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EXECUTIVE SUMMARY

Eastern Municipal Water District (EMWD) has developed this Groundwater Sustainability Plan (GSP) for the San Jacinto Groundwater Basin (SJGB) in compliance with the Sustainable Groundwater Management Act (SGMA; California Water Code [CWC], Section 10720 et seq.), which was passed by the California legislature and signed into law in 2014. This GSP has been developed by EMWD as the Groundwater Sustainability Agency (GSA) in accordance with the Department of Water Resources (DWR) GSP Regulations[1] to apply to the entirety of the San Jacinto Groundwater Basin (DWR Basin 8-005) that is not adjudicated[2]. The non-adjudicated part of the SJGB is considered the Plan Area in this GSP. Data from, and conditions in the adjudicated portions of the SJGB have been incorporated into this GSP, as appropriate, for understanding groundwater conditions within the Plan Area (Figure ES-1). The purpose of this GSP is to define the groundwater conditions that will be used to ensure ongoing, long-term, sustainable management of the groundwater resources within the Plan Area. The groundwater resources of the SJGB support domestic, agricultural, municipal and industrial, and environmental uses. Long-term sustainable management includes:

- Maintaining sufficient groundwater in storage to allow for ongoing groundwater production that meets the operational demands of groundwater users in the Plan Area.
- Protecting beneficial uses such as municipal and domestic supplies of fresh groundwater resources in the Lakeview and Perris North Groundwater Management Zones (GMZs) to the extent possible, by minimizing the northward and eastward migration of brackish groundwater from the Perris South GMZ.
- Avoiding subsidence related to groundwater production that substantially interferes with surface land uses.
- Ensuring that groundwater production does not result in significant and unreasonable loss of groundwater dependent ecosystems.

ES-1.0 INTRODUCTION

The SJGB is an approximately 248 square mile groundwater basin in Riverside County (Figure ES-1). DWR has designated the SJGB, which underlies the San Jacinto, Perris, Moreno and

[1] GSP Regulations refers to the emergency regulations adopted by DWR as California Code of Regulations (CCR), Title 23 (Waters), Division 2 (Department of Water Resources), Chapter 1.5 (Groundwater Management), Section 350 et seq. Specific Sections of the CCR are cited in the GSP as "CCR Section […]."

[2] CWC Section 10720.8 states that SGMA does not apply to adjudicated basins. There are three adjudications that are wholly or partially within the physical boundaries of the SJGB (Figure ES-1). This GSP consists of a "single plan covering the entire basin developed and implemented by one groundwater sustainability agency," per CWC Section 10727(b)(1), with EMWD acting as the single-agency GSA. It does not apply to the adjudicated areas within the SJGB.

Menifee Valleys, a high-priority groundwater basin. As a result of this designation, the SJGB is subject to SGMA.

Approximately 39% of the SJGB is adjudicated, 2% of the SJGB is under the jurisdiction of the Federal government, and the remaining 59% of the SJGB lies within the jurisdictional boundaries of the EMWD. The adjudicated portion of the SJGB falls under three separate adjudications: the Hemet-San Jacinto Basin adjudication, the San Bernardino Basin Area adjudication, and the Santa Margarita River Watershed adjudication (Figure ES-1). Of these adjudicated areas, the Hemet-San Jacinto Basin adjudicated area has the greatest overlap with the SJGB, encompassing approximately 85 square miles within the SJGB. In contrast, the boundaries of the San Bernardino Basin Area and Santa Margarita River Watershed adjudications each overlap approximately 4 square miles of the SJGB. SGMA does not apply to the adjudicated areas of the SJGB, which are under the jurisdiction of the respective watermasters.

Federal land use jurisdiction in the Plan Area includes the Department of Defense, for activities and actions on the March Air Reserve Base (MARB), and the U.S. Department of Veterans Affairs (National Cemetery Administration) for management of the Riverside National Cemetery. Both MARB and the Riverside National Cemetery are located on the former March Air Force Base, which encompassed approximately 6,500 acres straddling Interstate 215 just south of Highway 60 (March JPA 2019). In 1996, March Air Force Base was converted from an active duty base to a reserve base and 4,400 acres of the former active duty base was transferred to the public jurisdiction of the March Joint Powers Authority (March JPA 2019), leaving the remainder of the base under the jurisdiction of the Air Force Reserve Command.

The portion of the SJGB that is not adjudicated and is not under Federal jurisdiction, has been managed by EMWD, under a Groundwater Management Plan that was adopted in 1995 (EMWD 1995). This area is known as the West San Jacinto Basin, to distinguish it from the Hemet-San Jacinto adjudicated area, which covers the eastern part of the SJGB. In this GSP the Hemet-San Jacinto adjudicated area is referred to as the "Hemet-San Jacinto Management Area."

In 2017, EMWD notified DWR that it had formed the West San Jacinto GSA. The jurisdictional boundary of the West San Jacinto GSA encompasses the non-adjudicated portion of the SJGB that intersects with EMWD's jurisdictional boundary and does not include the portion of the SJGB that is under Federal jurisdiction (Figure ES-1). However, this GSP has been developed to apply to the entire area of the SJGB that is not adjudicated, including the area of the SJGB that is under Federal jurisdiction. The combined area of the West San Jacinto GSA, MARB, and the March JPA are referred to as the "Plan Area" in this GSP. This GSP identifies sustainable management criteria within the Plan Area. These criteria were developed using current and historical data from the entire SJGB.

EMWD submitted Bulletin 118 basin boundary modification requests to DWR in 2016 and subsequently in 2018 to adjust the boundary to better represent the local groundwater aquifer. As part of the basin boundary modifications, areas of shallow bedrock on the southwestern boundary of the Plan Area were removed from the 2016 Bulletin 118 Groundwater Basin boundary, along with areas that fall under the jurisdiction of the Hemet-San Jacinto Watermaster. This GSP applies to the modified Plan Area boundary that was approved by DWR on February 11, 2019.

ES-2.0 BASIN SETTING

ES-2.1 Surface Water and Precipitation

The SJGB lies within the approximately 780 square mile San Jacinto Watershed (Figure ES-2). The San Jacinto River and its tributaries are ephemeral streams that contribute recharge to the SJGB as surface water infiltrates through the streambed and migrates in the subsurface to the groundwater table. The other primary drainages in the SJGB are the Salt Creek flood control channel, and the Perris Valley Storm Drain.

Flows in the primary drainages of the SJGB reflect the dry Southern California setting in which the SJGB is located. Riverside County Flood Control and Conservation District maintains eight precipitation stations in the SJGB, six of which are located in the Plan Area. Within the SJGB, station 186, in the City of San Jacinto, has recorded precipitation since 1915. This station provides the longest record of precipitation in the SJGB. The average water-year[3] precipitation measured at station 186 is 12.5 inches (Figure ES-3). This gauge has the highest average precipitation in the SJGB, with precipitation measured at other gauges ranging from 9.9 to 12.0 inches over the time period during which those gauges operated. Precipitation trends showing periods of above and below average precipitation were similar across all the gauges in the SJGB.

ES-2.2 Hydrogeologic Conceptual Model

The boundaries of the SJGB are formed by the San Jacinto Mountains on the east, the San Timoteo Badlands on the northeast, the Box Springs Mountains on the north, lower-relief hills on the west (e.g., Gavilan Peak and Steele Peak), and the Santa Rosa Hills and Bell Mountain on the south (Figure ES-1). The bedrock hills that surround the SJGB prevent hydraulic communication between the SJGB and other nearby groundwater basins. As a result, the SJGB is a closed groundwater basin with no significant groundwater flow between it and other nearby groundwater basins (EMWD 2016). Intrusive crystalline bedrock, and isolated areas of Pre-Cretaceous and Cretaceous metamorphic formations of sedimentary and volcanic origin form the bottom boundary of the SJGB.

[3] A water-year begins on October 1 and ends on September 30 of the following year. For example, water year 2015 began October 1, 2014 and ended September 30, 2015.

Alluvial deposits from the early Pleistocene through the late Holocene compose the primary water bearing sediments in the SJGB. Depth to bedrock in the Plan Area ranges from near ground surface adjacent to internal and boundary hills and mountains to depths of greater than 2,000 feet below land surface in the northeastern part of the Plan Area. The thick alluvial deposits on the east side of the Plan Area, in the vicinity of Mystic Lake, result from faulting along the Claremont and Casa Loma Faults. Confining, or clay-rich, layers within the Plan Area tend to be laterally discontinuous and of limited aerial extent, consistent with the depositional environment.

The distribution of groundwater production wells, the location of production areas within the Plan Area, the relative contribution of inflow and outflow sources, and the subsurface geology are shown in Figure ES-4, which summarizes the hydrogeologic conceptual model of the Plan Area. Historically, the primary inflows to the alluvial aquifer have been mountain front recharge, precipitation, seepage from Lake Perris, and return flows from irrigation (Figure ES-4). Together, these compose approximately 86% of the annual recharge to the Plan Area. The primary outflow is groundwater production (Figure ES-4).

ES-2.3 Current and Historical Groundwater Conditions

Groundwater Elevations

Groundwater elevations in the SJGB are influenced by the rates of groundwater production and groundwater recharge. Before the 1980s, groundwater production resulted water level declines in parts of the SJGB. These water level declines led to adjudication of the Hemet-San Jacinto management area, and appointment of a watermaster to manage groundwater production and management in the eastern part of the SJGB. In the western part of the SJGB, which is not adjudicated, groundwater elevations have been rising since the 1980s. This recovery in groundwater elevations occurred despite prolonged periods of drought that occurred from 1984 to 1991, 1998 to 2002, and 2005 to 2018.

Groundwater elevations in the Plan Area measured in October 2018 ranged from approximately 1200 feet above mean sea level (MSL) to 1800 feet MSL (Figure ES-5). The highest groundwater elevations were measured in the northeastern part of the Plan Area, north of state route 60, and the lowest groundwater elevations were measured in the Lakeview area, adjacent to the Lakeview Mountains (Figure ES-5). Groundwater flow directions in the Plan Area are complex and depend on both local groundwater production operations, and subsurface hydrogeology. Groundwater flow is deflected around large bedrock outcrops that disrupt the continuity of the alluvial aquifer in multiple locations throughout the Plan Area. In general, however, groundwater within the Plan Area tends to flow from the north, south, and west, towards the South Perris Production Area.

Groundwater in Storage

The rising groundwater levels in the Plan Area indicate that groundwater recharge exceeded groundwater production since the mid-1970s. Annual estimates of the change in groundwater in storage were computed using simulation results from EMWD's groundwater model, a MODFLOW numerical groundwater flow model developed for the San Jacinto Groundwater Basin. Between water years 1985 and 2012, the EMWD's groundwater model estimates that groundwater in storage increased by an average rate of approximately 15,600 AFY. This resulted in a cumulative increase of groundwater in storage of approximately 440,000 AF over the simulated time period (Figure ES-6).

In this GSP, the current condition water budget was calculated from EMWD's groundwater model using the average groundwater supply, demand, and changes in storage between water years 2013 and 2018. During this time period, there was 32,200 AFY of average annual recharge to the Plan Area, and an average annual groundwater discharge of 26,100 AFY. This resulted in an average annual increase in groundwater in storage of approximately 6,100 AFY between 2013 and 2018, for a cumulative increase of approximately 30,500 AF.

Groundwater Quality

Groundwater quality in the SJGB has been impacted by historical agricultural and industrial practices. Constituents of concern (COCs) in the groundwater include nitrate and total dissolved solids (TDS), which have accumulated in the SJGB over time and currently exceed the water quality objectives established in the *Water Quality Control Plan for the Santa Ana River Basin* (Basin Plan; RWQCB 2019). In addition to distributed sources of TDS and nitrate, point source contaminants from industrial, service commercial (e.g., gas stations, dry cleaners, etc.), and military facilities have locally affected water quality with specific contaminants such as fuels, perchlorate, and PFAS[4]. Historical activities at MARB, which is the largest and most consequential environmental cleanup site in the Plan Area, have resulted in the detection of elevated concentrations of fuels, oils and solvents; volatile organic compounds (VOCs); polycyclic aromatic hydrocarbons (PAH); and PFAS.

Of the potential COCs measured in the groundwater of the Plan Area, TDS and nitrate are the only two for which groundwater quality objectives have been developed in the Basin Plan (Table ES-1). This means that the Basin Plan has defined concentrations of these constituents in the groundwater for the "reasonable protection of beneficial uses of water" (RWQCB 2019). Other COCs have regulatory thresholds that are applied after the groundwater has been extracted and before it can

[4] PFAS stands for per-and polyfluoroalkyl substances, which include the specific chemical compounds: perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

be served as drinking water. Therefore, TDS and nitrate are the focus of the water quality discussion in this GSP.

Table ES-1
Ambient TDS and Nitrate as Nitrogen Concentrations and Assimilative Capacity

Groundwater Management Zone	Water Quality Objective	Historical Ambient	2015 Ambient	Difference from 2012 to 2015	Assimilative Capacity[a]
Total Dissolved Solids Concentration (mg/L)					
Perris North	570	568	720	–40	–150
Perris South	1,260	1,258	2,340	–60	–1,080
Lakeview/Hemet-North*	520	519	850	–10	–330
Menifee	1,020	1,021	1,970	–60	–950
San Jacinto-Lower Pressure	520	520	780	–20	–260
Nitrate as Nitrogen Concentration (mg/L)					
Perris North	5.2	5.2	7.4	0.1	–2.2
Perris South	2.5	2.5	6.0	0.2	–3.5
Lakeview/Hemet-North*	1.8	1.8	2.6	0.1	–0.8
Menifee	2.8	2.8	4.5	–0.1	–1.7
San Jacinto-Lower	1.0	1.0	1.5	0.4	–0.5

Source: SAWPA (Santa Ana Watershed Project Authority Basin Monitoring Program Task Force) 2017. Recomputation of Ambient Water Quality in the Santa Ana River Watershed for the Period 1996 to 2015. Prepared by DBS&A. September.
a) Assimilative capacity is the difference between the water quality objective and the current ambient water quality. Where the assimilative capacity is below 0, the current water quality is poorer than the water quality objective.

EMWD implemented a groundwater management plan in 1995 to address increasing concentrations of TDS and nitrate in groundwater. TDS and nitrate concentrations are analyzed every three years as part of amendments to the Basin Plan (RWQCB Resolution No. R8-2004-0001; SAWPA 2017). The assimilative capacity for TDS and nitrate is assessed by Groundwater Management Zones (GMZs) within the Plan Area that were established as part of the Basin Plan (Table ES-1; Figure ES-7). The Santa Ana Watershed Project Authority, its member agencies, and the Basin Monitoring Program Task Force produce information on ambient water quality in each GMZ within the Santa Ana River Basin, including those within the Plan Area, and periodically update and evaluate progress toward meeting the applicable groundwater quality objectives in the Basin Plan.

Subsidence

Subsidence related to groundwater withdrawal is not currently occurring in the Plan Area. Historically, subsidence has occurred in the vicinity of Mystic Lake, an ephemeral lake on the east side of the Plan Area. This subsidence has been linked to the combined effects of groundwater withdrawal and tectonics. Mystic Lake overlies strands of the San Jacinto Fault that have formed a pull-apart valley that has subsided at a rate of up to 1.2 inches per year (3 cm per year). DWR evaluated the risk of future subsidence related to groundwater withdrawal in groundwater basins

throughout California (DWR 2014). DWR ranked the SJGB as having a low risk for future subsidence related to groundwater withdrawal.

Groundwater/Surface Water Connections and Groundwater Dependent Ecosystems

Groundwater elevation, streamflow, and lithologic data indicate that groundwater and surface water are not connected within the majority Plan Area. Streamflow in the drainages of the Plan Area is ephemeral. Groundwater is encountered at depths greater than 100 feet below ground surface in the vicinity of the San Jacinto River. In the vicinity of the Perris Valley Storm Drain and along the western stretch Salt Creek Flood Control Channel, groundwater is encountered at depths between 30 and 70 feet below land surface. Surface water infiltration through the bed of the San Jacinto River, Perris Valley Storm Drain, and Salt Creek Flood Control Channel is not impacted by groundwater production and management within the Plan Area.

Groundwater and surface water may be connected in Winchester, where the Salt Creek Flood Control Channel enters the Plan Area. Groundwater is not actively extracted within this region of the Plan Area and there are no groundwater elevation measurements that characterize the interaction between surface water and groundwater.

Three vegetation communities were classified as Groundwater Dependent Ecosystems (GDEs) within the Plan Area based on measured groundwater elevations that were within 30 feet of ground surface in the vicinity of these communities. The three communities are located west of MARB and adjacent to the Riverside National Cemetery on land which is under the jurisdiction of the Federal government.

An additional 29 vegetation communities in the Plan Area were identified as potential GDEs. These communities are largely located along the margins of the Plan Area, generally over 1 mile from any major groundwater production center, and within or adjacent to the foothills that surround the SJGB. Because the potential GDEs are not located near current groundwater production areas, there are no wells in the vicinity of the potential GDEs, and the groundwater elevation adjacent to the potential GDEs is not known. Because these communities are typically located along surface water drainages at the margins of the Plan Area, they may be supported by infiltrating surface water, rather than groundwater. Without direct measurement of groundwater elevation near the potential GDEs, the source of water that sustains the vegetation communities cannot be determined. Therefore, these communities have remained classified as potential GDEs for this GSP.

ES-2.4 Water Budget

The water budget for SJGB was developed using the San Jacinto Flow Model (SJFM-2014), which includes the entire SJGB, including the Hemet-San Jacinto Groundwater Management Area. Groundwater conditions between 1984 and 2012 are characterized as the historical groundwater

conditions in this GSP, and the historical water budget was calculated using the SJFM-2014 results over this time period. Current and future conditions were simulated using an updated version of the SJFM-2014. The updates included incorporating future projects, projected groundwater extractions, projected retail water sales, and recent and future projected climate conditions. The current water budget was calculated based on SJFM-2014 results for 2013 through 2018, and the future water budget was calculated based on SJFM-2014 results for 2019 through 2070. A summary of the historical, current, and projected water budgets for the Plan Area, the Hemet-San Jacinto Groundwater Management Area, and the SJGB as a whole are presented in Table ES-2.

Table ES-2
Historical Current, and Projected Average Annual Water Budget Inflows and Outflows in the Plan Area, Hemet-San Jacinto Management Area, and the entire SJGB

	Inflows (AFY)	Outflows (AFY)	Average Annual Change in Storage (AFY)
Plan Area			
Historical Period Average (1985-2012)	39,600	24,000	15,600
Current Period Average (2013-2018)	35,600	29,500	6,100
Future Projected Average (2019-2070)	46,300	48,700	-2,400
Hemet-San Jacinto Groundwater Management Area			
Historical Period Average (1985-2012)	43,300	53,000	-9,700
Current Period Average (2013-2018)	37,400	42,400	-5,000
Future Projected Average (2019-2070)	46,600	46,600	-20
San Jacinto Groundwater Basin			
Historical Period Average (1985-2012)	77,900	72,000	5,900
Current Period Average (2013-2018)	67,700	66,500	1,100
Future Projected Average (2019-2070)	87,800	90,200	-2,400

Throughout the historical period, average annual groundwater outflows from the Plan Area were approximately 24,000 AFY. Over the same period of time, groundwater in storage in the Plan Area increased by approximately 435,500 AF. In the Hemet-San Jacinto Management Area, average groundwater outflows averaged 53,000 AFY. Over the historical period, groundwater in storage decreased by approximately 271,600 AF. Overall, the SJGB as a whole gained approximately 5,900 AFY of storage between 1985 and 2012 (Table ES-2).

Groundwater outflows in the Plan Area averaged approximately 29,500 AFY between 2013 and 2018. Over this same time period, which incorporates the drought from 2013 through 2018, groundwater in storage increased by approximately 6,100 AFY in the Plan Area. In the Hemet-San Jacinto Groundwater Management Area, groundwater outflows averaged approximately 42,400 AFY and the volume of groundwater in storage decreased by approximately 5,000 AFY .

For the SJGB as a whole, groundwater in storage increased by approximated 1,100 AFY between 2013 and 2018 .

Under projected conditions, groundwater outflows in the Plan Area are estimated to reach 48,700 AFY, in part because of increased groundwater production from EMWD's Perris North Program, expansion of the Perris II desalter capacity, and DWR's Lake Perris Seepage Recovery Program. At the higher groundwater production rate, groundwater in storage is anticipated to decline on average 2,400 AFY over the course of the 50-year projected hydrologic conditions . This anticipated decline in groundwater storage is necessary to improve the groundwater quality in the Plan Area. Groundwater production in the Hemet-San Jacinto Management Area is assumed to average approximately 45,100 AFY in the future. At this production rate, groundwater in storage in the Hemet-San Jacinto Management Area is expected to remain constant over the course of the projected 50-year period (Table ES-2). Overall, the SJGB as a whole is projected to lose approximately 2,400 AF of storage annually over the course of the 50-year projection (Table ES-2).

Potential impacts to the projected water budget were also evaluated using two projected climate scenarios, provided by DWR. These two scenarios, which are taken from global climate models and scaled to 6 square kilometer grids across California, project changes to future precipitation and evapotranspiration rates in 2030 and 2070. In the first scenario, using projected precipitation and evapotranspiration conditions for 2030, the average annual change in storage in the SJGB was projected to be approximately 6,600 AFY. In the 2070 climate scenario, the average annual decrease in storage was projected to be approximately 9,600 AFY. Although these scenarios indicate long-term declines in groundwater storage, projected water levels in the future scenarios do not reach the minimum thresholds for the Plan Area, and the Plan Area is not anticipated to experience undesirable results even in the more conservative climate change scenario.

ES-3.0 SUSTAINABLE MANAGEMENT CRITERIA

The sustainability goal for the Plan Area[5] is to manage groundwater resources in a way that facilitates long-term sustainable use of groundwater in the San Jacinto Groundwater Basin. Long-term sustainable management includes:

- Maintaining sufficient groundwater in storage to allow for ongoing groundwater production that meets the operational demands of groundwater users in the Plan Area.
- Protecting fresh groundwater resources in the Lakeview and Perris North Groundwater Management Zones (GMZs) to the extent possible, by minimizing the northward and eastward migration of brackish groundwater from the Perris South GMZ.

[5] The sustainability goal and sustainability management criteria defined in this GSP apply only to the Plan Area, which is the non-adjudicated part of the San Jacinto Groundwater Basin (SJGB), because the remaining areas of the SJGB are under the oversight of a Court appointed watermaster.

- Avoiding subsidence related to groundwater production that substantially interferes with surface land uses.
- Ensuring that groundwater production does not result in significant and unreasonable loss of GDEs.

The sustainability goal for the Plan Area was developed based on the current understanding of the hydrogeologic conceptual model, which incorporates historical groundwater elevation, groundwater in storage, and groundwater quality data. Over the past 30 years, groundwater in storage has been increasing in the Plan Area and water levels have been rising (Figure ES-6). The lack of long-term overdraft, and observed storage increase over the last 30 years, indicates that EMWD has been managing the Plan Area sustainably under its Groundwater Management Plan since 1995 (EMWD 1995).

ES-3.1 Undesirable Results

Under SGMA, undesirable results occur when the effects caused by groundwater conditions occurring throughout the Plan Area cause significant and unreasonable impacts to any of six sustainability indicators. The undesirable results are:

- Chronic Lowering of Groundwater Levels
- Significant and Unreasonable Reduction of Groundwater in Storage
- Significant and Unreasonable Degradation of Water Quality
- Significant and Unreasonable Land Subsidence
- Significant and Unreasonable Interconnected Surface Water
- Significant and Unreasonable Seawater Intrusion

The definition of significant and unreasonable for each of the six indicators was determined by the GSA using the processes and criteria described in this GSP.

Chronic Lowering of Groundwater Levels

Significant and unreasonable chronic lowering of groundwater levels indicating a depletion of supply is an undesirable result applicable to the Plan Area. The primary cause of groundwater conditions that would lead to a significant and unreasonable chronic lowering of groundwater levels is groundwater production in excess of natural and artificial recharge over a period that

contains both wet and dry water years. Chronic lowering of groundwater levels in the Plan Area would cause undesirable results if groundwater levels drop to elevations below which:

- The effectiveness of existing and future projects to mitigate water quality degradation in the Plan Area is impaired
- The volume of groundwater available in the aquifer is insufficient for domestic, agricultural/industrial, and municipal supplies
- Land subsidence that is induced by groundwater withdrawals substantially interferes with land use

The GSA used well construction information, production history, and historical water levels to define that chronic lowering of groundwater levels indicating a depletion of supply would occur in the Plan Area if the average aquifer saturation[6] falls below 65% of the potential aquifer saturation. Therefore, the criteria used to define undesirable results associated with chronic groundwater level declines are groundwater elevations that correspond to an average aquifer saturation of 65% throughout the Plan Area.

Significant and Unreasonable Reduction of Groundwater in Storage

Significant and unreasonable reduction of groundwater in storage is an undesirable result applicable to the Plan Area. Reduction of groundwater in storage is related to chronic lowering of groundwater levels. The primary cause of a reduction of groundwater in storage is groundwater production in excess of natural and artificial recharge during a period containing both wet and dry water years. The GSA used well construction information, production history, and historical water levels to define that chronic lowering of groundwater levels indicating a depletion of supply would occur in the Plan Area if the average aquifer saturation falls below 65% of the potential aquifer saturation. Therefore, the criteria used to define undesirable results associated with reduction of groundwater storage are groundwater elevations that result in an average aquifer saturation below 65% throughout the Plan Area.

Groundwater elevations that correspond to an aquifer saturation of 65% are lower than historical low water levels. However, reduction of groundwater storage beyond that previously experienced in the Plan Area may be required to maintain operational flexibility for water quality management projects, protect potable aquifer, and ensure ongoing beneficial use of groundwater for municipal and agricultural/industrial supplies.

[6] Aquifer saturation is defined as the saturated aquifer thickness divided by the total aquifer thickness.

Significant and Unreasonable Degradation of Water Quality

Significant and unreasonable degradation of water quality is an undesirable result applicable to the Plan Area. This undesirable result could occur if fresh groundwater supplies are impacted by migration of brackish groundwater. Migration of brackish groundwater is related to groundwater elevation differences that determine the groundwater gradient and drive groundwater flow within and between GMZs. Based on the current understanding of the extent of impaired groundwater, and consistent with the Water Quality Control Plan for the Santa Ana River Basin (RWQCB 2019), the criterion used to define undesirable results for degraded water quality is the current location of the 1,000 mg/L TDS iso-concentration contour. Northeasterly migration of the 1,000 mg/L TDS iso-concentration contour within the Lakeview GMZ is an undesirable result associated with degraded water quality.

Significant and Unreasonable Land Subsidence Resulting from Groundwater Withdrawals

Significant and unreasonable land subsidence resulting from groundwater withdrawal is an undesirable result applicable to the Plan Area. Groundwater levels that are below historical conditions may cause subsidence because groundwater acts to reduce the effective stress needed to maintain pore-structures in the aquifer. As groundwater levels decline, pressure on the aquifer matrix increases, which may cause the pore-structure to collapse, causing the land surface to subside. The undesirable result for land subsidence in the Plan Area is defined as land subsidence resulting from groundwater withdrawals that substantially interferes with surface land uses. Water levels will be used as a proxy for direct measurement of land subsidence.

Significant and Unreasonable Seawater Intrusion

The Plan Area lies more than 30 miles inland from the Pacific Ocean and is hydraulically disconnected from surrounding basins. Therefore, seawater intrusion is not an undesirable result applicable to the Plan Area.

Significant and Unreasonable Reduction in Interconnected Surface Water and Groundwater

There are no surface water bodies in the Plan Area that connect directly to groundwater. Therefore, there is no significant and undesirable reduction of interconnected surface and groundwater in the Plan Area.

Significant and unreasonable reduction of interconnected surface water and groundwater due to groundwater withdrawals would be an undesirable result applicable to the Plan Area if declines in groundwater levels result in loss of interconnected surface water that cause significant and unreasonable loss of GDEs. The only known GDEs in the Plan Area are located west of Interstate

2015, near the Lieutenant General Archie J. Old Jr. Golf Course, where groundwater elevations and quality are actively monitored and remediated in an effort to protect potable aquifer supplies in the Plan Area. Additionally, 23 potential GDEs were identified in areas that lack groundwater measurements but are unlikely to have shallow groundwater based on groundwater levels elsewhere in the Plan Area. The three known GDEs encompass a total area of approximately 5.4 acres and are not designated as critical habitat. The small size of these GDEs, their location near industrial sites and major roads, and the history of groundwater elevations in this area that were below the thresholds necessary to sustain GDEs make these GDEs areas of low ecological value. Loss of these GDEs in the event of groundwater elevation declines in the area is not considered a significant and unreasonable loss of GDE habitat.

The additional 23 remaining potential GDEs in the Plan Area are not adjacent to current groundwater production wells, and groundwater levels in the vicinity of these potential GDEs are not known. However, groundwater elevations elsewhere in the Plan Area are typically greater than 30 feet below ground surface. Therefore, it is likely that the vegetation communities that compose these potential GDEs rely on infiltrating surface water, rather than groundwater.

Because lowering groundwater levels would not result in significant and unreasonable loss of interconnected surface water that results in significant and unreasonable loss of GDE habitat in the Plan Area specific undesirable results related to interconnected surface water and groundwater are not defined in this GSP.

Defining Undesirable Results

Undesirable results are defined using representative monitoring points (RMPs) selected from the broader groundwater monitoring well network in the Plan Area. Eleven total RMPs were selected; six are used to monitor undesirable results related to groundwater levels, four are used to monitor undesirable results related to groundwater quality, and one is used to monitor both groundwater levels and groundwater quality (Figures ES-8 and ES-9; Table ES-3).

Table ES-3
Representative Monitoring Points in the Plan Area

RMP Casing Name	Location [a]	Screen Interval (s) (ft bgs)	Sustainability Indicator(s)[b] Monitored
EMWD 74	Menifee Production Area	220-640	Levels, Subsidence, Storage
EMWD A1	South Perris Production Area	290-575	Levels, Subsidence, Storage
EMWD Skiland 05	South Perris Production Area	313-567	Levels, Subsidence, Storage
EMWD 52	North Perris Production Area	290-665	Levels, Subsidence, Storage
UCR Scott[c]	Moreno Valley Production Area	*Unknown*	Levels, Subsidence, Storage
EMWD 94	Nuevo/Lakeview Production Area	185-380;420-580	Levels, Subsidence, Storage

Table ES-3
Representative Monitoring Points in the Plan Area

RMP Casing Name	Location [a]	Screen Interval (s) (ft bgs)	Sustainability Indicator(s)[b] Monitored
Nutrilite 07[c]	Nuevo/Lakeview Production Area; Lakeview GMZ	390-697	Levels, Subsidence, Storage, Quality
Nutrilite 02[c,d]	Lakeview GMZ	*Unknown*	Quality
Nutrilite 04 [c,d]	Lakeview GMZ	170-186;198-220;262-275;282-292;310-342;372-480	Quality
Nutrilite 08 [c,d]	Lakeview GMZ	*Unknown*	Quality
Bootsma, John[c]	Lakeview GMZ	350-650	Quality

[a] Location is defined by production area for wells that are used to monitor water levels, and by groundwater management zone for wells that are used to monitor groundwater quality.
[b] Levels = Chronic Decline in Groundwater Levels, Subsidence = Land Subsidence related to groundwater withdrawals, Storage = Significant and Unreasonable Reduction of Groundwater Storage, Quality = Degradation of Water Quality
[c] Wells that are not owned by EMWD
[d] Nutrilite 02, 04, and 08 are monitored as Sentinel Wells as part of the Perris II Reverse Osmosis Treatment Facility monitoring and reporting program

The seven wells used to monitor undesirable results related to chronic declines in groundwater elevation, significant and unreasonable loss of groundwater in storage, and significant and unreasonable land subsidence resulting from groundwater withdrawal were chosen based on their proximity to areas of active groundwater production, well construction, and records of measurement. Historical groundwater elevations at these wells are representative of groundwater conditions in each of the production areas and reflect the increase of groundwater levels and storage experienced throughout the Plan Area between 1985 and 2018. Undesirable results for chronic lowering of groundwater levels, significant and unreasonable reduction of groundwater in storage, and land subsidence resulting from groundwater withdrawals are defined as groundwater elevations that are below the minimum threshold at 3 out of the 7-water level representative monitoring points for two consecutive spring monitoring events.

The five wells used to monitor undesirable results related to water quality were chosen based on their inclusion in existing groundwater quality monitoring programs, their location northeast of the current limits of the 1,000 mg/L TDS plume in the Lakeview GMZ, and their well construction. The Plan Area would be found to be experiencing undesirable results related to significant and unreasonable degradation of water quality if the concentration of TDS exceeds 1,000 mg/L at 3 of the 5-water quality representative monitoring points for 2 consecutive annual water quality sampling events.

ES-3.2 Minimum Thresholds

Minimum threshold groundwater elevations established at the seven RMPs used to monitor undesirable results related to chronic declines in groundwater elevation, significant and

unreasonable loss of groundwater in storage, and significant and unreasonable land subsidence resulting from groundwater withdrawals, coincide with the water levels at which 65% of the aquifer remains saturated within the Plan Area (Table ES-4). The water level minimum thresholds provide operational flexibility for projects in the Plan Area that aim to mitigate water quality degradation while ensuring ongoing beneficial use of groundwater by maintaining the volume of groundwater available for domestic, municipal, industrial, and agricultural supplies.

Table ES-4
Minimum Thresholds and Measurable Objectives

	Chronic Decline in Groundwater Levels		Reduction of Groundwater Storage		Land Subsidence		Degradation of Water Quality	
	Groundwater Elevation (ft MSL)						*Concentration of TDS (mg/L)*	
RMP	*MT*[1]	*MO*[2]	*MT*	*MO*	*MT*	*MO*	*MT*	*MO*
EMWD 74	1200	1250	1200	1250	1200	1250	NA	NA
EMWD A1	1200	1250	1200	1250	1200	1250	NA	NA
EMWD Skiland 05	1200	1250	1200	1250	1200	1250	NA	NA
EMWD 94	1200	1250	1200	1250	1200	1250	NA	NA
Nutrilite 07	1100	1150	1100	1150	1100	1150	1000	520
EMWD 52	1200	1250	1200	1250	1200	1250	NA	NA
UCR Scott	1300	1350	1300	1350	1300	1350	NA	NA
Nutrilite 02	NA	NA	NA	NA	NA	NA	1000	520
Nutrilite 04	NA	NA	NA	NA	NA	NA	1000	520
Nutrilite 08	NA	NA	NA	NA	NA	NA	1000	520
Bootsma, John	NA	NA	NA	NA	NA	NA	1000	520

Interconnected surface water-groundwater and seawater intrusion MTs are not established because they are not undesirable results applicable to the Plan Area

1) MT – Minimum Threshold
2) MO – Measurable Objective

Groundwater elevation and TDS concentration are not correlated in the Plan Area. Therefore, water level thresholds cannot be used as a proxy for groundwater quality thresholds. The minimum threshold for degraded water quality is a groundwater concentration of 1,000 mg/L TDS at the five-groundwater quality RMPs (Table ES-4). A concentration of TDS in the groundwater equal to 1,000 mg/L corresponds to the upper secondary maximum contaminant level for TDS established by the California State Water Resources Control Board. The water quality minimum threshold concentrations at these RMPs protect against the degradation of potable aquifer supplies by ensuring that groundwater with TDS concentrations greater than 1,000 mg/L does not migrate to the northeast into areas where the concentration of TDS in the groundwater is currently lower than 1,000 mg/L.

ES-3.3 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" (23 CCR §351. Definitions). The water level measurable objectives are 50 feet higher than the water level minimum thresholds in the Plan Area (Table ES-4). These measurable objectives provide a reasonable margin of operational flexibility under adverse conditions, by allowing for changes to groundwater production to occur before the water levels reach an elevation at which undesirable results would occur. The water level measurable objectives are approximately equal to or higher than historical low groundwater levels at five of the seven RMPs in the Plan Area.

Groundwater quality measurable objectives were established using the Basin Plan Objective of 520 mg/L TDS in the Lakeview-Hemet North GMZ (Table ES-4). The Basin Plan Objective is based on the historical water quality in the Lakeview-Hemet North GMZ. The concentration of TDS in parts of the Lakeview-Hemet North GMZ currently exceeds 520 mg/L. Therefore, working with the Santa Ana Regional Water Quality Control Board, EMWD has defined mitigation to improve the water quality while allowing the use of recycled water in this area.

ES-3.4 Monitoring Network

The objective of the monitoring network in the Plan Area is to track and monitor parameters that demonstrate groundwater conditions, and associated factors that influence groundwater conditions, in the Plan Area. In order to accomplish this objective, the monitoring network must be capable of:

- Monitoring changes in groundwater conditions
- Monitoring groundwater conditions relative to the sustainable management criteria
- Quantifying annual changes in water budget components.

The SJGB has an existing network of wells that are used to monitor groundwater conditions. This network includes both dedicated monitoring wells and production wells. The current network is capable of representing groundwater conditions in the Plan Area. The network will continue to be used to monitor groundwater conditions to assess long and short-term trends in groundwater elevation and groundwater quality. New monitoring wells associated with groundwater quality improvement projects will be installed in the Plan Area over the next 5 years. The data from these wells will be evaluated to assess whether or not the wells are suitable for inclusion in the monitoring network for the GSP.

ES-4.0 PROJECTS AND MANAGEMENT ACTIONS

The seven projects and management actions outlined in this GSP document the potential actions that the West San Jacinto GSA could undertake in the event that the current understanding of the hydrogeologic conceptual model of the Plan Area, and the numerical groundwater modeling based on that conceptual model, have not sufficiently represented the long-term groundwater conditions in the Plan Area. At this time, projects and management actions are not necessary to achieve sustainability in the Plan Area, which has experienced rising groundwater levels and increased groundwater in storage over the past 30 years. However, projects and management actions may be necessary to respond to changing conditions in the Plan Area in the future.

ES-4.1 Management Action #1 - Adjust Groundwater Production As-Needed to Meet Water Level and/or Water Quality Objectives

EMWD's existing and planned groundwater desalter facilities include production wells that are located in two of the five groundwater production areas. This allows EMWD to adjust the flow rate of groundwater produced in different geographic areas while maintaining the overall flow needed to meet anticipated consumer demand. If groundwater total dissolved solids (TDS) concentrations begin to approach the minimum threshold at three of the five groundwater quality RMPs, EMWD may need to increase groundwater production south and west of the RMPs to reverse the groundwater flow direction and maintain hydraulic control of the TDS plume in the Lakeview GMZ. If groundwater elevations decline at a rate that exceeds the projected rate of decline and water levels begin to approach the minimum thresholds for groundwater elevation at one or more of the RMPs, EMWD can shift production from one groundwater production area to another in order to allow groundwater elevations to recover in the impacted production area. Additionally, if groundwater levels in multiple groundwater production zones are approaching the minimum thresholds at the relevant RMPs, EMWD could reduce its overall groundwater production from the Plan Area, in order to allow groundwater elevations to recover.

ES-4.2 Management Action #2 – Impose Recharge or Imported Water Purchase/ Pumping Offset Fee

Projected groundwater extractions from both EMWD and private pumpers were incorporated into the future baseline and future baseline with climate change scenarios. These projected extractions are not anticipated to cause undesirable results in the Plan Area. Projected groundwater extractions are, however, anticipated to approximately equal the sustainable yield of the Plan Area. Therefore, new projects that rely on groundwater production or increase groundwater production rates from existing wells would exceed the production rates modeled in the future baseline simulation. Depending on the additional volume of water extracted and the location of new production, new projects may cause undesirable results in the Plan Area. In the event that overdraft conditions do

occur within the Plan Area such that the SJGB is no longer sustainable, Board of Directors for the West San Jacinto GSA may enact a means of increasing recharge using imported water by imposing a recharge fee, or a water purchase / pumping offset fee for groundwater users in the Plan Area. These fees would be used to develop and support projects that increase recharge and/ or purchase additional imported water to offset EMWD groundwater extraction.

ES-4.3 Management Action #3 – Develop a Groundwater Allocation

In the event that new projects relying on groundwater production or increasing groundwater production rates from existing wells cause undesirable results in the Plan Area, the Board of Directors for the West San Jacinto GSA may enact a means of limiting over-pumping by developing a groundwater allocation for pumpers in the Plan Area. Any groundwater allocation would be developed in conjunction with the stakeholders in the Plan Area and would be anticipated to incorporate historical groundwater production from existing stakeholders and EMWD. After development of the groundwater allocation, the West San Jacinto GSA would work to develop a fee structure for groundwater production in excess of the allocations assigned to each groundwater producer. If conditions require, this management action would be developed with stakeholder input after the GSP is adopted.

ES-4.4 Project #1 – Assess feasibility of recycled water delivery to Private Producers in the Menifee Production Area

Private wells extract the largest volume of groundwater in the Menifee Production Area. As a result, EMWD has less direct influence over groundwater elevations in the Menifee Production Area than it does in the other four production areas. If groundwater elevations begin to approach the groundwater level minimum threshold at well EMWD 74, which is the water level RMP well in the Menifee Production Area, EMWD will assess the feasibility of delivering recycled water to private groundwater producers in this area. Recycled water would be used to offset private groundwater production and allow groundwater levels in the aquifer to recover. EMWD has recycled water infrastructure that may allow for recycled water deliveries to private producers but, because groundwater elevations in the Menifee Production Area have been stable or rising over the last 30 years, a feasibility analysis that includes a comprehensive analysis of the engineering required to complete the delivery system, and a cost per acre foot of water has not yet been conducted.

ES-4.5 Project #2 – Conduct additional investigations and/or technical studies

Projected groundwater elevations in the Plan Area are not expected to approach either the measurable objectives, or the minimum thresholds at any of the groundwater level RMPs during the 50-year planning and implementation horizon for this GSP. Implementation of the Perris II Reverse Osmosis Treatment Facility Project is expected to prevent the northeastward migration of brackish groundwater

into the Lakeview GMZ. The projected future conditions are based on the results from the SJFM-2014, which incorporates the current hydrogeological conceptual understanding of the Plan Area, as well as projects that are known to be under development, or in the beginning stages of implementation, and an assessment of potential future climate conditions in the Plan Area. There is, however, uncertainty inherent in any numerical model projection, because models, by definition, are simplified representations of the physical world.

Because there is uncertainty in the projected conditions in the Plan Area, actual future groundwater conditions may differ from the predicted conditions. Future measured groundwater level declines that exceed the projected groundwater declines may indicate that the current understanding of the hydrogeologic conceptual model or the current representation of the influences on groundwater conditions in the numerical groundwater model need to be refined. Similarly, future measured TDS concentrations that approach the minimum thresholds may indicate that the source of water contributing to higher TDS concentrations, or the ability of EMWD to use hydraulic containment to control the northeastward spread of the brackish water plume is poorly constrained. If the management actions listed above fail to control groundwater level declines, or the increases in TDS concentration, EMWD will conduct additional investigations and/or technical studies to fill in data gaps and improve the understanding of the primary controls on groundwater conditions in the Plan Area.

ES-4.6 Project #3 – Construct Additional Dedicated Monitoring Wells

The current groundwater monitoring network in the Plan Area consists of long-screen groundwater production wells and agricultural wells, as well as dedicated monitoring wells. While it is adequate to characterize the groundwater conditions in the Plan Area, the monitoring network could be improved by installation of additional dedicated monitoring wells. Although installation of dedicated monitoring wells will not directly benefit any single measurable objective, data from dedicated monitoring wells will provide a clearer understanding of the groundwater conditions in the Plan Area both laterally and vertically. This will allow for improved management which will, in-turn, benefit the measurable objectives for groundwater quality, chronic declines in groundwater levels, and/or groundwater in storage.

ES-4.7 Project #4 – Determine The Location and Status of Domestic Wells in the Plan Area

Several domestic wells were identified in DWR's well completion report database. Groundwater quality in the Plan Area varies with geographic location and not all groundwater is suitable for domestic consumption. Groundwater wells that produce 25 AFY or more are included in the current groundwater monitoring network for the Plan Area. As part of this GSP, groundwater wells that produce 2 AFY or more will be added to the groundwater monitoring network. Typical

domestic wells use less than 2 AFY and are classified as *de minimis* wells under SGMA. This project will assess the location and status of domestic wells within the Plan Area to determine if the wells listed in DWR's database are active. Active wells will be sampled for water quality. If the water quality in these active domestic wells does not meet drinking water standards, or if groundwater level declines will impact active domestic wells with groundwater quality that does meet drinking water standards, the well users will be given the option to connect to their respective water purveyor's potable water system.

Assessing the location and status of domestic wells within the Plan Area will not directly benefit any single measurable objective. However, understanding the groundwater conditions in the Plan Area and their potential impact to domestic well users will improve overall management of the Plan Area for all beneficial uses and users.

ES-4.8 Adaptive Management

The projects and management actions included in this GSP are part of a broad portfolio of management strategies that EMWD has successfully employed over its 70-year history to maintain and improve groundwater conditions in the Plan Area and throughout its service area. Because groundwater levels have been rising, and projects have been implemented to improve water quality in the Plan Area, the decision to pursue or implement the projects and management actions in this GSP will be based on an evaluation of future groundwater conditions in the Plan Area. This adaptive management strategy relies on data to help reduce uncertainty and inform future decision-making.

Consistent with SGMA, the projects and management actions suggested in this GSP will be evaluated every 5 years, at a minimum. New projects or management actions may be proposed, and the current projects and management actions may be modified or eliminated during the 5-year evaluation process.

ES-5.0 GSP IMPLEMENTATION

Implementation of this GSP will require the GSA to prepare and submit annual reports and 5-year GSP evaluations to DWR. EMWD has prepared annual reports for the west side of the San Jacinto Groundwater Basin since 1995, and EMWD will submit an annual report for the Plan Area to DWR by April 1 of each year. The Hemet-San Jacinto Watermaster submits a separate annual report for the Hemet-San Jacinto Management Area. The annual report for the Plan Area will include the required components for each preceding water year.

EMWD will evaluate the GSP at least every 5 years. This 5-year evaluation will be provided as a written assessment to DWR that will describe whether the Plan implementation, including implementation of projects and management actions, are suitable to maintain sustainable groundwater use in the Plan Area.

Figure ES-1 San Jacinto Groundwater Basin, Plan Area Boundary, and Groundwater Sustainability Agency

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Figure ES-2 Watersheds and Drainage

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Figure ES-3 Water Year Precipitation and Cumulative Departure From the Mean Precipitation at Station #186 - San Jacinto

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Figure ES-4 Hydrogeological Conceptual Model

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Figure ES-5 Fall 2018 Groundwater Elevations

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Figure ES-6 Historical Cumulative Change in Groundwater in Storage in the Plan Area

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Figure ES-7 Groundwater Management Zones

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Figure ES-8 Water Level Representative Monitoring Points

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Figure ES-9 Water Quality Representative Monitoring Points

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