustainability. In that case, appropriate projects and/or management actions will be chosen from those listed under Group 4. As work on supplemental water supply and resource management efforts is ongoing, it may be the case that additional projects will be identified and added to the Group 4 list in future GSP updates (see Table 4a.1-1).

The current Group 4 PMAs include the following supply-related PMAs:

- Recycled Water Project; and
- Zaca Creek/ Santa Rosa Creek Recharge Pond Project.

The current Group 4 PMAs include the following demand-related PMAs:

- Non-native Vegetation Removal
- Agricultural Land Retirement/ Pumping Allowance
- Drought Mitigation by Pumping Optimization and Deepen Existing Wells

The CMA GSA is taking an adaptive management approach to CMA management over the planning horizon. Consequently, potential projects and management actions will continuously be considered and evaluated over the planning horizon to ensure that the most beneficial and economically feasible projects and management actions are implemented to reach sustainability in the CMA. Proposed projects and management actions may be modified, as necessary, if the intended project benefits are not realized in the intended timeframe.

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CHAPTER 5: PLAN IMPLEMENTATION

This Chapter describes proposed and planned projects and tasks associated with implementation of the GSP for the CMA. The implementation projects and tasks are planned to be undertaken over a four-year implementation timeline by (2026), for inclusion in the Five-Year Plan Assessments due in 2027. As previously described in Section 3b, undesirable results are not identified as occurring presently within the CMA. The projects identified for implementation are designed to meet SGMA requirements, including reporting and addressing data gaps, and will act to ensure the current conditions of the Basin are maintained or improved into the future.

Preliminary cost estimates are provided for the proposed implementation projects and tasks. The preliminary cost estimates are based on 2021-dollar amounts. The current inflation rate in 2021 is 5.39%, the second year it has been over 5% since 1981 and the highest it has been since 1990.[143] Prior to this general inflation, construction and material costs were already rapidly increasing due to the 2018 tariffs of 25% on steel and 10% on aluminum. The CMA GSA will be adaptive towards inflation and changes in inflation rates in future budgeting decisions.

143 Consumer Price Index (CPI) inflation was 5.39% for the period June 2020-June 2021. U.S. Bureau of Labor Statistics. https://www.bls.gov/cpi/ (Accessed 2021-07-22). Labor costs and construction costs are rising more rapidly.

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Section 5 A – IMPLEMENTATION PROJECTS

This section describes project and tasks to implement the CMA GSP. **Table 5a.1-1** summarizes the implementation projects.

Table 5a.1-1
Summary of Implementation Projects

Project Category	Task	Type	Completion
Completing Ongoing Field Investigations	Surveying Representative Wells	One Time	WY 2023
	SkyTEM Airborne Geophysics	One Time	WY 2023
Monitoring Network Gaps	Video Logging and Sounding Wells	One Time	WY 2023
	Add new GWL Monitoring	One Year	WY 2023
	Dedicated GWL Monitoring Wells (Outreach)	One Time	WY 2022
	SW Gage Installation (planning)	One Time	WY 2023
Improved Data Collection for Management	Well Registration Update	One Time	FY 2023-2024
	Well Metering Requirement	One Time	CY 2023
Data Management	Data Updates	Annual	Ongoing
Reporting and Plan Updates	SMGA WY Annual Reports	Annual	Ongoing
	SGMA Five Year Plan Assessment	5 Year	Ongoing

WQ = Water Quality, SW = Surface Water, WY = water year (October 1 – September 30), FY = fiscal year (July 1 – June 30), CY = calendar year (January 1 – December 31)

5a.1 COMPLETING ONGOING FIELD INVESTIGATIONS

Certain field investigations commenced during the development of this GSP following preliminary review of potential data gaps. Full implementation of the CMA GSP includes completing these projects (described below).

5a.1-1 Surveying Representative Wells

During the summer of 2020, wells that were part of the existing groundwater monitoring programs conducted by the County of Santa Barbara were surveyed to improve vertical accuracy of well elevations. As part of the development of this project including the Representative Monitoring Program, several additional wells were suggested for ground surveying due to uncertainty in actual locations. This implementation project would improve the location information for these wells to an accuracy of better than plus or minus (±) half a foot (±0.5 feet). Wells with elevation data uncertainly of greater than ±0.5 feet were indicated in the Appendices 3b-A and 3b-D with a "±" designation attached to the elevation.

In CMA the following would need to be surveyed:

- 7N/32W-31M1, current accuracy ±20 feet
- 6N/32W-12K2, current accuracy ±5 feet

The surveying work for these wells is expected to take a two-person team less than a day of work to meet this precision requirement. Expected cost for completion are $2,000 to $4,000. A completion target date to perform the work is set for the end of water year 2023 (September 30, 2023).

5a.1-2 SkyTEM Airborne Geophysics Results

During the Summer and Fall of 2019, the CMA GSA applied for a California Proposition 68 grant for an Airborne Electromagnetic (AEM) geophysical survey of the CMA, with the intent to capture a coherent three-dimensional regional scale geophysical data set of the majority of the CMA, including areas lacking information on historical wells. The overall intent of the AEM data set would be to improve the three-dimensional geologic model and subsequent groundwater modeling. The groundwater model is used to calculate the water budget and projections about future conditions. Additionally, this geophysical data may provide a regional snapshot of the groundwater level, as well as the presence of highly saline water.

Grant funding for the project was awarded in Spring 2020. However, due to pandemic SARS-CoV-2 (COVID-19) conditions (Section 1c.1, Appendix 1c-A), the international team conducting the survey was prevented from entering the country which delayed the survey of the first AEM flight to November 2020. Data processing of the November 2020 geophysical data is ongoing and may include recent published USGS geophysics data and maps (Sweetkind et al. 2021).

Implementation of the AEM data into the GSP to improve management of the basin is a multi-phase process that likely will take up to two years to complete. The funding for the AEM Project included plans for completion of the following remaining phases of work, as deemed necessary after review of the data and initial results.

I. Complete processing of the raw geophysical point data into three-dimensional data.

II. Using this geophysical data, update the three-dimensional geological model.

III. Incorporate the updates from the three-dimensional geological model into the groundwater model. Run groundwater model calibration checks.

IV. Use the updated groundwater model to update water budget and other projections.

Proposition 68 grant funding (see Section 5c) for the SkyTEM AEM was designated for the SkyTEM AEM survey in 2020. However, with the recent unexpected inflation, additional funding may need to be acquired. The Phase I work is planned to have a completion date by the end of water year 2022 (September 30, 2022), with the Phase II-IV task being updated during water year 2023 (September 30, 2023).

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5a.2 MONITORING NETWORK DATA GAPS

In addition to filling the preliminary data gaps partially addressed above in Section 5a.1, additional data gaps have been identified in the earlier chapters of this GSP. Projects included here address data gaps to improve management of the CMA groundwater. Land subsidence is also a consideration for improving monitoring data. However, the locations for additional land subsidence monitoring are not included as part of the implementation projects and can be reviewed for further consideration the annual updates of this CMA GSP.

5a.2-1 Video Logging and Sounding of Representative Wells

During implementation of the GSP, additional data may be collected for wells that were identified as representative wells in the basin that have missing well completion information. Missing well completion information includes the depth of perforation intervals, and the total current depth of the well. This implementation project will require conducting field investigations to collect information about these wells. **Table 5a.2-1** lists the wells that were identified as partially lacking needed information.

Table 5a.2-1
CMA Representative Wells with Unknown Depths or Screened Intervals

SGMA Indicator(s)	DBID	State Id	Well Depth	Perforations / Screen Intervals
GWL	82	7N/33W-36J1	known	TBD
GWL	75	7N/32W-31M1	known	TBD
GWL	90	6N/31W-7F1	known	TBD
SW-GDE	1120	6N/32W-9G1	known	TBD
SW-GDE	1115	6N/32W-13G2	known	TBD
SW-GDE	1111	6N/31W-17R1	known	TBD

GWL = Groundwater Level; SW-GDE = Surface Water and Groundwater Dependent Ecosystems; TBD = To Be Determined

The Video Logging Representative Wells project consists of conducting video logs to identify perforation or screen intervals in each of wells. This would be supplemented by sounding of the well bottom, and the depth to water.

Each well is expected to cost approximately $1,250 to $2,000 for video logging. Expected cost for completion of 6 wells would be approximately $7,500 to $12,000 in additional funding. This is a project that falls within the scope of the DWR Technical Support Services (TSS) program. The TSS program may be able to provide this at a lower cost to the CMA GSA. A target date for completing the video logging and sounding of representative wells is end of water year 2023 (September 30, 2023).

5a.2-2 Add Suggested Wells to Groundwater Level Monitoring Program

The Monitoring Network (Section 3a) identified that additional wells for groundwater levels and water quality monitoring are recommended to be added to the Buellton Upland. Figure 3a.3-1 (Monitoring Network) shows the locations where these wells are located. In addition, for the identified data gap near the confluence of Santa Rosa Creek and the Santa Ynez River, installation of a piezometer may be appropriate if an existing well is not present or available, to evaluate the groundwater-surface-water connection and the associated GDEs identified in this area.

Four existing wells are identified as reporting water quality as part of the Irrigated Land Regulatory Program to be added to the water level monitoring network. These wells are private wells part of commercial irrigation projects. One well is in the upper Cañada de Laguna, and would provide information on the northeast Buellton Upland, two of the wells are an expected upper (SYRA subflow) and lower (Buellton Aquifer) the Santa Ynez River alluvium, and the last is at the base of Santa Rosa Creek in the Buellton Upland. If these wells are unable to be added to the groundwater levels, the CMA GSA should evaluate drilling a new dedicated monitoring wells near these locations.

Adding these wells to the groundwater level monitoring network would be a several step process:

1) Secure permission and access rights from the well owners to monitor water levels at those locations.

2) Collect the necessary data to establish these as groundwater level monitoring wells. This includes establishing measuring points for each well to meet the vertical accuracy requirements of 0.5 feet or better.[144] This could require a survey of the well location. In accordance with SGMA

[144] 23 CCR § 352.4.

requirements well construction information would be collected, or video logging and well sounding.

3) Work with the well owner and the monitoring entity to establish water level monitoring dates in spring and fall where the wells are not pumped to ensure that the measured water levels are representative of static waters.

The cost involved in implementing this project depends on engagement and cooperation with the existing well owners. Labor costs in securing permission and access rights is part of the overhead costs of the GSA. If access is granted conducting the measuring point survey, well sounding, and video logging an estimated cost of around $2,000 to $4,000 per well, with a project cost of $8,000 to $12,000 for all four.

5a.2-3 Drill Dedicated Groundwater Level Monitoring Wells

The Monitoring Network (Section 3a) identified two areas where groundwater level monitoring would be required. This includes the upper Cañada de Palos Blancos, and on the saddle between the Santa Ynez River and Santa Rosa Creek near highway 246. As a preliminary step the CMA GSA is conducting outreach to parcel owners about potential existing wells that could be used for the purposes of groundwater monitoring.

Both well locations include public lands (Figure 1d.2-1, Plan Area). The area in the Cañada de Palos Blancos includes land owned by the Bureau of Land Management. The saddle area includes a parcel owned by CCWA and is the location of CCWA Tank 7 (Figure 1d.2-3). The aquifer at the Cañada de Palos Blancos is estimated at up to 1,000 feet deep, while it is up to 2,000 feet deep at the CCWA Tank 7 location (Figure 2a.2-2, HCM).

Nested monitoring wells installed at both locations would provide data to evaluate hydraulic gradients in these areas. Each of the nested wells will be installed submersible water level logger or pressure transducers to collect groundwater level throughout the year. Preliminary estimate for two wells that partially penetrate the aquifer is $330,000, with the cost in part depending on the final well site and design details. These wells would only be necessary if the outreach to utilize existing wells is not successful.

Due to expense of drilling and installing the proposed nested wells, the plan is to conduct outreach to the community to locate any potential lower cost alternatives. This outreach is expected to run through the end of water year 2022 (September 30, 2022), and the CMA GSA may plan to revisit this issue at that time.

5a.2-4 Install Surface Water Gage

For the benefit of the entire Santa Ynez River Valley Groundwater Basin (all three management areas), a streamflow gage is proposed near the mouth of the Santa Ynez River near the estuary in order to measure the total surface water outflow from the entire system. Previously, the USGS operated a stream gage named “Santa Ynez River at Barrier near Surf” (USGS Gage ID 11135500) near the mouth of the River. However, this stream gage was discontinued in 1965. By reestablishing stream measurements at this historical site, the total surface water budget can be tracked from Bradbury Dam to the Pacific Ocean. Additionally, a stream gage at this site would help understand the dynamics of the Santa Ynez River estuary which would in turn help with an understanding of potential sea level intrusion and the effects of sea level rise.

Due to the sensitivity of steelhead (*O. mykiss*) and other wildlife, a weir or control structures across the entire river may not be feasible as it could be a barrier for any potential anadromous fish. It would be preferable for a new stream gage consisting of a water level elevation sensor, and a rating table calculated by periodic surveys of the channel cross section every five years or following particularly wet years. A preliminary study would be developed with a target date of end of Water Year 2022 (September 30, 2022) to determine a preliminary design.

The proposed location of the new stream gage may also require potentially lengthy permitting and coordination processes. The proposed stream gage location is within the boundaries of the Vandenberg Space Force Base (e.g., Figure 1a.3-1, Introduction), and therefore would require permission and coordination with the United States Space Force to install and maintain the steam flow gage. The proposed location is also within the California Coastal Zone requiring coordination with the California Coastal Commission. Installation and field work would need to avoid particularly sensitive times of the year for nesting birds or other wildlife.

A target date for completion of this permitting and coordination would be by the end of water year 2023 (September 30, 2023), pending the ability to obtain matching grant funding. Installation costs would depend on direction from the CMA GSA and how robust the system would need to be to accommodate peak flood conditions. Costs would also need to take into consideration the agency responsible for installing, operating, and maintaining the gage.

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5a.3 IMPROVED MANAGEMENT INFORMATION

The following implementation projects would improve the CMA GSA tracking effectiveness of the progress of plan implementation.

5a.3-1 Update Well Registration Program

Currently all wells within the CMA are part of the SYRWCD registry of all water-producing facilities within its jurisdiction. Property owners must register any new water-producing facility within 30 days or be guilty of a misdemeanor.[145] Figure 3b.2-1 (Sustainable Management Criteria) shows that as of March 2021 there are 111 wells (95 active, 16 inactive) identified in SYRWCD Zone D which is approximately representative of the Buellton Aquifer of the CMA.

Additional information is needed on production wells in the geographic bounties of the Santa Ynez River Alluvium subarea. Specifically, information is needed that identifies the aquifer from which wells extract water. As part of the implementation of this GSP, additional information would be useful to verify and improve information about production wells. Specifically, to identify which wells are pumping from the shallow subflow of the Santa Ynez River (which are regulated by SWRCB outside of SGMA) and which wells are pumping from the deeper Buellton Aquifer (subject to SGMA) in the reach between Solvang and Buellton Bend.

The following additional information would be requested for all current registered wells, and any new well that is registered in the CMA.

- Location of the well to within 103 feet[146] or better. Consumer mobile phones are typically able to provide accuracy to within 16 feet and would be sufficient for this purpose.
- Well log information, such as Well Completion report "Driller's Log" or geophysical logs, if available.

145 CWC Section 75640
146 Locations reported in degrees minutes seconds (format like 34° 36' 33" N) indicates accuracy of ±103 feet. Locations reported in decimal degrees to four digits (i.e. 34.6092° N) indicates accuracy of ±37 feet.

- Well information in the Irrigated Land Regulatory Program, which includes the site name and location identifier for the well on the property.
- Well metering, as described in section 5a.5-2.

Implementation is expected to involve relatively minor costs to the well owners and to the well registration program administration. A target date for the completion of the updates to the well registration is by the end of SYRWCD Fiscal Year 2023-2024 (June 30, 2024).

5a.3-2 Well Metering Requirement

This implementation project involves assessments of groundwater production where metered water usage for wells is estimated based on crop acres, population, livestock, landscape use, and pond evaporation. These factors for estimating usage are from the SYRWCD instructions pamphlet (SYRWCD, 2010) and currently "applied as published and are not to be altered for wet or dry reporting periods or irrigation methods." The recommendation of the GSP is that the use of static factors be phased out and replaced by water meter installations at wells provide well owners and incentive for efficient water use.

Metering would also help with verifying crop water use. Crops can be irrigated using various methods and variable efficiency. Irrigation improvements may include changes to reduce evaporation, like changes to the timing of irrigation application, replacing sprinkler systems with drip irrigation systems, and so forth. The benefits from these improvements in terms of increased water use efficiency are variable, and can require capital expenditures that are not compensated or incentivized under a single crop requirement system. Using well water meters for irrigation in combination with management actions described in Chapter 4 involving groundwater extraction fees would allow well owners to be incentivized for moving to more efficient water use with existing crops.

The GSP would also have benefit from more accurate measurements of the water that is being produced from the groundwater basin, which could better inform accurate estimates of sustainable yield and management decisions as part of the overall goal of ensuring future water availability.

Demand management measures from the Urban Water Management Act (UWMA) require that urban water suppliers not yet fully operating with proper water meters explain plans for installing water meters. While the CMA GSA is not subject to the UWMA, the GSA should give similar considerations as water metering requirements specified in the UWMP.

Installation costs for well meters are dependent on the size and flow rate required. In 2021, low flow water meters (less than 35 gallons per minute [gpm]) suitable for domestic use cost as little as $200, while high flow meters (up-to 600 gpm) suitable for large scale agriculture use can cost upwards of $800. Full water meter installation would include labor costs, which could easily be double or more the cost of the meter.

In recognition of the costs involved for water meter installations, it is recommended that metering be phased in over two years, with a target date of completion by end of calendar year 2023 (December 31, 2023). The GSA may provide financial incentives to help encourage and offset the metering costs.

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5a.4 Data Management System Maintenance

The Data Management System (DMS) was previously described in Section 1e.1 of this CMA GSP. The DMS is a centralized source for water information regarding the CMA. Aspects of the CMA DMS include a SQL database with water data, geographic information system (GIS) files, a map server to make the information available, electronic copies of reports, and a web interface to view these various data sets. The DMS Web interface includes interactive mapping and graphing, including a specific interface to track how the CMA is meeting the Sustainable Management Criteria (SMCs).

Costs related to maintain the DMS include rental costs for the server space and registration of the domain name. Because the DMS utilizes a computer system located on the internet the sever software requires periodic updates and software patches to ensure security. To keep the DMS as a relatively up-to-date resource, data and reports must be periodically added as they become available. With data that is collected and transmitted through telemetry, an automated update system can be developed to lessen the labor involved. Total annual costs to the CMA GSA for updating the DMS are expected to be around $10,000 to $15,000 per year, mostly in labor to update data and reports. Some of this cost may be counted in the annual reporting estimate.

If new features or updates are needed for the DMS, these items can involve additional labor costs to develop which can be highly dependent on the specifics of the feature needed.

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5a.5 REPORTING AND PLAN UPDATES

SGMA regulations require that the GSA periodically update DWR on the status of the CMA including process of the GSP implementation, and periodically assessing the GSP for potential improvements, or as a result of changing conditions. The following sub-sections describe how these required SGMA tasks plan to be accomplished.

5a.5-1 Annual Reports

In accordance with SGMA, the CMA is required to provide an annual report for the water year (October 1 to September 30 the following year) within six months following the end of the water year, and no later than "April 1 of each year following the adoption of the Plan."[147] These annual reports are to include general information about the Basin, groundwater elevation, contour maps, groundwater extraction data, surface water availability, total water use, and progress made towards GSP implementation.

Data on the first half of the water year[148] is compiled annually in the Santa Ynez River Water Conservation District's required "E*ngineering Investigation and Report upon Ground Water Conditions*"[149] (Stetson 2021, and previous annual reports) based on a July 1 to June 30 year.[150] A preliminary report is published in March,[151] and a final investigation including spring conditions data collected in March, is published at the end of April. The engineering investigation provides information for the SYRWCD's Board of Directors to consider regarding overdraft, water production, and obligated water purchases. Other annual reports on water resources are published throughout the year. Additional reports include the Santa Barbara County Hydrology report,[152] Annual Monitoring Summary for Biological Opinion, and the City of Buellton Annual Water Supply Report. Other annual reporting is provided Consumer Confidence Reports which are a federal requirement that larger public water systems (i.e., City of Buellton and CCWA) publish general information regarding their drinking water quality. Annual SGMA updates will commence with the

147 23 CCR § 356.2 Annual Reports
148 See the discussion regarding Water Year in the front matter.
149 CWC § 75560
150 CWC Section 75507
151 CWC Section 75570
152 Santa Barbara County Hydrology reports use a September 1st -August 31st water year.

inclusion of information compiled from these various annual reports and address the additional required elements of the SGMA annual reporting.

The general schedule for completion of the GSP annual reports is based on collecting data representing the fall season or end of the water year conditions which are typically collected through the end of October. Data would be updated into the DMS at that time. Following the data collection and compilation, the updated GSP document would be drafted and compiled in November and December of the year with presentation to the GSA committee expected for The January or February. The January and February presentation would include a public newsletter (see Section 1c and Appendix 1c-D). The final version of the annual GSP report would be submitted to DWR in mid-March.

The first of these GSP annual reports is for the water year ending September 30, 2021, prior to adoption and submittal of the GSP in January 2022. The first annual report is due by April 1, 2022.[153] This first annual report is to include updates about conditions in the basin since the previous year described in the GSP.

The first two years of developing the annual report will likely involve development time. Starting with the third year (report on water year 2023), preparation of the annual report is expected to be relatively less time intensive. The SYRWCD annual engineering investigation report costs approximately $18,000 each year, on average, to update and produce.[154] Once the annual report is mature, reproducing it in subsequent years will likely be similar in terms of costs.

5a.5-2 Five-Year Plan Assessment

In accordance with SGMA, the CMA is required to provide a written assessment of the GSP at least every five years.[155] This includes an updated description of current groundwater conditions, discussion of project or management actions, any potential GSP updates, evaluation of any significant new information or change in water use, and a general assessment of monitoring.

153 Personal Com. Anita Regmi, DWR Rep., 2021-05-25
154 Costs for producing the 2021 SYRWCD report which was representative average year. Inflation at the current 5.39% CPI annual rate means the same level of effort will cost around $19,000 in 2022 dollars, and $20,000 in 2023 dollars.
155 23 CCR § 356.4. Periodic Evaluation by Agency

The UWMPs are planning documents for municipal and retail supplies who serve more than 3,000 customers or serving more than 3,000 acre-feet annually. These documents are also updated on five-year cycles. Information from any 2025 UWMA plans (due in 2026) may be incorporated into the 2025 plan assessment. UWMPs include discussion of how a water supplier is planning for water supply reliability in normal, single dry, and multiple dry water years, and under future droughts, groundwater overdraft, regulatory revisions, and changing climatic conditions. UWMPs also include updates to population projections and future water demands. CCWA is the only water supplier in the CMA which is currently required to produce an UWMP.

Other data that may be updated in the Five-Year Plan Assessments include census population data, agricultural land use, and pumping data. Agricultural uses of land may also change over this five-year time frame. Particular crops that are planted depend on local and global demand and trade including emerging crops, such as cannabis, which may become more prevalent.

The expected schedule for completion of the Five-Year Plan Assessment (due in 2027) is expected to be a two-year process with updates starting in July 2025. This timeline should take into consideration the CMA GSA committee needs and would allow for periods of CMA GSA member agency staff, committee, and public review on the draft and resolution of comments prior to submittal of the Five-Year Plan Assessment to DWR. It is expected there will be additions and updates that will have occurred as a result of implementation.

In addition to updating the Five-Year Plan Assessment, to incorporate all requirements, this implementation project is expected to have outreach and engagement components including several presentations to the CMA GSA Committee and newsletters to inform the public.

Several of the Planning and Management Actions (Chapter 4) may rely on findings about conditions within the CMA, including population, agricultural lands, and sustainable yield. The Five-Year Plan Assessment would update these numbers and provide the GSA an opportunity to update management actions as a result of any changes made within the CMA.

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Section 5 B – IMPLEMENTATION TIMELINE

The CMA GSA plans to start implementation of the GSP after adoption and submittal of the GSP by the CMA Committee in January 2022. **Table 5b.1-1** is a timeline summarizing the projects and actions planned and described in Section 5a. The Project and Management Actions described in Chapter 4 are primarily driven due to trigger conditions within the basin and may occur simultaneously with the projects identified and listed here.

Table 5b.1-1
5-Year Implementation Timeline of CMA GSP

Water Year	**2022**			**2023**				**2024**				**2025**				**2026**				**'27**
Fiscal Year	**2021-22**		**2022-23**				**2023-24**				**2024-25**				**2025-26**				**2026-27**	
Calendar Year	**2022**				**2023**				**2024**				**2025**				**2026**			
Quarter	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Surveying Representative Wells																				
SkyTEM Airborne Geophysics																				
Raw Data Processing																				
Update 3D Geologic Model																				
Update Groundwater Model																				
Logging and Sounding Wells																				
Add Suggested Wells to GWL																				
Drill Monitoring Wells (outreach)																				
SW Gage Installation																				
Access, Permitting, Design																				
Installation																				
Well Registration Update																				
Well Metering Mandate																				
Data Updates																				
SMGA WY Annual Reports																				
Five-Year Plan Assessment																				
Data Updates																				
Document Updates																				
Public Comments																				
Finalizing Plan Assessment																				

SECTION 5C – PLAN FUNDING

This section describes funding for this CMA GSP, as well as opportunities for funding from State and Federal sources. This expands on the administrative details introduced in Section 1b.

5C.1 FUNDING FOR DEVELOPMENT OF THIS GSP

Development of this GSP and associated work activities required for development, preparation and submittal of the Groundwater Sustainability Plan (GSP) for the Santa Ynez River Valley Basin (SYRVGB) was funded by a combination of local contributions from member agencies and state grants.[156] State funding that contributed to the development of this GSP included the following grant programs.

Table 5c.1-1
State of California Grant Contributions to
Development of this Groundwater Sustainability Plan

Management Areas	Grant Program	Funding Amount	Award Date	Project Title
WMA, CMA, EMA	Proposition 1, Round 2, Sustainable Groundwater Planning Grant Program	$1,000,000	2018	Santa Ynez River Valley Basin GSP Planning and Preparation
WMA, CMA	Prop. 68, Round 3, Sustainable Groundwater Planning Grant Program	$296,000	2019	Airborne Electromagnetic Survey of the WMA and CMA of the Santa Ynez River Valley Basin

The two voting CMA member agencies (City of Buellton and Santa Ynez River Water Conservation District) funded the remainder of the costs through a cost sharing agreement. The Santa Barbara County Water Agency (SBCWA), as a non-voting member, is not responsible for any other costs related to the CMA GSP development. All member agencies are responsible for their own costs to attend and participate in the CMA GSA committee.

156 Project: Santa Ynez River Valley Basin GSP Planning and Preparation. Reference number 3860-PM-285. Bond Accountability. California Natural Resources Agency.

5C.2 FUNDING FOR FUTURE CMA GSA ACTIVITIES

In accordance with SGMA[157], the CMA GSA has a financial plan to implement future costs of this GSP. These costs include the implementation projects (Section 5a) needed to resolve data gaps and improve management, and project and management actions (Chapter 4) as needed to improve groundwater conditions in the basin.

GSP implementation costs are expected to require a broad variety of funding sources, from State, and local sources. As described in the Plan Area (Section 1d) a substantial portion of the CMA is considered disadvantaged, with disadvantaged communities (DAC) mapped over approximately 14% of the land area. Total population of the Plan Area is approximately 5,900 people, with the City of Buellton population approximately 5,100.

The CMA GSA is currently funded by a cost sharing agreement between the two voting CMA GSA member agencies (City of Buellton and Santa Ynez River Water Conservation District). Future costs are anticipated to be funded through fees created by the GSA, and or continuing cost-sharing between agencies. In addition, the exact governance structure of the Santa Ynez River Valley Groundwater Basin may change in the future to a Joint Powers Authority (JPA), in which there maybe cost-sharing between the management areas (WMA, CMA, and EMA). There also may be opportunities to obtain implementation grants from the State of California.

Under SGMA[158] following adoption of this GSP, the CMA GSA will have the authority to directly collect fees on the extraction of groundwater from the basin to fund costs of groundwater management including, but not limited to, fees that increase based on the quantity of groundwater produced annually, the year in which the production of groundwater commenced from a groundwater extraction facility, and impacts to the Basin. The exact mechanisms and structure of obtaining funding from the local community to manage the local groundwater resources still needs to go through additional planning including stakeholder outreach, public workshops and GSA hearings. The local funding mechanisms may include a

157 23 CCR § 355.4 (b)(9) "Whether the Agency has the legal authority and financial resources necessary to implement the Plan."
158 CWC Section 10730.2

combination of assessments, property related fees, and/or non-tax fees based on property acres, number of wells, and/or amount of groundwater extracted.

5c.2-1 Potential State of California Grant Programs

As a small community[159] the CMA GSA (and the City of Buellton) is eligible for Technical Assistance (TA) Funding Program. Projects that TA funds include improvement of drinking water, wastewater, groundwater quality, and storm water programs.

Other state of California sources of funding includes State Water Resource Control Board loans and Grants. Following state grant programs may be applicable:

- Clean Water State Revolving Fund (CWSRF)
- Drinking Water State Revolving Fund (DWSRF)
- Small Community Grant Fund
- Groundwater Grant Fund (Chapter 10, Prop 1)
- Parks and Water Bond (Chapter 11, Prop 68)

DWR is providing additional financial assistance to initiate GSPs under the Proposition 1- Integrated Regional Water Management (IRWM) Implementation Grant Program.[160] Approximately $403 million in grant funding is being made available for implementation projects with at least $51 million being made available for projects that provide benefits specifically to Disadvantaged Communities (DAC). DWR also provides Technical Support Services (TSS)[161] to support GSAs. The TSS offered support includes: monitoring well installation, geophysical logging, borehole video logging and other field activities.

159 Defined as a population of less than 10,000,

160 Implementation Grant Program. Integrated Regional Water Management. Department of Water Resources. Web site. https://water.ca.gov/Work-With-Us/Grants-And-Loans/IRWM-Grant-Programs/Proposition-1/Implementation-Grants Accessed 2021-09-01.

161 Assistance and Engagement. Department of Water Resources. Web site. https://water.ca.gov/programs/groundwater-management/assistance-and-engagement Accessed 2021-09-01.

5c.2-2 Potential Federal Grant Programs

Federal grant programs that may be applicable to the CMA. Several grants include support for defense communities like the CMA which in part is a bedroom community for the Vandenberg Space Force Base, a critical Department of Defense installation.

- Water Infrastructure Financing and Integration Act (WIFIA)
- Reclamation Integration Financing and Integration Act (RIFIA)
- Bureau of Reclamation – WaterSMART Program
- Department of Defense
    - Defense Communities Infrastructure Program
    - Readiness and Environmental Protection Integration Act (REPI)
- Water Resources Development Act (WRDA)
- U.S. Department of Agriculture
    - Community Facilities program
    - Regional Conservation Program

Surface and subflows of the Santa Ynez River are managed through releases of the Federal Bureau of Reclamation operated Cachuma Project under the State Water Resources Control Board. National Oceanographic and Atmospheric Administration (NOAA) through comments indicated interest in the additional plan element[162] discussing local groundwater dependent ecosystems. NOAA Fisheries provides grants[163] for management, research, monitoring, and outreach activities that have direct conservation benefits for listed species under the Endangered Species Act, as well as the pacific salmon and steelhead.

162 CWC Section 10727.4 Additional Plan Elements: "where appropriate […] (l) Impacts on groundwater dependent ecosystems."

163 Funding & Financial Services. National Oceanographic and Atmospheric Administration. Website. https://www.fisheries.noaa.gov/funding-opportunities/ Accessed 2021-08-31.

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No External Citations.

Section 5c: Plan Funding

No External Citations.

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Groundwater Sustainability Plan

CMA

Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

Geosyntec consultants

STETSON ENGINEERS INC.

DUDEK