

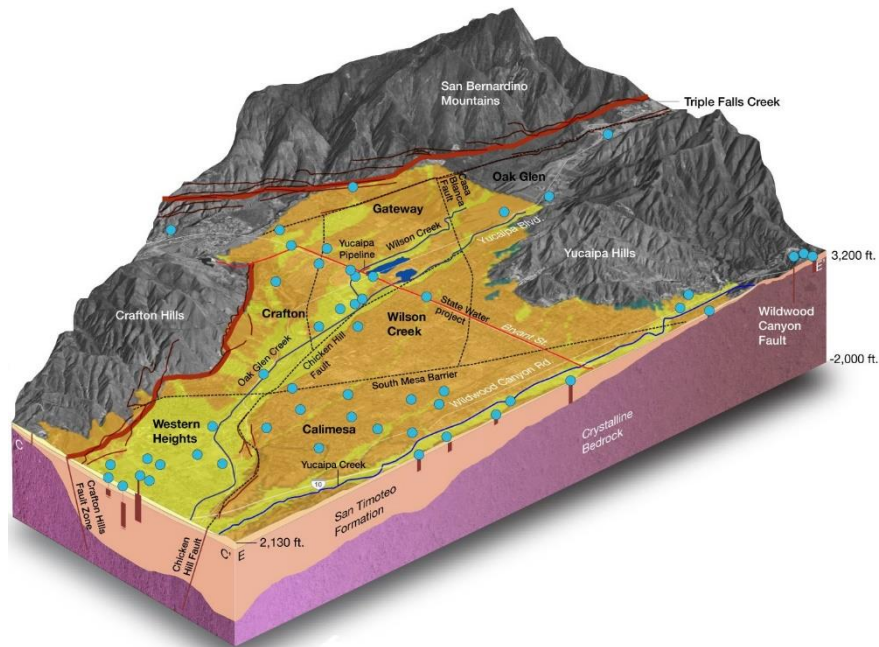
Public Draft Groundwater Sustainability Plan

for the

Yucaipa Groundwater Subbasin

Prepared for:

Yucaipa Groundwater
Sustainability Agency
c/o San Bernardino Valley
Municipal Water District
San Bernardino, California
92408



Prepared by:

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CA 92024
T 800.450.1818
F 760.632.0164

PUBLIC REVIEW DRAFT
Yucaipa Subbasin Groundwater Sustainability Plan

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Yucaipa Groundwater Sustainability Agency
c/o San Bernardino Valley Municipal Water District
San Bernardino, California 92408

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Steven Stuart, PE

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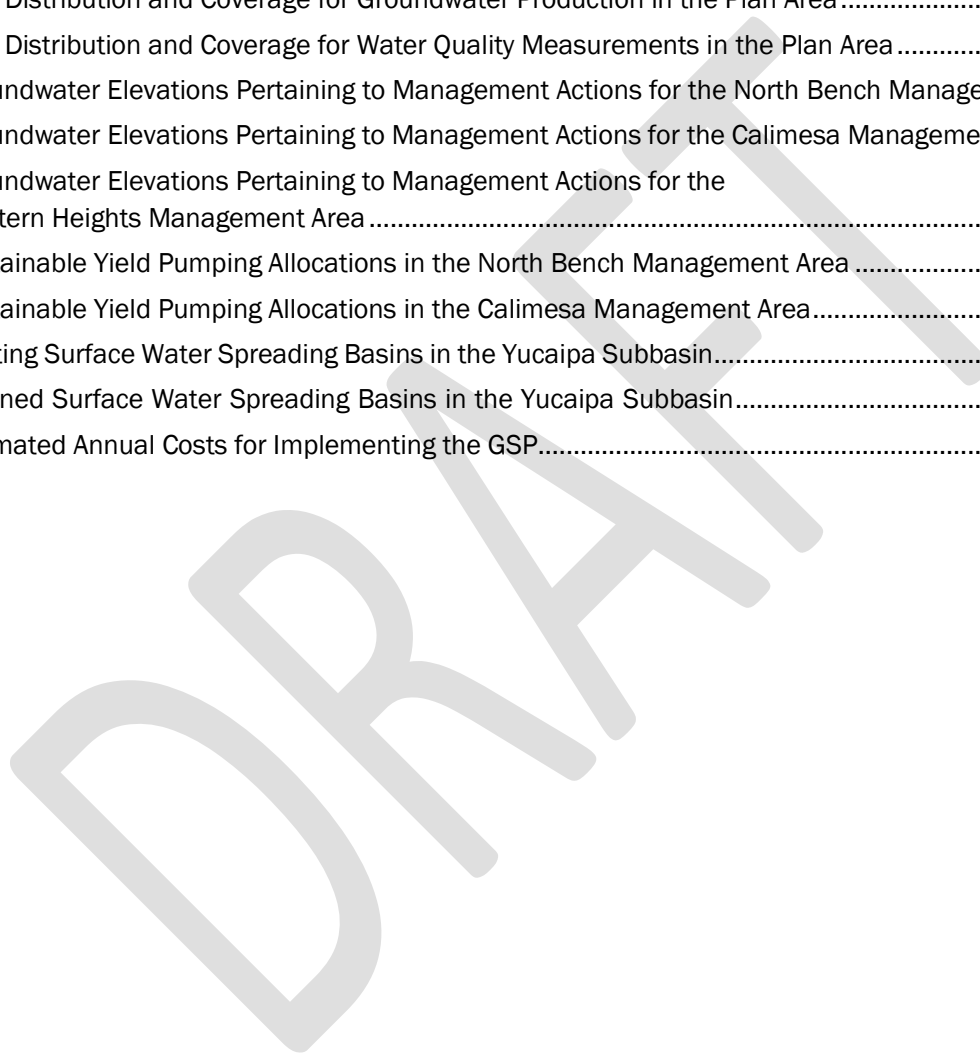
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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
µg/L	micrograms per liter
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
CalGEM	California Geologic Energy Management Division
CASGEM	California Statewide Groundwater Elevation Monitoring
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System;
COC	contaminants-of-concern
DEH	Riverside County Department of Environmental Health
DMS	data management system
DTW	depth-to-water
DWR	California Department of Water Resources
EHS	San Bernardino County Department of Public Health Environmental Health Services
ET	evapotranspiration
ft/ft	feet per foot
GAMA	Groundwater Ambient Monitoring and Assessment Program
GDE	groundwater dependent ecosystem
GMZ	groundwater management zone
gpd	gallons per day
gpdf	gallons per day per foot
gpdf ²	gallons per day per square foot
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HMP	Habitat Monitoring Program
ILRP	Irrigated Lands Regulatory Program
IRWM Plan	Integrated Regional Water Management Plan
LAMP	Local Agency Management Program
Ma	mega-annum (1 million years)
MBMP	Maximum Benefits Monitoring Program
mgd	million gallons per day
MOA	Memorandum of Agreement
MSL	mean sea level
NCCAG	Natural Communities Commonly Associated with Groundwater
NDMI	Normalized Derived Moisture Index
NDVI	Normalized Derived Vegetation Index
NOAA	National Oceanographic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OGSWFF	Oak Glen Surface Water Filtration Facility
OWTS	on-site wastewater treatment systems

Acronym/Abbreviation	Definition
PCE	tetrachloroethylene
PEST	Parameter ESTimation software
PET	potential evapotranspiration
PRMS	Precipitation Runoff Modeling System
RMP	representative management practice
RO	reverse osmosis
RUWMP	San Bernardino Valley Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SBCFCD	San Bernardino County Flood Control District;
SBVMWD	San Bernardino Valley Municipal Water District
SCAG	Southern California Association of Governments
SGMA	Sustainable Groundwater Management Act
SGPWA	San Geronio Pass Water Agency
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UWMP	urban water management plan
VOC	volatile organic compounds
WDR	Waste Discharge Requirement
WHWC	Western Heights Water Company
WRWRF	Henry N. Wochholz Regional Water Reclamation Facility
WSCP	Water Shortage Contingency Plan
YIHM	Yucaipa Integrated Hydrologic Model
YVWD	Yucaipa Valley Water District

Executive Summary

ES-1 Introduction

The Yucaipa Groundwater Sustainability Agency (GSA), acting as the groundwater sustainability agency for the Yucaipa Subbasin (Plan Area, Subbasin), developed this Groundwater Sustainability Plan (GSP) in compliance with the 2014 Sustainable Groundwater Management Act (SGMA) (California Water Code Section 10720–10737.8, et seq.) and the California Department of Water Resources (DWR) GSP Regulations (23 CCR, Section 350 et seq.). The Yucaipa Subbasin lies within the Upper Santa Ana River Basin Hydrologic Region (DWR basin number 8-002.07) and underlies an area of approximately 25,300 acres under portions of the cities of Calimesa, Redlands, and Yucaipa, as well as unincorporated San Bernardino and Riverside Counties.

DWR designated the Yucaipa Subbasin a high priority basin based primarily on its reliance on groundwater for water supply. However, this Subbasin is not in a state of critical overdraft. Under SGMA, GSAs “have the responsibility for adopting a Plan that defines the basin setting and establishes criteria that will maintain or achieve sustainable groundwater management” (California Water Code, Section 350.4[e]). The requirement of the GSP is to maintain or achieve sustainable groundwater management in the Yucaipa Subbasin by 2042.

Nine local agencies entered into a Memorandum of Agreement (MOA) in 2017 to form the Yucaipa GSA. The local agencies included South Mesa Water Company, South Mountain Water Company, Western Heights Water Company, and Yucaipa Valley Water District, collectively referred to herein as the “Water Purveyors”; the Cities of Calimesa, Redlands, and Yucaipa, collectively referred to herein as the “Municipalities”; and San Bernardino Valley Municipal Water District and San Geronimo Pass Water Agency, collectively referred to herein as the “Regionals.” The County of Riverside and the County of San Bernardino, collectively referred to as the “Counties,” are stakeholders. The City of Calimesa submitted a written Notice of Withdrawal dated November 19, 2018, and the Yucaipa GSA subsequently acknowledged the withdrawal of the City of Calimesa from the Yucaipa GSA at the January 23, 2019, GSA Board meeting. The City of Calimesa is now considered a stakeholder in the Plan Area.

A number of water resources monitoring and management programs have been implemented throughout the Plan Area by several Yucaipa GSA member agencies and stakeholders seeking to maintain and/or enhance water resources management in the region, and to comply with state and federal laws applicable to water supply, water quality, watershed health and/or wildlife habitat. These programs will be integral in the sustainable management of groundwater in the Plan Area.

The Southern California Association of Governments (SCAG) maintains a land use dataset that combines regional data from general plans, specific plans, zoning codes, and existing land use. The SCAG dataset includes land use designations for the Plan Area and San Timoteo Wash Watershed for years 1990, 1993, 2001, 2005, 2012 and 2016. The predominant land use types in the Plan Area from 1990 to 2016 include Vacant and Undeveloped or Protected Land and Single Family Residential, which combined, made up 82% of the Plan Area in 1990 and 70% of the Plan Area in 2016. The primary land use changes within the Plan Area from 1990 to 2016 include a decrease in Vacant and Undeveloped or Protected Land (19% decrease) and an increase in Single Family Residential (10% increase) and Open Space and Recreation (7% increase). Rural Residential, Facilities, and to a lesser extent, Commercial, Office, and Industrial, and Multi-Family Residential have increased since 1990, while Agriculture land use has decreased.

Water resources utilized in the Plan Area include local groundwater produced from the principal aquifer in the Yucaipa Subbasin, imported State Water Project (SWP) water from the San Bernardino Valley Municipal Water District and San Gorgonia Pass Water Agency, surface water diverted from Oak Glen Creek, recycled water from the Henry N. Wochholz Regional Water Reclamation Facility (WRWRF), and captured stormwater at the Oak Glen Creek spreading basins (and Wilson Creek basins during significant runoff events). Beneficial uses of groundwater include municipal and domestic supply, industrial and commercial, agricultural and environmental uses. YVWD diverts surface water from Oak Glen Creek and Birch Creek to the Oak Glen Filtration Plant (OGFP) located in the Oak Glen subbasin. Recycled water produced from the WRWRF is served to YVWD customers via the recycled water distribution system for irrigation purposes only, or discharged to San Timoteo Creek at a point upstream of the Yucaipa Subbasin.

Land use in the Yucaipa Subbasin in 2016 was 42% residential (single-family, rural, and multi-family), 8% facilities and commercial/industrial, 8% open space and recreational, 7% agricultural, and the remaining 35% vacant and undeveloped land. The 2015 RUWMP noted that approximately 96% of the water served by YVWD is for residential use. Approximately 2.4% is for commercial, institutional and industrial use, with another 1.4% used for irrigation purposes. Groundwater dependent ecosystems (GDEs) are the primary environmental users of groundwater in the Subbasin. The discharge of recycled water to San Timoteo Creek helps sustain the GDEs downstream of the WRWRF outfall. GDEs located in the upper elevations in the Oak Glen subarea and in the lower region of the Live Oak subarea are currently considered to be dependent on shallow groundwater.

ES-2 Basin Setting

The Yucaipa Subbasin (DWR Basin Number 8-2.07) comprises an eastern portion of the Upper Santa Ana Valley Groundwater Basin. The Subbasin is bounded to the north and northeast by the San Andreas Fault Zone and the San Bernardino Mountains, to the east by the Yucaipa Hills, to the south by San Timoteo Wash and the San Timoteo Badlands, and to the west by the Crafton Hills and the San Bernardino Basin Area. The Yucaipa Subbasin is overlain by the Yucaipa plain, a gently sloping area of unconsolidated deposits of late Pleistocene and Holocene sediments originating from the surrounding mountains and hills. The Yucaipa Subbasin ranges in elevation from 1,300 feet above NAVD88 to approximately 5,100 feet above NAVD88.

The bottom of the Yucaipa Subbasin consists of crystalline bedrock. Overlying the bedrock are late Pleistocene to Holocene deposits of alluvial sediments originating from the surrounding Crafton Hills, San Bernardino Mountains, and Yucaipa Hills. The deeper sedimentary deposits consist of units representing the San Timoteo Formation, the Sedimentary deposits of Live Oak Canyon, and surficial materials. The primary water-bearing formations in the Yucaipa Subbasin that form the principal aquifer are the Sedimentary deposits of Live Oak Canyon and the San Timoteo Formation.

ES-2.1 Precipitation and Surface Water

The Yucaipa Subbasin lies within the San Timoteo Wash watershed. The primary surface water drainage features are Wilson Creek, Oak Glen Creek, Yucaipa Creek and San Timoteo Creek. The headwaters for Wilson Creek and Oak Glen Creek originate in the San Bernardino Mountains. Yucaipa Creek begins in the Yucaipa Hills and flows east to west out of Wildwood Canyon. San Timoteo Creek is the major drainage feature in the San Timoteo Wash watershed. It enters the Yucaipa Subbasin at the southern end of the Live Oak subarea and runs approximately 3.5 miles before exiting the Plan Area. San Timoteo Creek is tributary to the Santa Ana River.

Stream flow near the upper reaches of Wilson Creek and Oak Glen Creek may be diverted to the Wilson Creek spreading basins and the Oak Glen spreading basins, respectively. The Wilson Creek spreading basins are used for the infiltration of imported SWP water and stormwater. The Oak Glen Creek spreading basins were designed to reduce flooding downstream of Bryant Street, collect debris and sediment in the basins to improve downstream water quality, enhance groundwater recharge by capturing stormwater runoff, and provide additional open space and habitat.

The San Bernardino County Flood Control District (SBCFCD), a division of the Department of Public Works, installed a network of climate stations throughout San Bernardino County to collect precipitation, stream flow and temperature data. Mean annual precipitation per water year (WY; defined as the 12-month period between October 1 and September 30 of the following calendar year) ranged from 11.15 inches in the Crafton subarea to 24.50 inches in the Triple Falls Creek subarea. The weighted mean annual precipitation across the Plan Area is 15.86 inches based on precipitation data collected at the 17 SBCDPW climate stations from the 1953 WY to the 2018 WY.

Periods of above or below average precipitation affect the volume of water that naturally recharges the groundwater aquifer underlying the Plan Area. To characterize the effects of total water year precipitation on local groundwater supplies and demands, and the volume of groundwater in storage, the precipitation measurements were categorized into six water year types. Water year type was characterized by normalizing measured water year precipitation by the long-term water-year precipitation averages measured at each of the 17 SBCFCD climate stations in the Subbasin. The normalized water year precipitation measurements were then categorized into the following water year types:

1. Critically Dry: < 50% of the long-term precipitation mean
2. Dry: $\geq 50\%$, but < 75% of the long-term precipitation mean
3. Below Normal: $\geq 75\%$, but < 90% of the long-term precipitation mean
4. Normal: $\geq 90\%$, but < 110% of the long-term precipitation mean
5. Above Normal: $\geq 110\%$, but < 150% of the long-term precipitation mean
6. Wet: $\geq 150\%$ of the long-term precipitation mean

ES-2.2 Hydrogeological Conceptual Model

The Yucaipa Subbasin exists in a “right-step-over” zone between the active San Andreas and San Jacinto Fault Zones. The Yucaipa Plain lies between these two fault systems and comprises an extensive deposition of Quaternary sediments originating from the San Bernardino Mountains and Yucaipa Hills. The “right-step-over” zone created by the lateral displacement along the San Andreas and San Jacinto Fault Zones created a series of northeast-southwest trending normal-slip faults. Displacement along these faults, in turn, created drop-down structures that filled in with Quaternary alluvial sediments.

The geologic units defined within the Yucaipa Subbasin are Mesozoic and older crystalline bedrock, the Plio-Pleistocene San Timoteo Formation, and the Quaternary Sedimentary Deposits of Live Oak Canyon and surficial alluvial deposits. The crystalline bedrock provides the base for the sedimentary deposits in the Yucaipa Subbasin. The San Timoteo Formation and the Sedimentary Deposits of Live Oak Canyon define the principal aquifer in the Yucaipa Subbasin. The primary use of groundwater produced from the principal aquifer is for municipal water supply. The Yucaipa Subbasin is divided into nine hydrogeologic subareas based on the apparent influences of faults (both mapped and inferred) on groundwater flow.

San Timoteo Creek conveys surface water out of the Plan Area and is tributary to the Santa Ana River. Surficial soils mapped in the Plan Area indicate that the surface water drainages are underlain by highly permeable loamy sand with relatively high infiltration rates; thereby, indicating that leakage from stream flow is a major contributor to groundwater recharge. Geologic cross-sections provide scaled-details of the physical features that influence groundwater flow and provide a visual approximation of the storage capacity of the Subbasin.

ES-2.3 Current and Historical Groundwater Conditions

Current Groundwater Elevations

The current condition for groundwater levels in the Yucaipa Subbasin is represented by static water levels measured in September 2018. The 2018 WY was characterized as a “dry” water year type. The preceding 2017 WY was characterized as an “above normal” water year type with precipitation ranging from 14.42 inches at SBCFCD station 3023 to 21.49 inches at SBCFCD station 3126A.

Static groundwater levels measured in September 2018, which represents the current water year low, ranged from 1,723.93 feet above NAVD88 at well WHWC-11 in the Western Heights subbasin to 3,331.80 feet above NAVD88 at well YVWD-14 in the Oak Glen subbasin. In general, groundwater flowed from the northeast to the southwest in the Yucaipa Subbasin. Static groundwater levels measured in March 2018 represent the current water year high. Groundwater levels ranged from 1,743.93 feet above NAVD88 at WHWC-11 to 3,297.90 feet above NAVD88 at YVWD-14.

Historical Groundwater Elevations

The earliest groundwater elevation data was collected in the 1920s. The first recorded static groundwater elevation was at YVWD-37 at 2,556 feet above NAVD88 in April 1921. This well is located in the northern part of the Crafton subarea. Historically, groundwater elevations in the Yucaipa Subbasin have ranged from 1,350.63 feet above NAVD88 in the Live Oak subarea to 3,355.80 feet above NAVD88 in the Oak Glen subarea.

In the 50-year historical period from 1966 to 2016, the highest static groundwater elevations (i.e., historical high) observed in the Calimesa, Wilson Creek and Gateway subareas occurred in the spring of 1988. Static groundwater elevations in the Subbasin ranged from 3,165.89 feet above NAVD88 at YVWD-13 in the Oak Glen subarea to 1,793.70 feet above NAVD88 at WHWC-02A in the Western Heights subarea. The hydraulic gradient in the principal aquifer in the spring of 1988 was 0.0448 feet/foot. The groundwater flow direction was to the southwest at an azimuth of 239 degrees.

The lowest groundwater elevations (i.e., historical low) observed in the Subbasin occurred in the Fall of 2007. The historical low in groundwater elevations occurred right before the marked increase in SWP water imported into the Subbasin by YVWD in the 2007 WY, and subsequent decline in groundwater production from 13,000 acre-feet per year (AFY) in the 2007 WY to 10,000 AFY in the 2009 WY. Static groundwater elevations in the Subbasin ranged from 3,346.50 feet above NAVD88 at YVWD-13 in the Oak Glen subarea to 1,728.90 feet above NAVD88 at WHWC-14 in the Western Heights subarea. The hydraulic gradient in the principal aquifer in Fall 2007 was 0.049 feet/foot. The groundwater flow direction was to the southwest at an azimuth of 232 degrees.

Groundwater in Storage

GSSI (2021) conducted a study to estimate the volume of groundwater in storage at the end of the 2016 WY. GSSI (2021) used the integrated Santa Ana River (SAR) numerical model as a tool to estimate the volume in storage. The SAR model includes the full alluvial thickness of the Subbasin, in that the bottom of the SAR model is defined by the contact between bedrock and the overlying alluvium. The estimated volume of groundwater in storage in the Yucaipa Subbasin at the end of the 2016 WY was 2,233,000 acre-feet (AF).

Groundwater Quality

The Regional Water Quality Control Board (RWQCB) Santa Ana Region recognized in the 1975 and 1983 Basin Plans that the most serious water quality issue to the Santa Ana River Basin “was the build up of dissolved minerals, or salts, in the ground and surface waters” (RWQCB 2019). The historical use of water for irrigation purposes, particularly for citrus that demanded large volumes of applied water, was a main contributor to increasing concentrations of TDS and nitrate. The RWQCB (2019) recognized the need to implement salt and nutrient management plans to control the salt and nutrient loading to the basin.

The 2004 Basin Plan update included the creation of new groundwater management zones (GMZs) and set “maximum benefit” objectives for TDS and nitrate-nitrogen in the Chino North, Cucamonga, San Jacinto Upper Pressure, Yucaipa, Beaumont and San Timoteo GMZs. The majority of the Yucaipa Subbasin is within the Yucaipa GMZ, with part of the lower sections in the Beaumont and San Timoteo GMZs. In 2014, the Regional Board adopted order number R8-2014-0005, an amendment to the Basin Plan that revised the maximum benefit commitments in the Yucaipa, San Timoteo and Beaumont GMZs.

The implementation of reverse-osmosis treatment at the YVWD WRWRF facility has reduced the TDS concentration in recycled water to an average of <300 mg/L. YVWD is serving some recycled water to its customers, with plans to increase the usage of recycled water, for irrigation purposes. The application of recycled water for irrigation purposes has not increased TDS concentrations in the principal aquifer. Nitrate concentrations observed in the Subbasin have, in general, remained steady at <10 mg/L after agricultural practices in the Plan Area decreased significantly after the 1970s and septic systems were replaced with sanitary sewer services in the 1980s, with the exception of the Western Heights subarea. There are no TDS or nitrate water quality issues that may affect the long-term supply and beneficial uses of groundwater produced from the principal aquifer.

Land Subsidence

Historical records of land subsidence in the Plan Area do not indicate that land subsidence resulted from past groundwater production from the principal aquifer. Land subsidence was attributed to past tectonic activity associated with movement along the San Andreas and San Jacinto Fault Zones. Land subsidence data obtained from the SGMA Data Portal (State of California 2021) indicated a range of subsidence for the Plan Area from 0.0 feet to 0.054 feet, or 0.65 inches, from June 2015 to October 1, 2018. This does not constitute a significant and unreasonable vertical displacement of land surface that “substantially interferes with surface land uses and may lead to undesirable results,” (23 California Code of Regulations 354.28 (c) (5)).

Because the minimum thresholds established in this GSP are based on groundwater elevations at or below the historical low groundwater elevations observed in the Plan Area, there exists the potential for land subsidence to occur should groundwater levels fall below the historical lows over a long period. Subsidence related to declining

groundwater levels as a result of groundwater withdrawals cannot be directly measured in the Plan Area, so the minimum thresholds established for the chronic lowering of groundwater levels will be used as a surrogate for direct measurements of land subsidence. Should groundwater levels fall below the historical lows and persist at such a level for more than 12 months, then the Yucaipa GSA will refer to the InSAR data set included in the SGMA Data Portal and periodically obtain future data to compare to the baseline dataset compiled from June 2015 to October 1, 2018.

Groundwater – Surface Water Connections

Wilson Creek, Oak Glen Creek, and Yucaipa Creek are the major surface water drainages in the Yucaipa Subbasin that may have a hydrologic connection with the underlying principal aquifer. However, no direct investigations have been conducted to characterize the relationship between surface water flows in these drainages with the underlying groundwater. Groundwater elevation data collected at wells located near these drainages indicated depths-to-water greater than 200 feet below ground surface (bgs). Shallow observation wells installed adjacent to San Timoteo Creek indicated that San Timoteo Creek was a gaining stream upstream of its confluence with Yucaipa Creek and the reach downstream of Alessandro Road was characterized as a losing stream. The best available estimates for groundwater-surface water connections derive from the preliminary U.S. Geological Survey integrated hydrological numerical model. The numerical model simulates the amount of runoff originating from precipitation over the San Timoteo Wash watershed and computes leakage from flows in the creeks to the underlying aquifer.

Groundwater Dependent Ecosystems

GDEs in the Plan Area were characterized by reviewing the NCCAG dataset alongside measured groundwater elevations, aerial photographs, and Landsat data analyzed by The Nature Conservancy. The Nature Conservancy used Landsat data to calculate historical variations in the Normalized Derived Vegetation Index (NDVI) and Normalized Derived Moisture Index (NDMI). The Nature Conservancy calculated average values of NDVI and NDMI between July 9 and September 7 of each year to estimate vegetation health during the driest period of the year, when the overlying habitats are most likely to depend on groundwater. GDEs were identified adjacent to San Timoteo Creek, Oak Glen Creek and Wildwood Canyon Creek. The habitats located along Oak Glen Creek, Wildwood Canyon Creek, and San Timoteo Creek consist of coast live oak (*Quercus agrifolia*), riparian mixed hardwood, Fremont cottonwood (*Populus fremontii*), and willow (*Salix* spp.).

ES-2.4 Water Budget

A historical water budget was prepared for the 50-year period starting in water year 1965 and ending water year 2014 (October 1, 1965, to September 30, 2014). Current conditions in the Subbasin were characterized by quantifying the water budget for the period from the 2015 WY through 2018 WY (October 1, 2014, to September 30, 2018). Three future scenarios were assessed to characterize projected conditions in the Subbasin. These scenarios characterize projected water budgets for the period extending from the 2019 WY through the 2069 WY (October 1, 2018, to September 30, 2069). Individual components of the water budget are described in units of acre-feet (AF) or acre-feet per year (AFY).

Estimates of the individual water budget components for the historical and current conditions in the Basin are based on simulation results from the Yucaipa Integrated Hydrologic Model (YIHM). The YIHM is an integrated surface water and groundwater numerical model developed by the U.S. Geological Survey to simulate the effects of native and non-native water supplies and demands on groundwater conditions across the entire Yucaipa Valley watershed. Individual water budget components were extracted from the YIHM based on the B118 boundary for the Yucaipa Subbasin.

ES-2.5 Management Areas

In order to sustainably manage the groundwater resources of the Yucaipa Subbasin, the Subbasin was divided into four management areas. The boundaries of the management areas were based on the geologic structures (i.e., faults, hydraulic barriers) that influence groundwater flow and defined the hydrogeologic subareas in the Subbasin, the distribution of water supply wells by the different water purveyors, and the identification and location of GDEs in the Subbasin. The geologic structures, or faults and hydraulic barriers, that influence groundwater flow across them (e.g., the Chicken Hill Fault and South Mesa Barrier) are effective boundaries to establish management areas as groundwater production on one side of the structure will not significantly affect groundwater levels at wells located on the other side. Each management area was assigned minimum thresholds and measurable objectives that will define sustainability within their individual boundaries.

The following management areas, listed in order from the highest to lowest along the hydraulic gradient in the Subbasin, are based on the geologic structures that defined the hydrogeologic subareas in the Subbasin, the distribution of public water supply wells, and presence of GDEs:

1. North Bench Management Area
2. Calimesa Management Area
3. Western Heights Management Area
4. San Timoteo Management Area

ES-3 Sustainable Management Criteria

The goal is to manage groundwater resources for sustainable, long-term use in the Yucaipa Subbasin. Long-term sustainable management includes:

- Maintaining sufficient groundwater in storage to allow for ongoing groundwater production that meets the operational demands of South Mesa, South Mountain, WHWC and YVWD and private well users, and the regulatory commitments established in the Plan Area.
- Ensuring that groundwater production does not result in significant and unreasonable loss of GDEs.

The sustainability goal for the Plan Area was developed using historical groundwater elevations, groundwater in storage, and the identification of GDEs in the Plan Area. The importation of SWP water into the Subbasin in 2003 has provided a supplemental source of water, which led to a reduction in groundwater production in the Yucaipa Subbasin. This supplemental source of water, which averaged approximately 8,000 AFY since 2008, has led to an average reduction in groundwater production by 3,000 AFY. Consequently, groundwater levels have recovered between 50 feet in the Calimesa Management Area and 200 feet in the North Bench Management Area in the past 10 years, with the volume of groundwater in storage in the Subbasin increasing by approximately 18,000 AF. The cessation of the decline in groundwater levels observed from 1997 to 2007, and observed storage increase over the last 10 years, indicates that the Yucaipa GSA member agencies have been managing the groundwater resource sustainably.

ES-3.1 Undesirable Results

Under SGMA, undesirable results occur when groundwater conditions in the Plan Area cause significant and unreasonable effects to any of the six sustainability indicators:

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

The four sustainability indicators that do apply to the Yucaipa Subbasin, and which will be used to evaluate sustainable management in the Subbasin, include (1) chronic lowering of groundwater levels, (2) reduction of groundwater storage, (3) land subsidence, and (4) interconnected surface water. Minimum thresholds and measurable objectives were defined for each of these four sustainability indicators, where applicable, for the four management areas. A minimum threshold represents a condition in the management area when undesirable results are experienced. A measurable objective represents a condition when the groundwater resource is managed sustainably and no undesirable results are experienced.

For the North Bench, Calimesa and Western Heights management areas, the minimum thresholds and measurable objectives are based on historical lows in groundwater in storage and drought buffers that the Yucaipa GSA identified as providing operational flexibility before undesirable results are experienced. For the San Timoteo Management Area, the minimum threshold and measurable objective are based on shallow groundwater levels that sustain GDEs (along San Timoteo Creek and potential GDEs along Yucaipa Creek).

The following minimum thresholds and measurable objectives established for each management area are applicable for these sustainability indicators: chronic lowering of groundwater levels, reduction of groundwater storage, land subsidence, and depletion of interconnected surface water. Degraded water quality and seawater intrusion are not applicable in the Subbasin.

North Bench Management Area: The current volume of groundwater in storage in the North Bench Management Area is 255,000 AF. The minimum threshold is established at the historical low for groundwater in storage at 220,000 AF. The top of the drought buffer is at a volume in storage of 230,000 AF, 10,000 AF above the minimum threshold. This represents the measurable objective and provides operational flexibility to implement management actions and/or programs to prevent undesirable results when groundwater conditions decline below the minimum threshold. Groundwater conditions are defined by static groundwater levels measured at 8 wells, or representative monitoring points, in the management area. Specific groundwater elevations were defined at each representative monitoring point (RMP) that represent the minimum threshold (220,000 AF) and measurable objective (230,000 AF). Monitoring of groundwater elevations at the RMPs will provide a spatial and temporal characterization of groundwater conditions to help guide management actions to sustainably managed the Subbasin.

Calimesa Management Area: The current volume of groundwater in storage in the Calimesa Management Area is 800,400 AF. The minimum threshold is established at the bottom of a drought buffer at 772,700 AF. The measurable objective was established at the historical low volume in storage of 798,700 AF, which is

26,000 AF above the minimum threshold and represents the beginning of the drought buffer. Groundwater conditions are defined by static groundwater levels measured at 13 RMPs in the management area. Specific groundwater elevations were defined at each RMP that represent the minimum threshold (772,700 AF) and measurable objective (798,700 AF). Monitoring of groundwater elevations at the RMPs will provide a spatial and temporal characterization of groundwater conditions to help guide management actions to sustainably managed the Subbasin.

Western Heights Management Area: The current volume of groundwater in storage in the Calimesa Management Area is 800,400 AF. A drought buffer was defined from the historical low in the volume of groundwater in storage at 408,800 AF to 398,800 AF. The minimum threshold is established at 398,800 AF, the bottom of the drought buffer. The measurable objective is established at a volume in storage of 408,800 AF. Groundwater conditions are defined by static groundwater levels measured at 7 RMPs in the management area. Specific groundwater elevations were defined at each RMP that represent the minimum threshold (398,800 AF) and measurable objective (408,800 AF). Monitoring of groundwater elevations at the RMPs will provide a spatial and temporal characterization of groundwater conditions to help guide management actions to sustainably managed the Subbasin.

San Timoteo Management Area: A minimum threshold for this management area was established for the GDEs identified along San Timoteo Creek. At this time, no sustainability criteria are established for the other sustainability indicators because there are no existing municipal water supply wells that extract groundwater from the principal aquifer. If a water purveyor plans to install and operate a municipal water supply well and produce from the principal aquifer, then the water purveyor must investigate the potential influences of pumping from the principal aquifer on the shallow groundwater table sustaining the GDEs identified along San Timoteo Creek and the potential GDEs identified along Yucaipa Creek upstream of its confluence with San Timoteo Creek. Additionally, the average long-term groundwater production from the principal aquifer in the San Timoteo Management Area will be held at or below the estimated sustainable yield of 325 AFY.

The undesirable result identified for the San Timoteo Management Area is the condition when the shallow groundwater table sustaining the GDEs falls below 30 feet bgs as a result of groundwater production from the principal aquifer. A measurable objective of 20 feet bgs for the shallow groundwater table was defined and provides a reasonable margin of operational flexibility under adverse conditions by allowing for changes to groundwater production (if demonstrated to influence shallow groundwater) or the implementation of projects and/or programs to prevent groundwater levels falling below 30 feet bgs. Groundwater conditions are defined by static groundwater levels measured at six RMPs in the management area.

ES-3.2 Monitoring Network

The objective of a monitoring network is to track and monitor parameters that demonstrate “short-term, seasonal, and long-terms trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate Plan implementation” (23 CCR, Section 354.34). To accomplish this objective, the monitoring network must be capable of the following:

- Monitoring changes in groundwater and surface water conditions that may impact the beneficial uses or users of groundwater
- Monitoring groundwater conditions relative to the sustainable management criteria
- Quantifying annual changes in water budget components

Groundwater Monitoring

The groundwater monitoring network includes 76 wells. Groundwater elevation data is collected at 72 of these wells; water quality data is collected at 40 of these wells; and groundwater production data is collected at 31 wells. Groundwater elevation and groundwater production data is collected on a monthly basis by the water purveyors. Groundwater quality data is collected quarterly to annually by the water purveyors. Four of the municipal wells in the monitoring network are located outside the Plan Area and supply water to the Subbasin. This water supply is characterized as an imported groundwater supply to the Subbasin. The majority of the wells are municipal supply and monitoring wells; however, the network does include two irrigation wells operated by South Mountain.

Surface Water Monitoring

The SBCFCD manages five stream gauges within the Plan Area. Two stream gauges are located on Yucaipa Creek, one is located on Wilson Creek upstream of the confluence with Oak Glen Creek, and two stream gages are located on Oak Glen Creek upstream of its confluence with Yucaipa Creek. These stream gauges record mean daily flow rates. These stations were designed to measure peak flow events and, therefore, do not accurately measure flow outside of those peak events. SBCFCD has confidence in measurements collected at the two farthest downstream gauging stations in the Subbasin. The Yucaipa GSA will evaluate the feasibility of installing new gauging stations, if funding becomes available, or work with SBCFCD to improve the existing stations to more accurately measure stream flows in the Subbasin. Stream flow measurements are recognized as a data gap in this GSP.

Precipitation

Precipitation is monitored at 17 precipitation stations managed by SBCFCD within the Plan Area and three National Oceanographic and Atmospheric Administration stations with one in the Plan Area, one in the City of Redlands, and one in Beaumont. Daily precipitation is recorded at these stations, which provides adequate temporal resolution to evaluate short-term and seasonal impacts of precipitation on groundwater conditions in the Plan Area. The longest continuous records of daily precipitation have been measured at two SBCFCD climate stations dating back to 1932. The lengths of these records, plus long-term records for other stations, are adequate to evaluate long-term trends in precipitation within the Plan Area.

Monitoring Protocols

Monitoring protocols have been established in this GSP for the collection of groundwater elevation, groundwater production, and groundwater quality data at all wells in the Subbasin (and for those outside the Subbasin that provide water to it) to ensure a consistent recording of information to accurately represent groundwater conditions and effectively evaluate the sustainable management of the groundwater resource.

Monitoring Network Improvements

The Yucaipa GSA is required to review and evaluate the monitoring network for the Plan Area during every 5-year assessment of this GSP. Specifically, “each agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency,” (23 California Code of Regulations Section 354.38). While the existing monitoring

network satisfies the requirements to “demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions” (23 California Code of Regulations Section 354.34), there are improvements that can be made to improve local spatial coverage. Future improvements to the monitoring network have been identified for the following:

- Stream flow gauging
- Information on private well users
- Spatial and temporal gaps in groundwater level measurements

ES-4 Projects and Management Actions

Future projections using the YIHM with groundwater production constrained to the estimated sustainable yield of 10,980 AFY indicate that the Subbasin will not experience undesirable results over the 50-year planning and implementation period. The simulated Future Baseline with Climate Change II scenario indicated that conditions in the Calimesa Management Area may decline below the measurable objective and trend toward the minimum threshold at the end of the 50-year planning and implementation period. Under such conditions, the Yucaipa GSA has defined management actions that will be implemented to prevent undesirable results.

The management actions described are not currently necessary to achieve sustainability in the Plan Area, which has experienced rising groundwater levels and increased groundwater in storage since 2008. They would be implemented, as necessary, to respond to declining conditions that deviate from the future predictions by the YIHM.

Currently, no new projects have been identified as necessary to achieve groundwater sustainability in the Plan Area during the 50-year planning and implementation period. Member agencies of the Yucaipa GSA have constructed spreading basins and stormwater capture basins, and are in the process of designing and constructing new ones, to enhance recharge to the Subbasin thereby reducing dependence on imported water.

ES-4.1 Management Action No. 1

Management Action No 1: Reduce Net Use of Groundwater When Groundwater Levels Decline below Measurable Objectives

The drought buffers established for the North Bench, Calimesa and Western Heights management areas provide operational flexibility to implement management actions when groundwater conditions decline below their respective measurable objectives. The following management action will prevent undesirable results related to the chronic lowering of groundwater levels, reduction in groundwater storage, and land subsidence for these three management areas. The management action implemented when groundwater levels decline below the measurable objective for the San Timoteo management area will prevent significant and unreasonable effects resulting in a loss in surface water interconnected with shallow groundwater that sustain GDEs.

If groundwater elevations decline below the measurable objective levels established at 50% or more of the RMPs for two consecutive years in a management area, then the net use of groundwater in that management area will be reduced by a minimum 5% (Calimesa and Western Heights management areas) to 25% (North Bench management area) of the estimated sustainable yield for that management area. Groundwater elevations below the measurable objectives fall within drought buffers established in the North Bench, Calimesa and Western Heights management

areas. Reductions in the net use of groundwater in the Calimesa and Western Heights management areas are based on a tier structure that incrementally increases the reduction in groundwater use should groundwater elevations continue to decline.

If groundwater elevations decline below the minimum threshold levels established at 50% or more of the RMPs for two consecutive years in a management area, then the net use of groundwater in that management area will be reduced by a minimum 15% (Western Heights management area) to 35% (North Bench management area) of the estimated sustainable yield for that management area.

The net reductions in groundwater use may be achieved by either reducing groundwater production, artificially recharging the aquifer with supplemental water, using supplemental water for in lieu use, enacting water conservation programs and/or other programs that result in a net reduction of groundwater use, or any combination of these actions that result in a net reduction of groundwater use by the required reduction amount stipulated in this management action for a management area. Groundwater production may increase when groundwater levels recover to a higher tier in the drought buffer or rise above the measurable objective for two consecutive years. If the management action is implemented and conditions do not improve over a 5-year evaluation period, then the Yucaipa GSA will reevaluate and, possibly, recalibrate the YIHM to improve the accuracy of the model in estimating the sustainable yield and predicting future conditions.

For the San Timoteo Management Area, six RMPs were identified to characterize shallow groundwater elevations and evaluate whether groundwater production from the principal aquifer will cause significant and unreasonable effects on the interconnection between surface water and groundwater. GDEs have been identified along the reach of San Timoteo Creek in the Plan Area. If groundwater levels decline at 50% or more of the RMPs below 20 feet bgs for two consecutive years, then the Yucaipa GSA will investigate to confirm that the decline in the water table is a result of groundwater production from the principal aquifer. This may include observing groundwater levels at the RMPs and measuring stream flow when the principal aquifer well(s) is operating, or designing and implementing an aquifer test to confirm the influence of groundwater production from the principal aquifer on stream flow and the groundwater table. If an aquifer test is conducted and confirms the influence of production from the principal aquifer on the surface water/groundwater interconnection and a subsequent drawdown of the water table, then production from the principal aquifer will be reduced to the extent that it no longer causes a significant and unreasonable effect.

ES-4.2 Management Action No. 2

Management Action No. 2: Sustainable Yield Pumping Allocations and Groundwater Replenishment

At the adoption of the GSP, groundwater sustainable yield pumping allocations will be assigned to YVWD and private water users in the North Bench Management Area, to South Mountain, South Mesa, YVWD and private water users in the Calimesa Management Area, and to WHWC in the Western Heights management area. No sustainable yield pumping allocations were assigned in the San Timoteo management area at this time because the Yucaipa GSA needs to confirm the location and volume of private pumping from the principal aquifer and determine whether sustainable yield pumping allocations are appropriate to manage groundwater production in this management area.

The pumping allocations are designed to regulate the annual volume of groundwater produced by each groundwater user per water year and maintain the total groundwater produced at or below the estimated sustainable yields for these management areas. As an incentive to manage groundwater production at or below the sustainable yield

pumping allocation, a groundwater user may earn pumping credits in the amount of the sustainable yield pumping allocation less the groundwater pumped.

The Yucaipa GSA will apply a 5-year rolling pumping credit system to keep account of the pumping credits earned by each groundwater user, meaning pumping credits that are earned and not used after 5 years will be lost. Pumping credits, if available, may be used to offset the volume of groundwater produced in excess of the sustainable yield pumping allocation to the extent that the credits equal the pumping exceedance. Any remaining deficit will be charged a replenishment fee. The replenishment fee will be equivalent to the volume of groundwater that exceeds the sustainable yield pumping allocation multiplied by the rate per AF to purchase supplemental water at San Bernardino Valley Municipal Water District or San Gorgonia Pass Water Agency rates for imported SWP water. The supplemental water may be used to artificially recharge a management area, or as in lieu use to offset the pumping exceedance. Any pumping credits remaining will carry over into the next water year under the 5-year rolling pumping credit system.

The assessment for pumping credits will begin with the 2022 WY. The volume of water pumped per user will be accounted for on a monthly basis beginning October 1, 2021. Pumping credits will be earned by users that pump less than their respective sustainable yield pumping allocations for the 2022 WY. Pumping credits cannot be transferred or sold to another entity within a given management area or with the Subbasin. The sustainable yield pumping allocations will be reassessed during every periodic evaluation when the water budget analysis is updated and the sustainable yield reevaluated.

ES-4.3 Management Action No. 3

Management Action No. 3: Surplus Supplemental Water Spreading

Surplus supplemental water, which is not associated with Management Action #2, and discharged to a spreading basin to facilitate the artificial recharge of the Subbasin will have a separate accounting by the Yucaipa GSA. The surplus supplemental water will be accessible to the water purveyor that purchased the water and percolated it at a spreading basin. This water will be available to help offset production exceedances above the sustainable yield pumping allocations instead of pumping credits earned via Management Action #2.

ES-4.4 Projects

Currently, the Plan Area is not experiencing undesirable results with regard to the chronic lowering of groundwater elevations, reduction of groundwater in storage, land subsidence, and depletion of surface water as a result of groundwater production from the principal aquifer that threatens GDEs. The importation of SWP water as a supplemental source of water, both as direct use and through artificial recharge in the various spreading basins, has allowed the Yucaipa GSA member agencies to reduce groundwater production in the North Bench, Calimesa and Western Heights management areas to levels below their respective estimated sustainable yields. Groundwater production by private well owners in the San Timoteo management area has not caused significant and unreasonable effects related to the sustainability indicators per SGMA. The Subbasin is currently managed sustainably.

Management actions were defined to achieve sustainable management of the groundwater resources in the Plan Area should groundwater elevations decline below measurable objectives. These actions will be implemented when groundwater levels decline to the drought buffers established for the North Bench, Calimesa and Western Heights management areas. The drought buffers provide operational flexibility for the Yucaipa GSA to implement these management actions and/or other programs to prevent undesirable results.

No projects were identified in this GSP to help achieve groundwater sustainability in the Plan Area. Yucaipa GSA member agencies have constructed stormwater capture basins to enhance recharge to the Subbasin. The Wilson Creek and Oak Glen Creek spreading basins are designed to capture stormwater and are used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. Other existing and planned stormwater capture basins will provide additional opportunities to capture and recharge stormwater flows thereby reducing the reliance on imported water to meet the basin measurable objectives.

ES-5 Plan Implementation

Upon adoption of this GSP by the Yucaipa GSA, the primary activities associated with implementing the GSP include administrative duties by the member agencies of the Yucaipa GSA, the management of data collection, data validation, and analysis to evaluate conditions in the Subbasin, the preparation and submittal of annual reports and periodic evaluations, with associated data, to DWR, and an assessment of conditions in the Subbasin and determination if management actions need to be implemented. During the initial 5-year period after the GSP is adopted, the Yucaipa GSA will evaluate options to address data gaps, and conduct feasibility studies to evaluate the effectiveness of potential spreading basins and other programs that would maintain or achieve sustainability in the Subbasin.