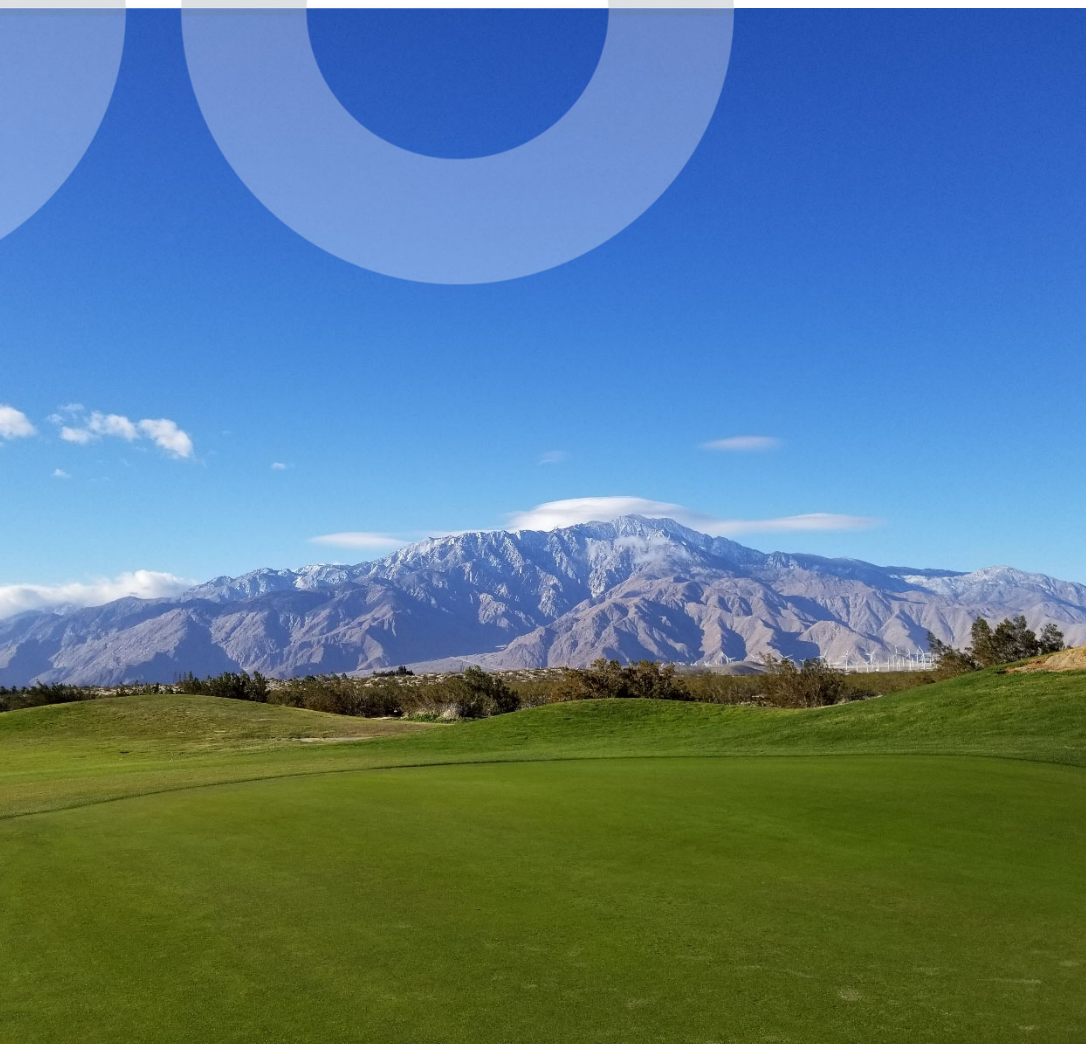
Mission Creek Subbasin Annual Report for Water Year 2021-2022

Prepared for:

Coachella Valley Water District
Desert Water Agency
Mission Springs Water District

February 2022



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February 24, 2022

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February 2022

For Submittal to:

California Department of Water Resources
in Accordance with
the Sustainable Groundwater Management Act

Prepared for:

Coachella Valley Water District

Desert Water Agency

Mission Springs Water District

Prepared by:

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Table of Contents

Appendices

List of Figures

List of Tables

Acronyms, Abbreviations, and Glossary

Acronym	Definition
AB	Assembly Bill
AD	Assessment District
AF	Acre-Feet
AFY	Acre-Feet per Year
AOB	Area of Benefit
BCM	Basin Characterization Model
bgs	Below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CDFM	Cumulative Deviation from the Mean
CDWR	California Department of Water Resources
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
COC	Constituent of Concern
CRA	Colorado River Aqueduct
CVCC	Coachella Valley Conservation Commission
CVMC	Coachella Valley Mountains Conservancy
CVRWMG	Coachella Valley Regional Water Management Group
CVWD	Coachella Valley Water District
CV-SNMP	Coachella Valley – Salt and Nutrient Management Program
CV-RUWMP	Coachella Valley Regional Urban Water Management Plan
CWA	Coachella Water Authority
DCP	Delta Conveyance Project
EIR	Environmental Impact Report
DEH	Department of Environmental Health
DHSB	Desert Hot Springs Subbasin
DHS	Desert Hot Springs
DMM	demand management measures
DWA	Desert Water Agency
ET	Evapotranspiration
ft	Feet
GAMA	Groundwater Ambient Monitoring and Assessment
GRF	Groundwater Replenishment Facility
GRP	Groundwater Replenishment Program
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GQPP	Groundwater Quality Protection Program
I-Bank	California Infrastructure and Economic Development Bank
InSAR	Interferometric Synthetic Aperture Radar
IWA	Indio Water Authority
MC-GH WMP	Mission Creek-Garnet Hill Water Management Plan

Acronym	Definition
MCL	Maximum Contaminant Level
mgd	million gallons per day
mg/L	milligrams per liter
MNM	Monitoring Network Module
MOU	Memorandum of Understanding
msl	mean sea level
MSWD	Mission Springs Water District
MWD	Metropolitan Water District of Southern California
MWH	MWH Americas, Inc. now Stantec
NAVD88	North American Vertical Datum of 1988
NGVD29	National Geodetic Vertical Datum of 1929
NOAA	National Oceanic and Atmospheric Administration
N/TDS	nitrogen/total dissolved solids
pCi/L	picocuries per liter
PRISM	Parameter-elevation Relationships on Independent Slopes Model
PMAs	Project and Management Actions
QSA	Quantification Settlement Agreement
RAC	Replenishment Assessment Charge
RCDEH	Riverside County Department of Environmental Health
RCDWR	Riverside County Department of Waste Resources
RCFCWCD	Riverside County Flood Control and Water Conservation District
RWRF	Regional Water Reclamation Facility
RWQCB	California Regional Water Quality Control Board, Colorado River Region
ROA	Result Oriented Activities
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SMCL	Secondary Maximum Contaminant Level
SNMP	Salt and Nutrient Management Plan
SWP	State Water Project
SWR	Storm Water Resources
SWRCB	State Water Resources Control Board
SWRCB-DDW	State Water Resources Control Board – Division of Drinking Water
TDS	Total dissolved solids
TSS	Technical Support Services
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VOC	volatile organic compound

Acronym	Definition
Water Infrastructure Improvements for the Nation	WIIN
WMP	Water Management Plan
WSCP	Water Shortage Contingency Plans
WVWRF	West Valley Water Reclamation Facility
WY	Water Year

Executive Summary

On behalf of the Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) (collectively the Agencies), Wood Environment & Infrastructure Solutions Inc. (Wood) has prepared this Mission Creek Subbasin Annual Report for Water Year (WY) 2020-2021 (Annual Report) in accordance with the annual reporting requirements of the Sustainable Groundwater Management Act (SGMA). The California Department of Water Resources (CDWR) designated the Mission Creek Subbasin as Basin No. 7-21.02 (CDWR, 2003). This Annual Report summarizes groundwater conditions and the implementation status of projects and management actions in the Mission Creek Subbasin (also referred to as the Subbasin) for WY 2020-2021 (October 1, 2020 to September 30, 2021). This executive summary is organized by headings that parallel those in the body of the report.

ES.1 Background

The Coachella Valley Groundwater Basin has been divided into four separate subbasins by the CDWR; these include the Indio, Mission Creek, San Gorgonio Pass, and Desert Hot Springs Subbasins. The Indio,[1] Mission Creek, and San Gorgonio Pass Subbasins have been designated medium-priority subbasins under the SGMA and the Desert Hot Springs Subbasin has been designated a very-low-priority subbasin.

On December 29, 2016, the Agencies collaboratively submitted the 2013 Mission Creek-Garnet Hill Water Management Plan (2013 MC-GH WMP [MWH, 2013]) and a bridge document (Stantec, 2016; 2016 Bridge Document) to the CDWR. Together, those documents described how the 2013 MC-GH WMP and supporting documents met the requirements of the SGMA and thus could be considered an Alternative to a Groundwater Sustainability Plan (Alternative Plan) under the SGMA. The 2013 MC-GH WMP, 2016 Bridge Document, and supporting documents were provided to the CDWR for review and evaluation as the Mission Creek Subbasin Alternative Plan. On July 17, 2019, the CDWR approved the Alternative Plan, finding it functionally equivalent to a Groundwater Sustainability Plan (GSP).

The Agencies initiated the five-year update, also known as a periodic evaluation, to the Mission Creek Subbasin Alternative Plan in 2019 and completed the five-year update entitled, "Mission Creek Subbasin Alternative Plan Update" (2022 Alternative Plan Update; [Wood and Kennedy Jenks, 2021]) in November 2021. The 2022 Alternative Plan Update was submitted to the CDWR in December 2021.

In accordance with the SGMA GSP Emergency Regulations (CDWR, 2016), annual reports are to be submitted to the CDWR by April 1 of each year following adoption of a GSP, or in this case, following submission of an Alternative Plan to the CDWR. This Annual Report contains a discussion of the Coachella Valley Groundwater Basin in general followed by sections describing each of the Annual Report elements for the Mission Creek Subbasin required by the SGMA. In addition, this Annual Report includes a new section (Section 8) describing the Sustainable Management Criteria established in the 2022 Alternative Plan Update and comparing current conditions to these criteria.

[1] The Indio Subbasin is also identified as the Whitewater River Subbasin by the United States Geological Survey, 1980. However, the subbasin is identified as the Indio Subbasin in CDWR Bulletin 108 (1964) and Bulletin 118 (2003). For continuity, this Annual Report will identify the subbasin as the Indio Subbasin.

ES.2 Coachella Valley Groundwater Basin and Subbasins

View looking west-northwest from Desert Dunes Golf Course toward the San Bernardino Mountains across the Mission Creek Subbasin.

The Coachella Valley Groundwater Basin extends approximately 45 miles southeast from the San Bernardino Mountains to the northern shore of the Salton Sea. Cities within the Coachella Valley include Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage, and the unincorporated communities of Thousand Palms, Thermal, Bermuda Dunes, Oasis, and Mecca. The Coachella Valley is bordered by the San Jacinto and Santa Rosa Mountains on the southwest, the San Bernardino Mountains on the northwest, the Little San Bernardino Mountains and the Mecca Hills on the northeast, and the Salton Sea on the southeast. The Coachella Valley lies within the northwesterly portion of California's Colorado Desert, an extension of the Sonoran Desert. The San Bernardino, San Jacinto, and Santa Rosa Mountains impede the eastward movement of storms and create a rain shadow, which results in an arid climate and greatly reduces the contribution of direct precipitation as a source of recharge to groundwater in the Coachella Valley.

Although there is interflow of groundwater throughout the Coachella Valley Groundwater Basin, fault barriers, constrictions in the groundwater basin profile, and areas of low permeability limit and control movement of groundwater. Based on these factors, the groundwater basin has been divided into subbasins including the Indio, Mission Creek, Desert Hot Springs, and San Gorgonio Pass Subbasins. The subbasins are defined without regard to water quantity or quality. They delineate areas underlain by formations which readily yield stored groundwater through water wells and offer natural reservoirs for the regulation of water supplies. The Mission Creek Subbasin has a groundwater storage capacity of 2.6 million acre-feet (AF) (CDWR, 1964).

The Mission Creek Subbasin extends from the active river channels of the upper reaches of the Whitewater River in the Coachella Valley southeast through the western portion of the Indio Hills and terminates approximately three miles north of the community of Bermuda Dunes. Much of the Mission Creek Subbasin is undeveloped and supports sparse desert vegetation. The City of Desert Hot Springs and the community of North Palm Springs (an unincorporated area not associated with the City of Palm Springs) are located in the central part of the Mission Creek Subbasin. The City of Palm Springs also extends into the Mission Creek Subbasin. Individual homes and smaller communities are scattered across the northwestern and other portions of the Mission Creek Subbasin. The portions of the Indio Hills within the Mission Creek Subbasin are undeveloped.

Average high temperatures exceed 100 degrees Fahrenheit (°F) in the months of June, July, August, and September. Based on National Oceanic and Atmospheric Administration (NOAA) records from 1991 to 2020, average high temperatures in May and October are in the low to mid 90s°F and average high temperatures in the months of November through April range from 69°F to 87°F. Average low temperatures range from 46°F in December to 80°F in August.

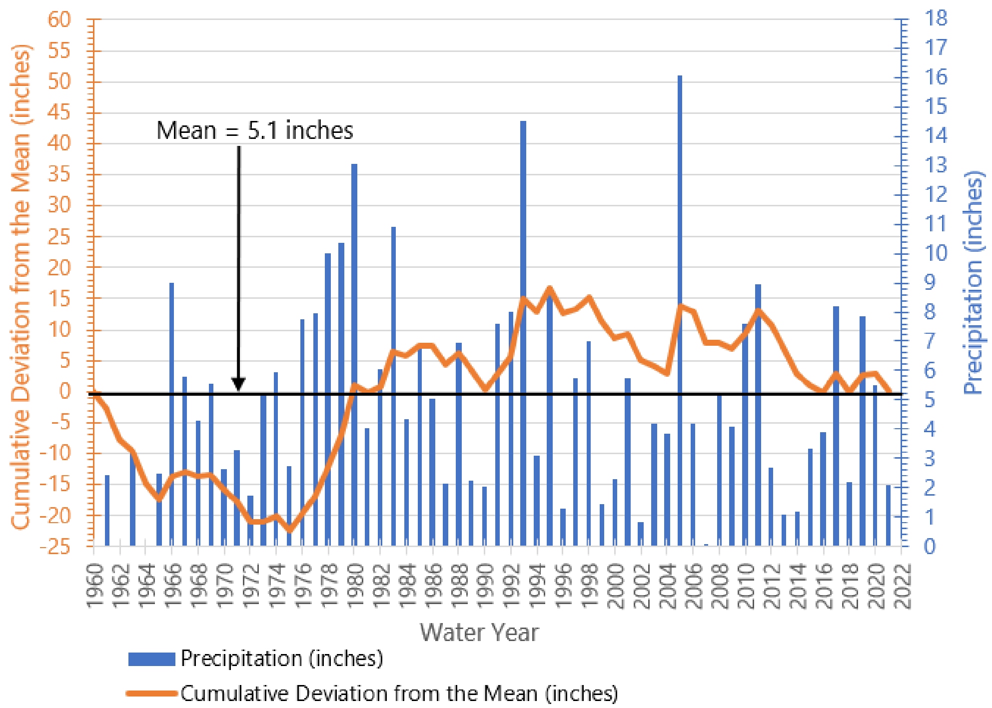
View looking north-northwest up Whitewater Canyon and river channel from Whitewater Canyon Road.

Figure ES-1 provides a summary of precipitation at the Desert Hot Springs precipitation station located approximately 1 mile north of the northern boundary of the Mission Creek Subbasin. The figure shows the variability in precipitation over time with wet and dry cycles of precipitation indicated by the upward and downward slope of the plot. The plot shows a relatively flat cumulative deviation from the mean since WY 2016-2017, indicating generally average precipitation for the period of WY 2016-2017 to the current water year. The annual precipitation total for WY 2020-2021 was 2.1 inches, which is below the mean annual precipitation of 5.1 inches.

The Mission Creek Subbasin is bounded by relatively impermeable bedrock of the San Bernardino Mountains and Little San Bernardino Mountains to the west/northwest and north/northeast, respectively. The Mission Creek fault separates the Mission Creek Subbasin from the Desert Hot Springs Subbasin to the northeast, while the Banning fault separates the Mission Creek Subbasin from the Garnet Hill Subarea of the Indio Subbasin to the south. Southeast of the Garnet Hill Subarea where the Garnet Hill fault appears to terminate into the Indio Hills, the Banning fault separates the Indio Subbasin from the southeastern portion of the Mission Creek Subbasin.

Groundwater within the Mission Creek Subbasin and adjacent subbasins is stored in unconsolidated alluvial sediments, which extend to a depth as great as 3,000 feet below ground surface (bgs) and are underlain by semi-consolidated and semi-permeable sediments (GCI, 1979). These alluvial sediments comprise the only aquifer identified in the Mission Creek Subbasin. Faults bounding the Mission Creek Subbasin are partial barriers to groundwater flow resulting in groundwater elevation differences across the faults. Because these faults are only partial barriers to groundwater flow, steep hydraulic gradients across the faults result in subsurface outflow from the Mission Creek Subbasin to the Garnet Hill Subarea of the Indio Subbasin, and subsurface inflow from the Desert Hot Springs Subbasin into the Mission Creek Subbasin.

Figure ES-1
Annual Precipitation and Cumulative Deviation from the Mean, Desert Hot Springs



Notes:
No precipitation reported in WY 1961-1962 and WY 1963-1964.
Cumulative Deviation from Mean starts WY 1959-1960 with an assumed mean precipitation.

The primary inflows to the Mission Creek Subbasin include infiltration of natural runoff in the creeks and washes fed by highland precipitation, subsurface mountain front recharge, and subsurface inflow from the Desert Hot Springs Subbasin. Precipitation on the valley floor is a relatively minor source of infiltration due to the arid climate. Additional sources of recharge include wastewater percolation, septic tank percolation, and return flow infiltration from water applied for municipal, agricultural, recreational (such as golf course irrigation), and industrial uses.[2] When available, a significant source of recharge to the Mission Creek Subbasin is artificial recharge of imported water that is infiltrated at the Mission Creek Groundwater Replenishment Facility (Mission Creek GRF), located in the northwestern part of the Mission Creek Subbasin.

The primary outflow of groundwater from the Mission Creek Subbasin is through groundwater production for urban, agricultural, and industrial uses. The Agencies produce groundwater in the Mission Creek Subbasin for delivery to their customers in the Mission Creek Subbasin and for export of groundwater to customers in the adjacent Desert Hot Springs Subbasin. Groundwater is also imported from the adjacent Garnet Hill Subarea of the Indio Subbasin for use in the Mission Creek Subbasin. Private wells used to

[2] In this report, the category "urban use" includes municipal and recreational uses unless those uses are identified separately.

pump for golf course irrigation, agricultural, and industrial use are metered to assess for costs to import water for groundwater replenishment. Additionally, there are private wells located in the Mission Creek Subbasin that, due to low levels of use, are not required to report their well production to CVWD or DWA, and some of these wells may produce groundwater on a regular basis. Other outflows of groundwater from the Mission Creek Subbasin include evapotranspiration from plants with deep roots that draw water at or near the groundwater surface (phreatophytes) in shallow groundwater areas and previously mentioned subsurface outflow to the Indio Subbasin including the Garnet Hill Subarea.

ES.3 Groundwater Elevation and Monitoring Wells

The 2022 Alternative Plan Update established nine Key Wells for monitoring of groundwater levels in the Mission Creek Subbasin. **Table ES-1** identifies the Key Wells and the rationale for selection of these wells. In addition to monitoring groundwater levels in the nine Key Wells for SGMA compliance, CVWD, DWA, and MSWD monitor groundwater levels in 15 additional wells in the Mission Creek Subbasin. Groundwater level data from nine of these wells were used to supplement the data from the Key Wells for contouring of groundwater elevations and changes in storage.

Table ES-1
Key Wells in the Mission Creek Subbasin - WY 2020-2021

State Well Number	Local Name	Map Name	Rationale for Selection as a Key Well
02S04E23N002S	Well No. 30	23N02	Long monitoring history. Northern portion of the northwestern Subbasin
02S04E28J001S	Well No. 35	28J01	Spatial coverage of northwestern Subbasin
02S04E36D001S	Well No. 22	36D01	Long monitoring history. North central portion of the Subbasin
02S04E36K001S	Well No. 29	36K01	Long monitoring history. North central portion of the Subbasin
03S04E04P001S	PW2	4P01	Spatial coverage of south portion of northwestern Subbasin
03S04E11L004S	Well No. 31	11L04	South central part of the main Subbasin
03S04E12C001S	Well 3405	12C01	Long monitoring history. Near the center of the main Subbasin
03S05E15R001S	15R01	15R01	Southern end of the main Subbasin
03S05E17J001S	17J01	17J01	Long monitoring history. South central part of the main Subbasin

wood.

As of January 2022, the SGMA Portal Monitoring Network Module (MNM) replaced the California Statewide Groundwater Elevation Monitoring (CASGEM) program as the database for SGMA groundwater well data and water level data. Data upload to CASGEM is no longer required for SGMA reporting purposes. One of the Key Wells was in CASGEM and data from this well were migrated to the MNM. Data for the remaining non-CASGEM Key Wells were uploaded to the MNM in December 2021 and January 2022. For compliance with the SGMA, the well reference point elevations and ground surface elevations were converted from National Geodetic Vertical Datum of 1929 (NGVD29) to North American Vertical Datum of 1988 (NAVD88) using the software program VDatum, published by the National Oceanic and Atmospheric Administration (NOAA).[3] The Agencies plan to resurvey all of the Key Wells relative to NAVD88 within two years. The groundwater elevations presented in this Annual Report represent the single aquifer identified as the Mission Creek Subbasin. Average groundwater levels for the water year (rather than groundwater levels from seasonal measurements) are presented because groundwater levels in the Mission Creek Subbasin do not exhibit strong seasonal trends. Significant groundwater level fluctuations, however, are observed near the Mission Creek GRF as groundwater levels respond directly to replenishment water deliveries and have varied by more than 100 feet during periods of high replenishment. Groundwater levels also vary due to groundwater extraction near North Palm Springs. The remainder of the Mission Creek Subbasin typically experiences very little seasonal variation of groundwater levels.

View looking east-northeast from Whitewater Canyon Road toward the consolidated Tertiary conglomerate and sandstone separating the Whitewater River from the main Mission Creek Subbasin.

The Groundwater Replenishment Program (GRP), combined with other water management elements, including water conservation, are helping to control groundwater overdraft and maintain sustainable groundwater levels within the Mission Creek Subbasin.

ES.4 Groundwater Extraction

During WY 2020-2021, 15,048 AF of groundwater were extracted from 23 metered wells and minimal pumpers[4] in the Mission Creek Subbasin. Because CVWD and DWA are authorized to collect replenishment assessments from groundwater producers, their respective legislations mandate the installation of water volume measuring devices on the wells of well owners that produce more than 25 acre-feet per year (AFY) in CVWD's service area and more than 10 AFY in DWA's service area. Approximately 90 percent of groundwater produced in the Mission Creek Subbasin is produced for urban water use, and the remaining approximately 10 percent of groundwater is produced for agricultural or industrial purposes or is unmetered with unknown use.

[3] https://vdatum.noaa.gov/about/currentevents.html

[4] Minimal pumpers are small pumpers who are not required to report production to CVWD (<25 AFY) or DWA (<10 AFY). As reported in the 2022 Alternative Plan Update, the amount of unmetered private well pumping in the Mission Creek Subbasin was estimated at approximately 480 AFY. This estimate agrees with previous estimates of approximately 500 AFY. Given the uncertainty in estimating this pumping, it is rounded to 500 AFY for WY 2020-2021.

ES.5 Surface Water Use

Precipitation that occurred in the Mission Creek Subbasin during WY 2020-2021 was estimated based on three precipitation stations within or near the Mission Creek Subbasin. Recorded precipitation included 2.03 inches (Edom Hill station), 2.1 inches (Desert Hot Springs station), and 7.44 inches (Whitewater North station). The 2.1 inches of recorded precipitation at the Desert Hot Springs station in WY 2020-2021 is less than the 61-year (water year) mean of 5.1 inches at that station (data from the Desert Hot Springs station are used for long-term comparisons because it has a substantially longer period of record than other stations in the area).

Mission Creek is the only surface water body in the Mission Creek Subbasin with a stream gauge. In WY 2020-2021, the stream gauge recorded 98 AF of stream flow. There is no direct use of this stream flow or of any other stream flow in the Mission Creek Subbasin.

In addition to natural replenishment from precipitation and stream flow, the Mission Creek Subbasin receives artificial replenishment from imported water. CVWD and DWA have contracts with the CDWR for State Water Project (SWP) water that is exchanged with the Metropolitan Water District of Southern California (MWD) for a like amount of Colorado River water from MWD's Colorado River Aqueduct (SWP Exchange Water). CVWD and DWA have a combined Table A amount of 194,100 AFY, which includes 100,000 AFY transfer from MWD under the Agreement for Exchange and Advance Delivery of Water. This imported water has been used to recharge the Mission Creek Subbasin at the Mission Creek GRF since 2002. For WY 2020-2021, 427 AF of SWP Exchange Water was delivered to the Mission Creek GRF and recharged to the Mission Creek Subbasin.

There is no recycled water use in the Mission Creek Subbasin. However, the municipal wastewater generated in the Mission Creek Subbasin is treated and disposed of within the Mission Creek Subbasin by percolation/evaporation. In WY 2020-2021, a total of 2,216 AF of wastewater was treated, all of which was disposed by percolation/evaporation.

ES.6 Total Water Use

Total water use for this Annual Report is direct use of water in the Mission Creek Subbasin. Local surface water is not used in the Mission Creek Subbasin and SWP Exchange Water is only used to replenish the aquifer. Wastewater is not currently recycled for direct use, but a portion percolates as return flow. Groundwater production within the Mission Creek Subbasin is the primary source of water used in the Mission Creek Subbasin and amounted to 15,048 AF in WY 2020-2021. Additional groundwater (52 AF) was imported from the Garnet Hill Subarea of the Indio Subbasin to partially meet MSWD's water demands in the Mission Creek Subbasin and a combined 6,879 AF of groundwater was exported from the Mission Creek Subbasin to the Desert Hot Springs Subbasin by CVWD and MSWD. Accounting for these imports and exports, the total direct use for WY 2020-2021 in the Mission Creek Subbasin was 8,221 AF.

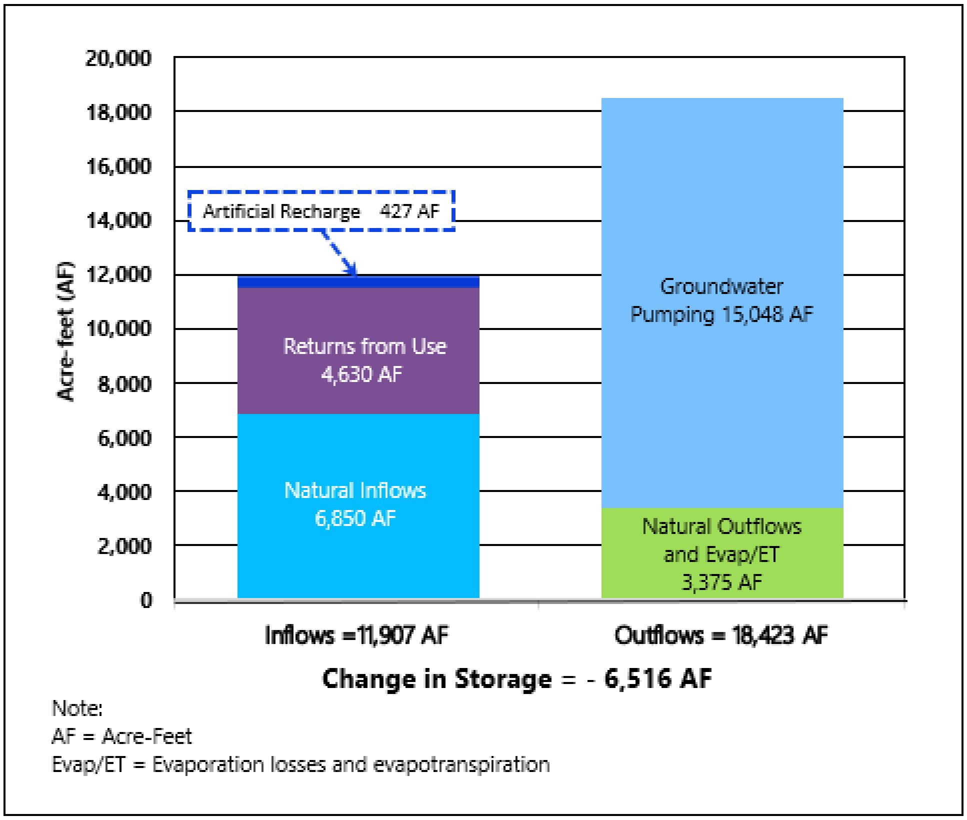
ES.7 Groundwater Balance and Change in Groundwater Storage

A groundwater balance for the Mission Creek Subbasin is a budget comparing inflows of groundwater into the Mission Creek Subbasin against outflows of groundwater out of the Mission Creek Subbasin during a specified period (typically one year). The difference between inflows and outflows for a given period is defined as the change in storage for that period. The groundwater balance for WY 2020-2021 is summarized on **Figure ES-2**.

The procedure for estimating natural recharge resulting from runoff and subsurface recharge at the mountain front, referred to as mountain front recharge, was modified from the previous Annual Reports. In previous Annual Reports, mountain front recharge was based on a long-term average of mountain front recharge calculated using results from a groundwater model (Psomas, 2013). For this Annual Report, mountain front recharge is estimated using the updated groundwater model for the Mission Creek Subbasin as documented in the 2022 Alternative Plan Update. The 25-year period from 1995 through 2019 was used to derive an average natural recharge for use in the groundwater balance. In addition, this Annual Report uses the updated groundwater model to estimate evapotranspiration and underflow into and out of the Mission Creek Subbasin from adjacent subbasins based on the most recent year modeled (2019). Data from 2019 were used as estimates for these water balance components for this Annual Report because they are considered more representative of current conditions than long-term averages.

As shown on **Figure ES-2**, Mission Creek Subbasin inflows included 6,850 AF of natural inflows (e.g., mountain front recharge, infiltration of surface water, and subsurface inflow from other basins), 4,630 AF of return flow from use (e.g., return from urban/ agriculture applications, percolation from septic tanks and wastewater treatment facilities), and 427 AF from artificial recharge of SWP Exchange Water at the Mission Creek GRF. The total inflow to the Mission Creek Subbasin in WY 2020-2021 was 11,907 AF.

Figure ES-2
Annual Groundwater Balance in the Mission Creek Subbasin - WY 2020-2021



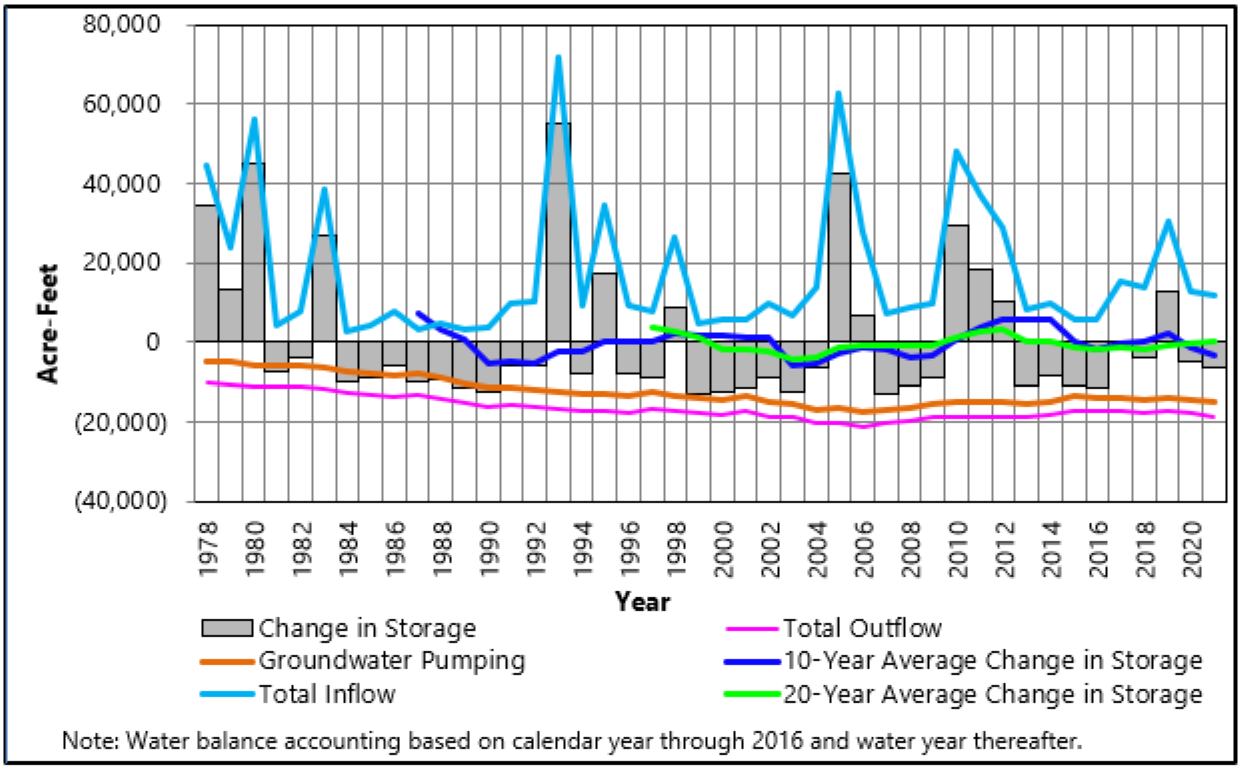
The Mission Creek Subbasin outflows included 15,048 AF of groundwater pumping and 3,375 AF of natural outflows (subsurface outflow to adjacent subbasins), evapotranspiration, and evaporative losses. The total outflow from the Mission Creek Subbasin in WY 2020-2021 was 18,423 AF. A comparison of the Mission Creek Subbasin inflows and outflows for WY 2020-2021 indicates an annual decrease in groundwater storage of 6,516 AF.

Based on the Key Wells and supplemental monitoring wells from 10 additional agency wells with water level data in both WY 2019-2020 and WY 2020-2021, change in water levels ranged from 0.6 feet of increase near the central part of the Subbasin to 7.6 feet of decrease immediately south of the Mission Creek GRF. Decline in groundwater levels near the Mission Creek GRF area appears to result from the decrease in recharge at the Mission Creek GRF between the last two water years. Throughout the remainder of the Mission Creek Subbasin, average annual groundwater levels typically indicated no more than approximately 0.5 feet of rise or 2.9 feet of decline from the previous water year. Overall, average annual groundwater levels in the Mission Creek Subbasin in WY 2020-2021 are similar to WY 2019-2020, with a slight decrease of approximately 2.1 feet in average groundwater levels since WY 2019-2020.

A comparison of the 10-year change in groundwater levels provides an analysis of the long-term trend in change in storage over the SGMA planning horizon. The change in groundwater levels observed in the 15 wells with groundwater level data in both WY 2010-2011 and WY 2020-2021 in the Mission Creek Subbasin ranged from approximately 19.6 feet of increase in the central-south part of the Subbasin to 172 feet of decrease in the Mission Creek GRF area of the Subbasin. Both of these high values appear to represent localized conditions. Groundwater levels representative of WY 2010-2011 appear to be under the influence of a second round of intense recharge at the Mission Creek GRF that began in calendar year 2010. Groundwater replenishment approaching 20,000 AF or more in calendar years 2005 and 2006 were followed by recharge of approximately 33,000 AF in 2010 and more than 20,000 AF in calendar years 2011 and 2012. These recharge efforts resulted in significant groundwater mounding near the Mission Creek GRF that has dissipated over the 10-year period resulting in an apparent steep water level decline for this area. The long-term effect of this recharge coupled with reduced groundwater pumping has resulted in the rise of groundwater throughout the remainder of the Mission Creek Subbasin since WY 2010-2011. The average groundwater level change over the ten-year period, after removing the two wells nearest the Mission Creek GRF, was an increase of about 11.0 feet.

Figure ES-3 shows annual inflows, outflows, groundwater production, and 10-year and 20-year running average changes in groundwater storage in the Mission Creek Subbasin based on the updated Mission Creek Subbasin groundwater model water balance documented in the 2022 Alternative Plan Update and water balance information provided Mission Creek Subbasin Annual Report for WY 2019-2020 (Wood, 2021). The Mission Creek Subbasin inflows vary significantly from year to year due to the variability in mountain front recharge and imported water replenishment deliveries. Replenishment activities vary annually in response to imported water availability, averaging approximately 4,076 AFY over the past four water years (WY 2016-2017 through WY 2019-2020). Years of high inflows correspond to wet years and high mountain front recharge or when increased SWP deliveries occurred. Both the 10- and 20-year running average change in groundwater storage have been relatively stable. The 20-year running average shows that the Mission Creek Subbasin has been in balance (i.e., no appreciable net change in storage) since 2013.

Figure ES-3
Historical Annual Change in Groundwater Storage in the Mission Creek Subbasin



ES.8 Sustainable Management Criteria

The Sustainable Groundwater Management Act (SGMA) defines sustainable groundwater management as the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. The Agencies recognize that establishing metrics to avoid undesirable results and to maintain sustainability is a valuable tool in groundwater management, and incorporated SGMA Sustainable Management Criteria into the 2022 Alternative Plan Update to guide water resources management in the Mission Creek Subbasin. A review and comparison of the Sustainable Management Criteria and comparison with groundwater conditions in the Annual Report was added as Section 8 to this year's Annual Report. The four Sustainability Indicators considered relevant to the Mission Creek Subbasin include: chronic lowering of groundwater levels, reduction of groundwater storage, degraded water quality, and land subsidence.

Chronic Lowering of Groundwater Levels

The Mission Creek Subbasin has met its sustainability objective for groundwater levels for WY 2020-2021. A review of WY 2020-2021 Key Well water levels and the sustainability criteria for chronic lowering of groundwater levels indicated that all of the Key Wells were above the thresholds established for sustainability (i.e., the Minimum Threshold). All but one well was above the level established as the desired objective for maintaining groundwater levels (i.e., the Measurable Objective) at or above 2009 groundwater levels in the Mission Creek Subbasin. Well 03S04E04P001S (4P01) fell below the Measurable Objective, by the relatively small amount of 0.6 feet (based on the lowest water level measurement in this well during the water year). Well 4P01 had been identified as having a provisional Measurable Objective and Minimum Threshold because of limited historical groundwater level data. Current and historical groundwater level data for this and other wells will be reviewed and an adjustment for the provisional Measurable Objective and Minimum Threshold for this well will be considered for future annual reports or 5-year updates.

Reduction of Groundwater in Storage

The Mission Creek Subbasin has met its sustainability objective for groundwater storage for WY 2020-2021. Because the Mission Creek Subbasin consists of a single aquifer laterally and vertically, groundwater storage is directly related to groundwater levels for the Subbasin. The Measurable Objective (703.1 feet NAVD88)[5] and Minimum Threshold (694.5 feet NAVD88) for groundwater storage are based on the average of the groundwater level Measurable Objectives and Minimum Thresholds for the nine Key Wells. The average water level in the Mission Creek Subbasin in WY 2020-2021 was 715.3 feet NGVD88, which is 12.2 feet above the Measurable Objective for groundwater storage and 20.8 feet above the Minimum Threshold for groundwater storage.

Land Subsidence

Neither land subsidence nor impacts to structures potentially caused by subsidence, have been identified historically in the Mission Creek Subbasin. There are no indications that ground level subsidence occurred in the Mission Creek Subbasin in WY 2020-2021 and water levels remain above the level where subsidence may be considered as a potential concern (i.e., groundwater level Minimum Thresholds). Geologic conditions of generally coarse-grained sediments and lack of thick, laterally extensive fine-grained sediments in the Mission Creek Subbasin aquifer reduce the likelihood of land subsidence. Although land subsidence has not been observed in the Mission Creek Subbasin, it is considered to have a potential to result in significant and unreasonable conditions. Land subsidence is most likely to occur if groundwater levels are lowered significantly below their historical low levels (i.e., under conditions of maximum reconsolidation stress). Consequently, Minimum Thresholds for groundwater levels in the Key Wells are used as a screening level for the potential of land subsidence. Groundwater levels are well above their Minimum Thresholds and therefore do not indicate a likely risk of land subsidence.

To further assess the potential presence of land subsidence in the Mission Creek Subbasin, ground level displacement monitoring by the CDWR was reviewed for the full length of the approximately five-year monitoring period available for this technology (June 2015 to October 2020) and also for the most recent annual record of vertical ground level displacement (October 2019 to October 2020). With the exception of a localized area of ground level decline in the vicinity of the former Edom Hill Landfill, only a relatively small magnitude of downward vertical ground level change (up to a potential maximum of 0.1 feet) was observed. Based on this and a lack of a clear trend of increasing vertical downward displacement over the period of monitoring, permanent land subsidence attributed to groundwater withdrawal is not apparent in the Mission Creek Subbasin.

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[5] NAVD88 = North American Vertical Datum of 1988.

In addition to the review of the CDWR information on subsidence in the Mission Creek Subbasin, the Agencies have engaged the United States Geological Survey (USGS) to study land subsidence in the Mission Creek Subbasin. The USGS initiated this study in 2021 and is currently gathering data to conduct the study. The Agencies have provided Mission Creek Subbasin groundwater level data. Completion of the study is anticipated in 2025.

Degraded Water Quality

The Mission Creek Subbasin has met its sustainability objectives for water quality for WY 2020-2021. The 2022 Alternative Plan Update identified two constituents of concern (COCs) for water quality degradation based on historical water quality and the potential for future water quality degradation. These constituents include naturally occurring uranium and nitrate. The Minimum Thresholds for uranium and nitrate were set at the California drinking water maximum contaminant levels (MCLs) for drinking water supply wells established by the State Water Resources Control Board (SWRCB). A review of water quality data for water supply wells in the Mission Creek Subbasin did not identify any exceedances of the MCL for nitrate (nine wells were tested during the water year). Uranium has not been detected above its MCL in active water supply wells in more than five years. Annual sampling is not required for uranium and no wells were sampled for uranium during WY 2020-2021.

Total dissolved solids (TDS) were also identified as a potential COC. TDS is currently being evaluated through update of the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP). The CV-SNMP Agencies – which include CVWD, Coachella Water Authority (CWA)/Coachella Sanitary District, City of Palm Springs, DWA, Indio Water Authority (IWA), MSWD, Myoma Dunes Mutual Water Company, and Valley Sanitary District – prepared a workplan entitled "*Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan*" (Development Workplan, West Yost, 2021) was submitted to the Colorado River Basin Regional Water Quality Control Board (RWQCB) in September 2021 and approved in October 2021. The Development Workplan outlines the steps and schedule to update the CV-SNMP, with a scheduled completion by October of 2026. The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects beneficial uses. When completed, the update to the CV-SNMP will provide a basis for establishing Measurable Objectives and Minimum Thresholds for TDS within the Mission Creek Subbasin.

The Development Workplan was required to include a groundwater monitoring workplan with an enhanced monitoring network, identification of data gaps, and a plan to fill the gaps. The CV-SNMP Agencies submitted this workplan entitled "*Groundwater Monitoring Program Workplan*" (Groundwater Monitoring Workplan) to the RWQCB in December 2020 (West Yost, 2020), and the RWQCB approved this workplan in February 2021. The Groundwater Monitoring Workplan outlines an expanded groundwater monitoring program that will sufficiently determine whether concentrations of nitrates and TDS, (collectively N/TDS), in groundwater are consistent with water quality objectives. The CV-SNMP Agencies initiated work on the CV-SNMP Groundwater Monitoring Workplan in 2021. A general application for the California Department of Water Resources Technical Support Services (DWR TSS) program for construction of wells to fill monitoring data gaps identified in the Monitoring Workplan and will complete application for specific wells (including a new monitoring well in the Mission Creek Subbasin) once the general application is approved. The first progress report for the Monitoring Workplan will be submitted to the RWQCB by March 31, 2022. In addition, the CV-SNMP have prepared a request for proposal to implement the Development Workplan and expect to select a technical and stakeholder engagement consultant to conduct this work by early May of 2022.

ES.9 Summary of Project and Management Actions and Description of Progress

Progress in achieving the sustainability goals described in the 2022 Alternative Plan Update for the Mission Creek Subbasin is summarized below for selected project and management actions (PMAs).

Water Conservation

- CVWD, DWA, and MSWD participated in (along with Coachella Water Authority [CWA], Indio Water Authority [IWA], and Myoma Dunes Water Company) in preparing the 2020 Coachella Valley Regional Urban Water Management Plan (2020 CV-RUWMP) that was submitted in June of 2021. The CV-RUWMP provides detailed descriptions of each of the Agencies' water conservation programs and demonstrates that each agency achieved greater than 20% reduction in urban water use by 2020, in compliance with the Water Conservation Act of 2009 Senate Bill X7-7 (SB X7-7).
- The 2020 CV-RUWMP that was recently completed and adopted includes standalone Water Shortage Contingency Plans (WSCPs) for each of the Agencies. The WSCPs contain Annual Water Supply and Demand Assessment procedures, defines six standard shortage levels from less than10% shortage up to greater than 50% shortage, and identifies shortage response actions including demand reduction actions and mandatory use restrictions and supply augmentation as well as communication protocols for implementing the WSCPs.
- The Agencies have initiated planning to conduct a water conservation study specific to the unique climate, soil, and occupancy conditions of the Coachella Valley. The regional conservation study, will take an econometric approach to estimating water savings for grass removal rebate programs and may be used to evaluate incentive amounts and to seek grant funding. In 2021, the agencies worked to get technical and financial support to complete the study.

Water Supply

- CVWD and DWA both have authority to operate imported water replenishment in the Coachella Valley. Imported water replenishment operations will deliver as much imported water to the Coachella Valley as possible given the constraints of SWP contract and delivery and MWD Colorado River Aqueduct (CRA) operations. During WY 2020-2021, in addition to their Table A water, CVWD and DWA purchased 1,440 AF and 734 AF of water, respectively, for aquifer replenishment from the Yuba River Accord Dry Year Water Purchase Program (Yuba Accord).
- MSWD is working to plan, design and construct tertiary treatment at MSWD's Regional Water Reclamation Facility (RWRF) where the recycled water can be used for groundwater recharge or for non-potable reuse for irrigation of parks, golf courses, schools, resorts, homeowner's associations, agricultural uses, etc. Use of recycled water for non-potable uses would provide in-lieu groundwater replenishment by source substitution. The project was bid and awarded in 2021, and construction began in early 2022.
- CVWD and DWA continue to invest in long-term, statewide water projects. CVWD and DWA agreed to continue to participate in the Delta Conveyance Project (DCP) and have advanced funds for planning costs during 2021 and 2022. In 2022, CVWD and DWA will consider advancing funds

for the planning costs during 2023 and 2024. The DCF will modernize SWP conveyance facilities in the Delta and increase future long-term reliability. The planning process for the proposed DCF is moving forward, and a Draft Environmental Impact Report is anticipated for public review in mid-2022.

- CVWD and DWA are participating in the Lake Perris Dam Seepage Recovery Project being led by the MWD. This project will collect and distribute SWP water seeping under the Lake Perris Dam for delivery to MWD in addition to its current allocated Table A water. The project consists of installing an integrated recovery well system down gradient from the face of the Lake Perris Dam that would include up to six new seepage recovery wells and a conveyance pipeline connecting the wells to MWD's Colorado River Aqueduct (CRA). CVWD and DWA were invited to partner in the project with MWD, and the parties signed an agreement with CDWR in 2021 to fund environmental analysis, planning, and preliminary design. The project is estimated to recover approximately 7,500 AFY, with approximately 2,750 AFY for delivery to CVWD and DWA that will allocate a portion of this water to the Mission Creek Subbasin. This project is estimated to result in delivery of 233 AFY of water to the Mission Creek GRF in 2023 increasing to approximately 268 AFY by 2045. The project is proceeding as planned, and the Draft Environmental Impact Report was released in May 2021 for public comments.
- The Sites Project Authority is developing the Sites Reservoir Delivery project to capture and store excess water from snowmelt and winter runoff from the Sacramento River for use during dry periods. The Sites Reservoir will be in the Sacramento Valley. The project is considered "off-stream," i.e., it will not dam or impede the Sacramento River or other streams. The Sites Reservoir will operate in conjunction with other California reservoirs to increase water supply reliability and resiliency. In 2019, CVWD and DWA entered into an agreement with the Sites Project Authority for the next phase of planning for the Sites Reservoir (Sites Project Authority 2019; 2020). In 2022, CVWD and DWA will consider continued investment in project planning costs via a Third Amendment to the 2019 Sites Reservoir Project Agreement. CVWD and DWA are participating members at 10,000 AFY (5.2%) and 6,500 AFY (3.4%) levels, respectively. Assuming a 30% conveyance loss, CVWD and DWA anticipate a total delivery of 11,550 AFY of Sites Reservoir water beginning in 2035. In WY 2020-2021, the final feasibility study for the project was issued by the United States Bureau of Reclamation, (USBR, 2021). The project was also awarded $13.7 million in the 2021 federal spending bill, authorized though the Water Infrastructure Improvements for the Nation (WIIN) Act.

Water Quality Protection

- MSWD's Groundwater Quality Protection Program (GQPP), a septic to sewer program, is ongoing and completion is subject to available funding. MSWD Assessment District (AD) 15 and AD-18 will support septic to sewer conversions by providing local funding to match with grant funding opportunities. MSWD has completed conversion of septic to sewer in five previous ADs to date. Design for planned conversions in AD-15 are expected to be constructed in 2022 with other completed designs planned for construction in 2023 and 2024. MSWD has other conversions in design to be constructed in future years.
- In anticipation of meeting future treatment and recharge needs, MSWD has completed design of the Regional Water Reclamation Facility (RWRF), which will treat wastewater flows to secondary

levels including nitrification and denitrification. Located in the Garnet Hill Subarea of the Indio Subbasin, the RWRF will divert some wastewater flows from existing wastewater treatment plants in the Mission Creek Subbasin that are nearing their permitted capacity. The RWRF will start receiving flow in 2023 and is projected to reach 1.50 million gallons per day (mgd) treatment capacity by approximately 2030. Wastewater flows will be from existing sewered customers and from the septic to sewer conversions in the Desert Hot Springs Subbasin, the Mission Creek Subbasin, and the Garnet Hill Subarea of the Indio Subbasin.

- The RWQCB approved the CV-SNMP Development Workplan in October 2021. The goal of the Development Workplan is to outline the steps and schedule to update the CV-SNMP, with a scheduled completion by October of 2026. CVWD, DWA, and MSWD, along with the other CV-SNMP Agencies, will implement the Development Workplan beginning in 2022. This includes conducting public outreach and creating a technical advisory committee, characterizing current groundwater quality and salt loading, developing N/TDS forecasting methodologies, completing forecasting for multiple scenarios, selecting a preferred scenario, establishing management zones, and recommending TDS objectives. The related Groundwater Monitoring Workplan includes installation of a new monitoring well in the Mission Creek Subbasin to address a data gap in the SNMP monitoring program. This new well is to be installed and sampled by December 31, 2026. The CV-SNMP Agencies received preliminary approval from Riverside County Flood Control and Water Conservation District for an easement to locate the monitoring well upstream of the Mission Creek GRF. CVWD, on behalf of the Agencies, has submitted a general application to the CDWR TSS. After this general application is approved, CVWD will submit an individual application to the CDWR TSS to construct this well.
- MSWD plans to initiate a study in the near term to evaluate the potential sources and migration risk of uranium. The study is also intended to evaluate whether the uranium source is associated with specific alluvial sediments so that future wells can be designed to avoid those sediments if necessary.

SGMA Implementation

- The Agencies have engaged the United States Geological Survey (USGS) to conduct a more detailed evaluation of the potential for subsidence in the Mission Creek Subbasin. As part of this evaluation, the USGS was provided with groundwater level data in December 2021. If this initial evaluation identifies subsidence as a potential issue, the USGS will develop a subsidence monitoring workplan for the Mission Creek Subbasin and conduct ground surface monitoring.
- The first 5-year Alternative Plan Update was completed in November 2021 and was submitted to CDWR in December 2021. The next 5-year Alternative Plan Update is due to CDWR on January 1, 2027. Future Alternative Plan Updates will evaluate groundwater conditions and the status of PMAs to determine whether the Sustainable Management Criteria and the project and management actions are meeting the sustainability goals of the Mission Creek Subbasin. In addition to meeting the SGMA requirements, the Agencies identified some other key areas requiring periodic review including evaluation of demand projections, imported water supply reliability, and update of the groundwater model and model forecasts.

Well Management

- The Agencies continue to work with Riverside County Department of Environmental Health (RCDEH) so that any new wells are constructed to current standards, artesian flow management policies are followed, and any existing wells that could be negatively impacting groundwater quality are retrofitted, properly capped, or destroyed. In addition, this coordination will allow for opportunities to communicate with permitting agencies regarding groundwater levels to help ensure that future wells are screened below minimum thresholds.
- The Agencies may develop a well inventory for the Mission Creek Subbasin that will identify and compile information about all production wells located within the Subbasin. CVWD is evaluating this effort, with DWA participating at its discretion. The well inventory would involve development of a well registry. The well inventory would support any expansion or refinement of the monitoring network, allow improvement of groundwater extraction estimates, and improve the understanding of how private wells may affect Mission Creek Subbasin conditions and how basin management may affect private wells.
- CVWD and DWA may consider expansion of groundwater extraction reporting to include groundwater pumpers that produce less than the current assessment thresholds but more than the de minimis threshold of 2 AFY or less established by the SGMA. CVWD is evaluating this effort within its Groundwater Sustainability Agency (GSA) boundary; DWA may require reporting within their GSA boundary at their discretion.

Adaptive Management

- CVWD, DWA, and MSWD identified a management strategy in the 2022 Alternative Plan Update to continue the existing Mission Creek Subbasin Management Committee structure, consisting of quarterly meetings with the General Managers from each agency.
- The Agencies have developed adaptive management procedures to monitor management progress and adjust these management procedures as needed. The adaptive management process consists of the following steps: 1) Planning, 2) Implementation, 3) Monitoring, 4) Analysis, and 5) Modification. The key to the adaptive management process is one of continual evaluation and program adjustment to meet the overall Mission Creek Subbasin management objectives.

Section 1 - Introduction

On behalf of the Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) (collectively the Agencies), Wood Environment and Infrastructure Solutions Inc. (Wood) has prepared this Mission Creek Subbasin Annual Report for Water Year (WY) 2020-2021 (Annual Report) in accordance with the annual reporting requirements of the Sustainable Groundwater Management Act (SGMA). This report summarizes groundwater conditions and the status of implementation of projects and management actions in the Mission Creek Subbasin (also referred to as the Subbasin) for WY 2020-2021 (October 1, 2020 to September 30, 2021).

1.1 Report Organization

Section 1 –Introduction, summarizes the report organization, background as related to the SGMA, and the approach the Agencies are taking to comply with the SGMA.

Section 2 – Coachella Valley Groundwater Basin Setting, provides an overview of the Coachella Valley Groundwater Basin, its component subbasins and subareas, and the regional geology of the Mission Creek Subbasin. In addition, this section provides information on the physiography, climate, geology, hydrogeologic conceptual model, and groundwater management of the Mission Creek Subbasin.

Section 3 – Groundwater Elevation Data, describes the sources of groundwater level data and provides a groundwater elevation contour map and hydrographs of groundwater levels over time.

Section 4 – Groundwater Extraction, summarizes groundwater extraction by volume, area, and water use sectors.

Section 5 – Surface Water, summarizes the various surface water and surface water-related components in the Mission Creek Subbasin including precipitation, stream flow, imported water delivery for direct groundwater replenishment, and wastewater treatment and disposal during the water year. This section also includes a description of contracts with the California Department of Water Resources (CDWR) and Metropolitan Water District of Southern California (MWD) for access and availability of imported water for use in the Mission Creek Subbasin.

Section 6 – Total Water Use, provides a summary of the total water use by water use by area and sector.

Section 7 – Groundwater Balance and Change in Groundwater Storage, provides the estimated groundwater balance and change in storage for the Mission Creek Subbasin.

Section 8 – Sustainable Management Criteria, provides a summary of the Sustainable Management Criteria for groundwater levels, groundwater storage, subsidence, and groundwater quality identified in the Mission Creek Subbasin Alternative Plan Update (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]), and compares the WY 2020-2021 conditions to these criteria.

Section 9 – Summary of Projects and Management Actions and Description of Progress, provides a summary of objectives met, and progress towards achieving the water management objectives outlined in the 2022 Alternative Plan Update.

Section 10 – References, provides references for this report.

1.2 Implementation of the Sustainable Groundwater Management Act

In 2014, faced with declining groundwater levels (most notably in California's Central Valley), the California Legislature enacted the SGMA, which was intended to provide a framework for the sustainable management of groundwater resources throughout California, primarily by local authorities. The SGMA consisted of three bills, Assembly Bill (AB) 1739 (Dickinson), Senate Bill (SB) 1168 (Pavley), and SB 1319 (Pavley), and was signed into law by Governor Brown on September 16, 2014.

The SGMA required local authorities to form local Groundwater Sustainability Agencies (GSAs) by June 30, 2017, to evaluate conditions in local groundwater basins and adopt locally-based Groundwater Sustainability Plans (GSPs) tailored to their regional economic and environmental needs. The SGMA allows a 20-year time frame for GSAs to implement their GSPs and achieve long-term groundwater sustainability. It protects existing water rights and does not affect current drought response measures. The SGMA provides local GSAs with tools and authority to:

- Monitor and manage groundwater levels and quality.
- Monitor and manage inelastic land subsidence and changes in surface water flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater extraction.
- Require registration of groundwater wells.
- Require reporting of annual groundwater extractions.
- Require reporting of surface water diversions to underground storage.
- Impose limits on extractions from individual wells.
- Assess fees to implement local GSPs or Alternative Plans.
- Request revisions of basin boundaries, including establishing new subbasins.

The CDWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program to track seasonal and long-term trends in groundwater elevations in California's groundwater basins. Through its CASGEM program, the CDWR ranked the priority of all 515 groundwater basins and subbasins in California as either very low, low, medium, or high priority.

In addition, the CDWR, as required by the SGMA, identified the basins and subbasins that are in conditions of critical overdraft. Twenty-one basins and subbasins in California were identified as critically-overdrafted basins. None of the subbasins in the Coachella Valley Groundwater Basin (including the Mission Creek Subbasin) were listed as critically-overdrafted.

The Coachella Valley Groundwater Basin has been divided into four (4) subbasins by the CDWR in California Bulletin 108 (1964) and Bulletin 118 (2003): they are the Indio, Mission Creek, San Gorgonio Pass, and Desert Hot Springs Subbasins. The Indio,[6] Mission Creek, and San Gorgonio Pass Subbasins have been designated medium-priority subbasins under the SGMA and the Desert Hot Springs Subbasin has been designated a very low-priority subbasin.

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[6] The Indio Subbasin is also identified as the Whitewater River Subbasin by the United States Geological Survey (USGS, 1980). However, the subbasin is identified as the Indio Subbasin in CDWR Bulletin 108 (1964) and Bulletin 118 (2003). For continuity, this Annual Report will identify the subbasin as the Indio Subbasin.

GSAs responsible for high-priority and medium-priority basins and subbasins must have adopted GSPs by January 31, 2020 for critically overdrafted basins, and by January 31, 2022 for those not currently in critical overdraft. GSAs may adopt a single GSP covering an entire basin or combine a number of GSPs created by multiple GSAs. Sustainability must be achieved within 20 years after adoption of the GSP for all high-priority and medium-priority basins. GSAs that elect to submit an Alternative to a GSP (Alternative Plan), rather than prepare a GSP in accordance with Water Code §10727 et seq., must have done so by January 1, 2017, with updates every five years thereafter. The State Water Resources Control Board (SWRCB) is empowered to intervene if local agencies fail to form GSAs or fail to adopt their GSPs or Alternative Plans on schedule.

1.2.1 Formation of GSAs by Local Agencies

Three separate entities filed Notices of Election with the CDWR to become GSAs to manage the Mission Creek Subbasin of the Coachella Valley Groundwater Basin within their respective service areas:

- **CVWD** – submitted its notice of election for the portion of the Mission Creek Subbasin within its boundaries (CVWD, 2015) and was approved by the CDWR as an exclusive GSA to manage the Mission Creek Subbasin within that area of the Mission Creek Subbasin.
- **DWA** – submitted its notice of election for a large portion of the Mission Creek Subbasin, which includes a large area also located within the boundaries of MSWD. The CDWR designated DWA as an exclusive GSA for all portions of the Mission Creek Subbasin located within DWA's boundaries, including those portions also located within MSWD boundaries.
- **MSWD** – submitted a notice of election for the portion of the Mission Creek Subbasin located within its boundaries, and this notice of election was rejected by the CDWR because it included areas also located within DWA's boundaries. MSWD later filed an amended notice of election for a three-square mile area included by DWA in its notice of election, but not within DWA's boundaries. MSWD's amended notice of election was filed without prejudice to its initial notice of election (MSWD, 2016). The CDWR designated the three-square mile area as "overlap" with DWA and MSWD. The overlap status of the three-square mile area has not been resolved. MSWD's initial notice of election, and DWA's claim of "exclusive" status over MSWD's service area are the subject of pending litigation, known as *Mission Springs Water District v. Desert Water Agency, et al.*, Riverside County Superior Court, Case No. PSC 1600676.

Several small portions of the Mission Creek Subbasin lie outside the boundaries of the GSAs. These fringe areas are located in San Bernardino County and are not included within the boundaries of a local water district. Portions of this fringe area are located within designated U. S. Forest Service or U. S. Bureau of Land Management wilderness areas with less than one square mile being privately owned. With the exception of the relatively small privately-owned portion, the fringe areas fall within the recently designated Sand to Snow National Monument. Discussions with the County of San Bernardino indicate it has no interest in being a GSA for this area. Because development in this fringe area is restricted by land ownership and wilderness/national monument designation, it was excluded from GSA coverage. Additionally, these lands are owned by the federal government.

1.2.2 Alternative to a Groundwater Sustainability Plan

The SGMA recognizes the efforts many areas such as the Coachella Valley have made in developing and implementing groundwater management by allowing existing groundwater management plans to be submitted as an alternative to preparing a GSP.

On December 29, 2016, CVWD, DWA, and MSWD submitted the 2013 Mission Creek-Garnet Hill Water Management Plan (2013 MC-GH WMP [MWH, 2013]) and a bridge document (Stantec, 2016; 2016 Bridge Document) to the CDWR as an Alternative to a Groundwater Sustainability Plan (Alternative Plan). The Alternative Plan described how the 2013 MC-GH WMP and supporting documents met the requirements of the SGMA and thus could be considered an Alternative Plan under the SGMA.

On July 17, 2019, the CDWR issued a SGMA Alternative Assessment Staff Report (CDWR, 2019a) and a Statement of Findings Regarding the Approval of the Mission Creek Subbasin Alternative Plan (CDWR, 2019b). As summarized by the CDWR (2019c), the Alternative Plan:

- Satisfied the objectives of the SGMA by successfully demonstrating that implementation of the Agencies' existing water management plan is likely to lead to groundwater sustainability for the Mission Creek Subbasin within the statutory timelines identified in the SGMA.
- Demonstrated an acceptable understanding of the hydrogeology, groundwater conditions, and water budget for the basin.
- Established goals for the basin, including maintaining groundwater levels above 2009 conditions, meeting water demands, and managing and protecting groundwater quality.
- Stated that while utilizing supplies from the Colorado River has assisted in correcting historical overdraft, it is also contributing to salt loading in the basin. The Alternative Plan stated that the region has developed a salt and nutrient management plan and is working to have that plan approved by the California Regional Water Quality Control Board, Colorado River Region (RWQCB).

Based on these findings, the CDWR provided recommendations to address in the first five-year update to the Alternative Plan, which was due by January 1, 2022. The recommendations were related to clarifying how progress toward achieving the sustainability goal will be measured, incorporating an approved salt and nutrient management plan, and enhancing descriptions of groundwater conditions.

The Agencies initiated the five-year update to the Alternative Plan in 2019. The 2022 2022 Alternative Plan Update was completed in November 2021 and submitted to the CDWR in December 2021.

1.2.3 2022 Alternative Plan Update

The 2022 Alternative Plan Update was prepared to meet specific requirements of the SGMA as it applies to the Mission Creek Subbasin and to support water management planning for a Planning Area that includes the Mission Creek Subbasin, the Desert Hot Springs Subbasin, and the Garnet Hill Subarea of the Indio Subbasin. SGMA requirements for the Garnet Hill Subarea of the Indio Subbasin are addressed in the 2022 Indio Subbasin Water Management Plan Update prepared by Todd Groundwater and Woodard & Curran (Todd and Woodard & Curran, 2021). The Desert Hot Springs Subbasin does not have SGMA reporting requirements because it is classified as a very low priority basin.

The 2022 Alternative Plan Update was prepared to:

- Ensure that the most current projections for population growth, land use, imported water supply, and other future conditions are incorporated into water management planning for the region.
- Update the groundwater flow model for the Planning Area for use as a tool in evaluating potential groundwater management actions.
- Provide an analysis of future projected groundwater demand based on population growth and other factors and estimate future projected supplies available for groundwater replenishment.
- Develop scenarios for forecasting groundwater conditions based on future demands and supplies assuming future hydrologic conditions are drier than the long-term historical average (climate change assumptions).
- Review historical information along with current and projected future environmental and demographic conditions to define undesirable results and develop objectives and thresholds to maintain groundwater sustainability.
- Address specific actions recommended in the CDWR's 2019 SGMA Alternative Assessment Staff Report and Statement of Findings (CDWR, 2019a; CDWR, 2019b).

The findings of the 2022 Alternative Plan Update confirmed that the Mission Creek Subbasin is, and is projected to be, sustainably managed. Based on predicted future water demands, the 2022 Alternative Plan Update identified that additional groundwater production will be needed through the planning period of 2045. As identified in the 2022 Alternative Plan Update and summarized in Section 9 of this Annual Report, the Agencies have identified options for obtaining additional imported water supplies and increasing water supply reliability through 2045. The additional imported water supplies will address potential future conditions that are outside of the Agencies' control, including climate change and regulatory changes.

To evaluate future conditions, the groundwater model for the Mission Creek Subbasin was updated and used to evaluate a range of water management and hydrologic scenarios. The results of these forecast scenarios were compared with the Sustainable Management Criteria developed in the 2022 Alternative Plan Update and described in Section 8 of this Annual Report. The water management forecast modeling showed that the Agencies can maintain sustainable groundwater levels in the Mission Creek Subbasin under assumed drier climate change conditions through the planning period by continuing Projects and Management Actions (PMAs) already in progress and implementing additional PMAs as currently planned.

Groundwater quality was evaluated in the 2022 Alternative Plan Update and is now reviewed in the Annual Reports (Section 8 of this Annual Report). The 2022 Alternative Plan Update included a review and reorganization of PMAs. Section 9 of this Annual Report includes a description of the PMAs along with any updates since the 2022 Alternative Plan Update was completed in November 2021.

1.2.4 Annual Reporting

Annual reporting of groundwater conditions in the Mission Creek Subbasin has been performed by the CVWD and DWA since 2003. CVWD and DWA both publish annual Engineer's Reports on Water Supply and Replenishment Assessment for the Mission Creek Subbasin for their respective Areas of Benefit (AOBs). The Engineer's Reports have described the groundwater levels, annual water balance, artificial and natural recharge, and groundwater pumping for the previous calendar year, as well as established the replenishment assessment charged for production in the following fiscal year. Many of these goals are now achieved through the Mission Creek Subbasin Annual Reports prepared in accordance with the SGMA. In addition, CVWD, DWA, and MSWD prepare annual Consumer Confidence Reports on the water quality of their urban water systems.

In accordance with the SGMA (Water Code Section 10728), on April 1 following the adoption of a GSP or submission of an Alternative Plan, and annually thereafter, a GSA shall submit an annual report to the CDWR containing the following information about the managed basin:

- Groundwater elevation data.
- Aggregated data identifying groundwater extraction.
- Surface water supply used for or available for groundwater replenishment or in-lieu use.
- Total water use.
- Change in groundwater storage.
- Progress toward implementing the GSP or Alternative Plan.

This Mission Creek Subbasin Annual Report for WY 2020-2021 (Annual Report) was prepared for the Mission Creek Subbasin in response to the SGMA requirements and follows the general format of the previous Mission Creek Subbasin Annual Report (Wood, 2021), with modifications listed below. This Annual Report contains a general discussion of the Coachella Valley Groundwater Basin setting followed by sections describing each of the annual report elements required for the Mission Creek Subbasin by the SGMA. This year's Annual Report format has been updated to include a report section on Sustainable Management Criteria identified for the Mission Creek Subbasin in the 2022 Alternative Plan Update (Section 8). The Mission Creek Subbasin has met its sustainable management objective every year since the Alternative Plan was submitted to the CDWR in December 2016. Consequently, there are no interim milestones that need to be reached for compliance with the SGMA. The Sustainable Management Criteria review is provided to document current conditions in the Subbasin relative to the established management criteria.

Section 2 – Coachella Valley Groundwater Basin Setting

The Coachella Valley Groundwater Basin extends approximately 45 miles southeast from the San Bernardino Mountains to the northern shore of the Salton Sea. **Figure 2-1** shows the location of the Coachella Valley Groundwater Basin and its subbasins, including the Mission Creek Subbasin. The Coachella Valley lies within the northwesterly portion of California's Colorado Desert, an extension of the Sonoran Desert. Cities within the Coachella Valley include Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage, and the unincorporated communities of North Palm Springs, Thousand Palms, Thermal, Bermuda Dunes, Oasis, and Mecca. The Coachella Valley is bordered by the San Jacinto and Santa Rosa Mountains on the southwest, the San Bernardino Mountains on the northwest, the Little San Bernardino Mountains and the Mecca Hills on the northeast, and the Salton Sea on the southeast. The San Bernardino, San Jacinto, and Santa Rosa Mountains impede the eastward movement of storms and create a rain shadow, which results in an arid climate and greatly reduces the contribution of direct precipitation as a source of recharge to the Coachella Valley Groundwater Basin.

The bulk of natural groundwater replenishment comes in the form of runoff from the adjacent mountains. Climate in the Coachella Valley is characterized by low humidity, high summer temperatures, and mild dry winters.

2.1 Coachella Valley Groundwater Basin

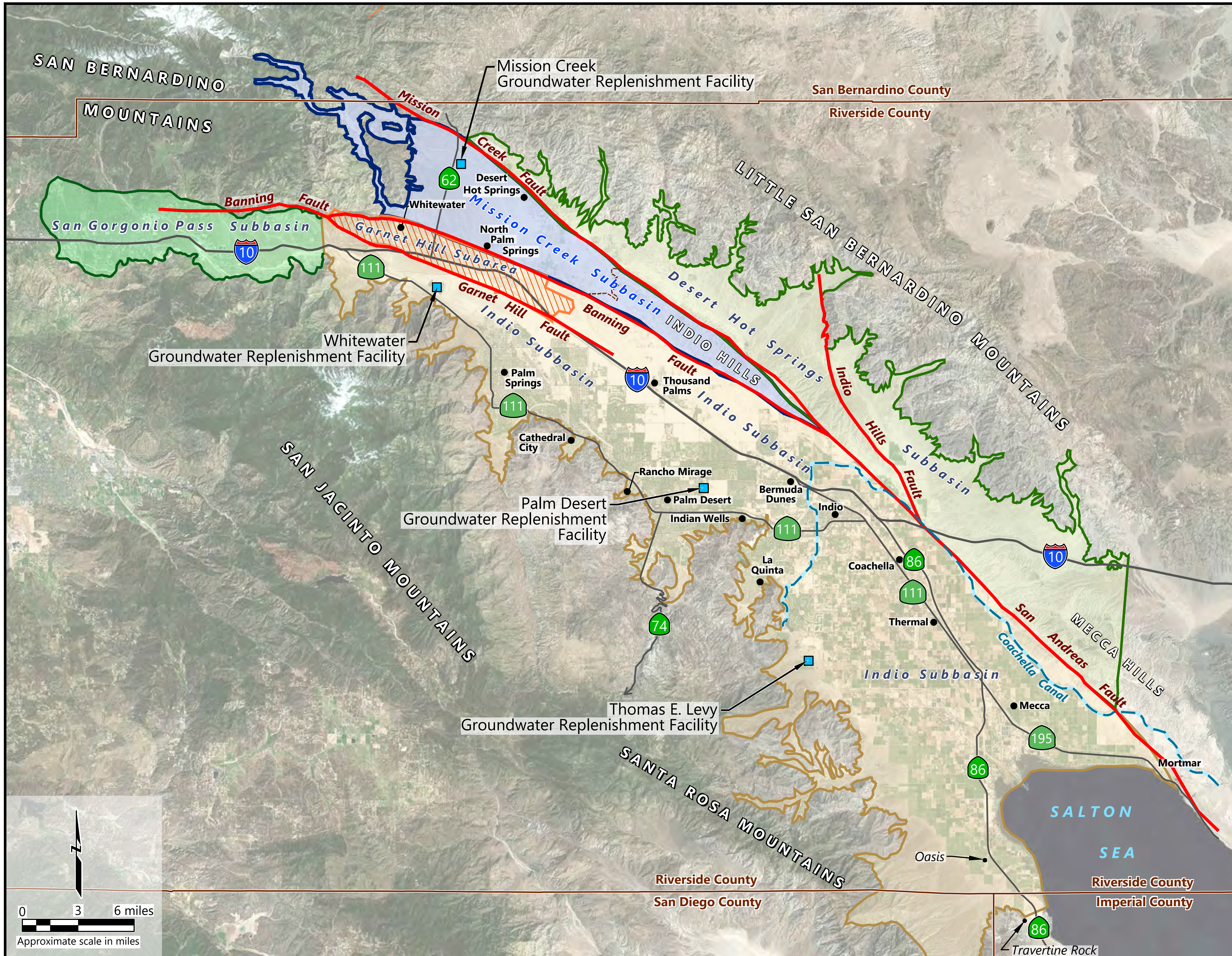
The geographic boundaries of the Coachella Valley Groundwater Basin correspond roughly with the Coachella Valley boundaries described above. At the west end of the San Gorgonio Pass, between the Cities of Beaumont and Banning, the basin boundary is defined by a surface drainage divide separating the Coachella Valley Groundwater Basin from the Beaumont Groundwater Basin of the Upper Santa Ana Drainage Area.

The southern boundary is formed primarily by the watershed of the Mecca Hills and by the northwest shoreline of the Salton Sea running between the Santa Rosa Mountains and Mortmar. Between the Salton Sea and Travertine Rock, at the base of the Santa Rosa Mountains, the southern boundary crosses the Riverside County line into Imperial and San Diego counties.

Although there is interflow of groundwater throughout the Coachella Valley Groundwater Basin, fault barriers, constrictions in the basin profile, and areas of low permeability materials limit and control movement of groundwater. Based on these factors, the Coachella Valley Groundwater Basin has been divided into subbasins and subareas, described by the California Department of Water Resources (CDWR) in 1964 and 2003, and by the United States Geological Survey (USGS) in 1974, as described below.

2.1.1 Subbasins and Subareas

As shown on **Figure 2-1**, the subbasins of the Coachella Valley Groundwater Basin are the Mission Creek, Desert Hot Springs, San Gorgonio Pass, and Indio Subbasins. The Garnet Hill Subarea shown on **Figure 2-1**, is identified as a subbasin by the USGS, and a subarea of the Indio Subbasin by the CDWR.



Explanation

- Mission Creek Subbasin
- Desert Hot Springs Subbasin
- San Gorgonio Pass Subbasin
- Indio Subbasin
- Garnet Hill Subarea of Indio Subbasin
- Fault
- Indio Hills boundary
- Coachella Canal

Basemap modified from an undated drawing by Krieger & Stewart Engineering, subbasin boundaries from "Mission Creek and Garnet Hill Subbasins Water Management Plan Final Report", January 2013, and an aerial photo from Esri World Imagery- Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, dated 10-15-2017.

Note:

All locations are approximate.

COACHELLA VALLEY GROUNDWATER BASIN
SUBBASIN and SUBAREA MAP
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: jrw	Date: 1/16/2022	Project No. CM19167353
wood.		Figure 2-1

Plot Date: 1/16/2022 5:59:55 PM, Plotted by: pat.herring
Drawing Path: Y:\CM19167353_(MISSION_CREEK)\ESRI\WY_2020-2021\ACAD\1-1_CV BASIN-SUBBASINS_V2.DWG, Subbasins

The subbasins are defined without regard to water quantity or quality. They delineate areas underlain by formations which readily yield stored groundwater through water wells and offer natural reservoirs for the regulation of water supplies.

The boundaries between subbasins within the Coachella Valley Groundwater Basin are generally defined by faults that impede the lateral movement of groundwater. Minor subareas have also been delineated, based on one or more of the following geologic or hydrologic characteristics: type(s) of water-bearing formations, water quality, areas of confined groundwater, forebay areas, groundwater divides, and surface drainage divides.

The following is a list of the subbasins and associated subareas in the Coachella Valley Groundwater Basin as designated by the CDWR in Bulletin 108 (1964) and Bulletin 118 (2003), with subbasin numbers as identified in CDWR (2003):

- Indio Subbasin (Subbasin 7-21.01)
  - Palm Springs Subarea
  - Thermal Subarea
  - Thousand Palms Subarea
  - Oasis Subarea
  - Garnet Hill Subarea[7]
- Mission Creek Subbasin (Subbasin 7-21.02)
- Desert Hot Springs Subbasin (Subbasin 7-21.03)
  - Miracle Hill Subarea
  - Sky Valley Subarea
  - Fargo Canyon Subarea
- San Gorgonio Pass Subbasin (Subbasin 7-21.04)

The location of each subbasin is shown on **Figure 2-1.**

2.1.2 Coachella Valley Groundwater Basin: Subbasin Storage Capacities

In 1964, the CDWR estimated that the subbasins in the Coachella Valley Groundwater Basin contained, in the first 1,000 feet below the ground surface, approximately 39,200,000 acre-feet (AF) of water.
The capacities of the subbasins are shown in **Table 2-1**.

[7] The Garnet Hill Subarea of the Indio Subbasin is identified as a separate subbasin, Garnet Hill Subbasin, by the USGS (1980). However, it is identified as the Garnet Hill Subarea of the Indio Subbasin in CDWR Bulletin 108 (1964) and CDWR Bulletin 118 (2003).

Table 2-1
Coachella Valley Groundwater Basin
Groundwater Storage Capacity

Subbasin/Subarea	Groundwater Storage Capacity (AF)[1]
Indio Subbasin	
Palm Springs Subarea	4,600,000
Thousand Palms Subarea	1,800,000
Oasis Subarea	3,000,000
Thermal Subarea	19,400,000
Garnet Hill Subarea	1,000,000
Subtotal Indio Subbasin	**29,800,000**
San Gorgonio Pass Subbasin	2,700,000
Mission Creek Subbasin	2,600,000
Desert Hot Springs Subbasin	4,100,000
Total All Subbasins	**39,200,000**

Notes

1. First 1,000 feet below ground surface. Capacities estimated by CDWR (CDWR, 1964).

2.1.3 Regional Geology

The Coachella Valley Groundwater Basin encompasses much of the Coachella Valley floor area. The Coachella Valley itself trends northwest to southeast; its surface slopes generally to the southeast and it is bounded on its northern, northwestern, southwestern, and southern margins by uplifted mountains of granitic and metamorphic rocks and indurated sedimentary rocks that form the bedrock surrounding and underlying the valley floor. The basin is bounded on the south by the Salton Sea. As shown on **Figure 2-2**, the floor of Coachella Valley in the Mission Creek Subbasin area (and in other areas) is underlain by Quaternary alluvium (Q) and dune sand (Qs). Coachella Valley sedimentary fill consists of thick sand and gravel sedimentary sequences eroded from the surrounding mountains (USGS, 2007). These sediments thicken from north to south and, depending on location within the basin, are at least several thousand and as much as 12,000 feet in thickness in the southern Indio Subbasin. Older semi-consolidated sediments units (Qpc) are also exposed on the valley floor and occur at the surface, in part, as the result of movement on several major fault zones in the area (**Figure 2-2**).

Figure 2-2 shows the major fault system crossing the Coachella Valley, which is the seismically active San Andreas fault system. This fault system includes the Banning, Garnet Hill, Mission Creek, and Indio Hills faults. Numerous other faults are located within the tectonically active basin. The Banning and Mission Creek faults form the southwestern and northeastern boundaries of the Mission Creek Subbasin.

Slight discrepancies between the fault locations and the basin boundaries, as shown on figures in this report, are due to the integration of different sources of information, each reported in different presentation styles, map scales, and time periods (e.g., USGS, 2007 for fault locations and CDWR, 2003 for basin boundary locations). More detailed information on the geology of the Mission Creek Subbasin is presented in Section 2.2.2 of this report.

2.2 Mission Creek Subbasin Description

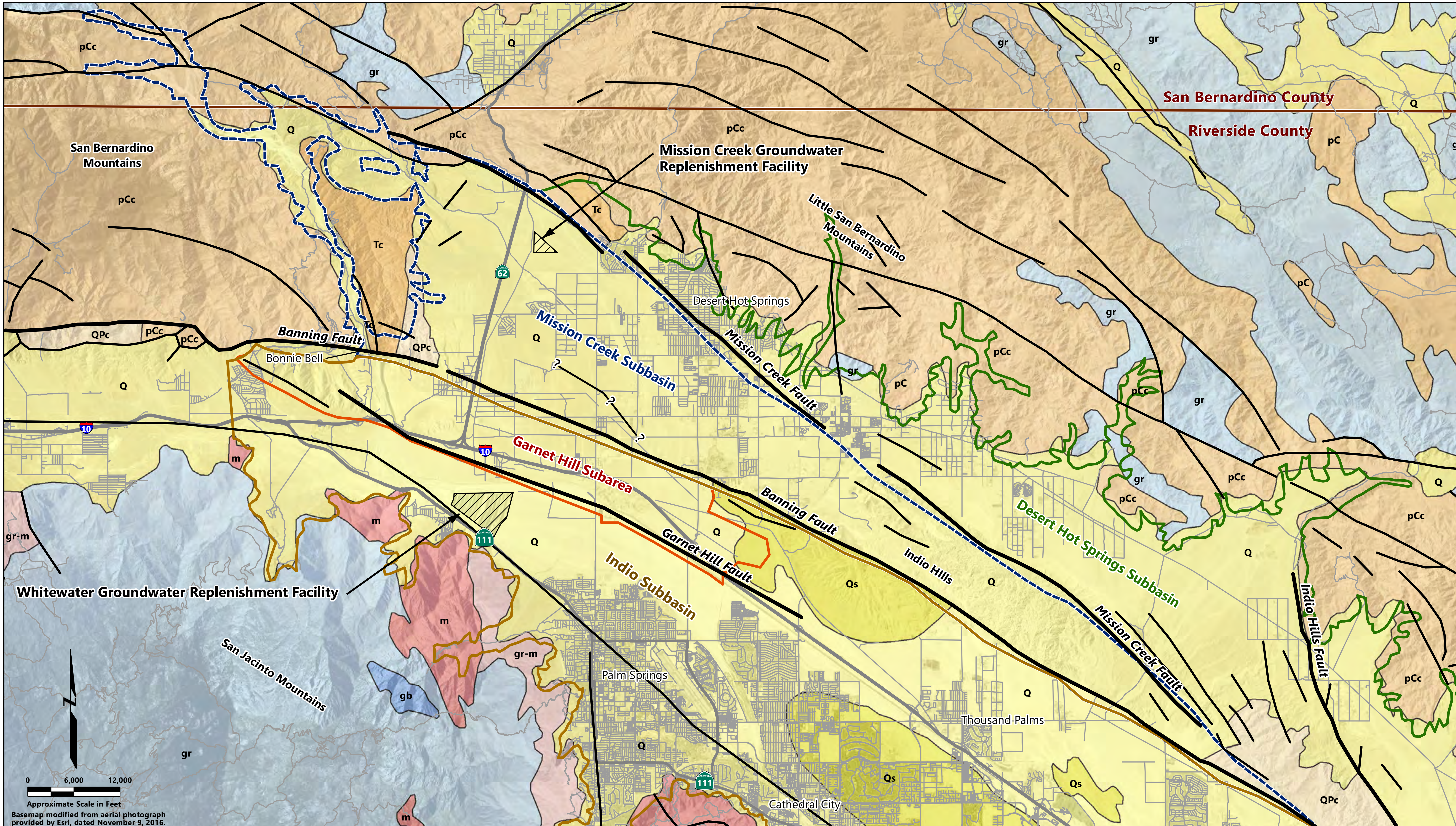
The Mission Creek Subbasin boundary is shown on **Figure 2-3**. The physiography and climate, geology, hydrogeology, hydrogeologic conceptual model, and the management areas overlying the Mission Creek Subbasin are described below.

2.2.1 Physiography and Climate

The northwestern end of the Mission Creek Subbasin includes the active and paleo stream channel of the Whitewater River, which has cut a broad canyon with steep sides along the foothills of the eastern flank of the San Bernardino Mountains. The northwestern extent of the Mission Creek Subbasin lies within the active Whitewater River channel at an elevation of approximately 5,000 feet above mean sea level (msl). The Whitewater River channel and northern paleo channel area are largely uninhabited with the exception of the small community of Bonnie Bell.

The main Mission Creek Subbasin (outside of the Whitewater River channel and northern paleo channel) extends from the base of the San Bernardino Mountain foothills and into the western portion of the Indio Hills. Much of the Mission Creek Subbasin is undeveloped and supports sparse desert vegetation. The City of Desert Hot Springs and the community of North Palm Springs are located in the central part of the Mission Creek Subbasin. Palm Springs city limits also extend into the Mission Creek Subbasin and the city limit ends just south of the community of North Palm Springs (**Figure 2-3**). Individual homes and smaller communities are scattered across the northwestern and other parts of the Mission Creek Subbasin. The Indio Hills are not inhabited within the Mission Creek Subbasin. Numerous wind turbines for generating electricity have been constructed in the western part of the Mission Creek Subbasin and near the Indio Hills.

Ground surface elevation is approximately 2,000 feet above msl in the northwest part of the Mission Creek Subbasin and the ground surface slopes gently toward the south-southeast and south to an elevation of approximately 700 feet above msl near the western boundary of the Indio Hills, northwest of Seven Palms Ridge (**Figure 2-3**). Ground surface elevation then increases to the southeast toward the uninhabited Indio Hills. The Indio Hills are incised and eroded highlands that rise to more than 1,600 feet above msl. The western Indio Hills are located within the Mission Creek Subbasin but, as described in report Section 2.2.2, comprise semi-consolidated sediments of low permeability in the groundwater-saturated zone and are not considered part of the main Mission Creek Subbasin area for groundwater resources. Ground surface slopes downward toward the southeast from the Edom Hill area to an elevation of approximately 200 feet above msl at the southeastern end of the Mission Creek Subbasin.



Explanation

- Fault
- Facility
- Highway/road

Site Features

- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- Garnet Hill Subarea of Indio Subbasin

Geology

- **Qs**: dune sand (Quaternary)
- **Q**: alluvium (Quaternary)
- **QPc**: sandstone (Tertiary-Quaternary)
- **Tc**: sandstone conglomerate (Tertiary)
- **gb**: gabbro (Triassic)
- **gr**: diorite (Permian)
- **pC/pCc**: gneiss (Paleozoic)
- **gr-m**: plutonic rock (Early Proterozoic to Late Cretaceous)
- **m**: schist (Early Proterozoic to Cretaceous)

Sources:
1. USGS Open File Report 2005-1305, 2007.
2. Geotechnical Consultants, 1978.

Note:
Fault and groundwater basin boundary alignments differ due to different sources.

REGIONAL GEOLOGY IN THE MISSION CREEK SUBBASIN AREA
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: pah	Date: 1/14/2022	Project No.: CM19167353

wood.

Figure 2-2

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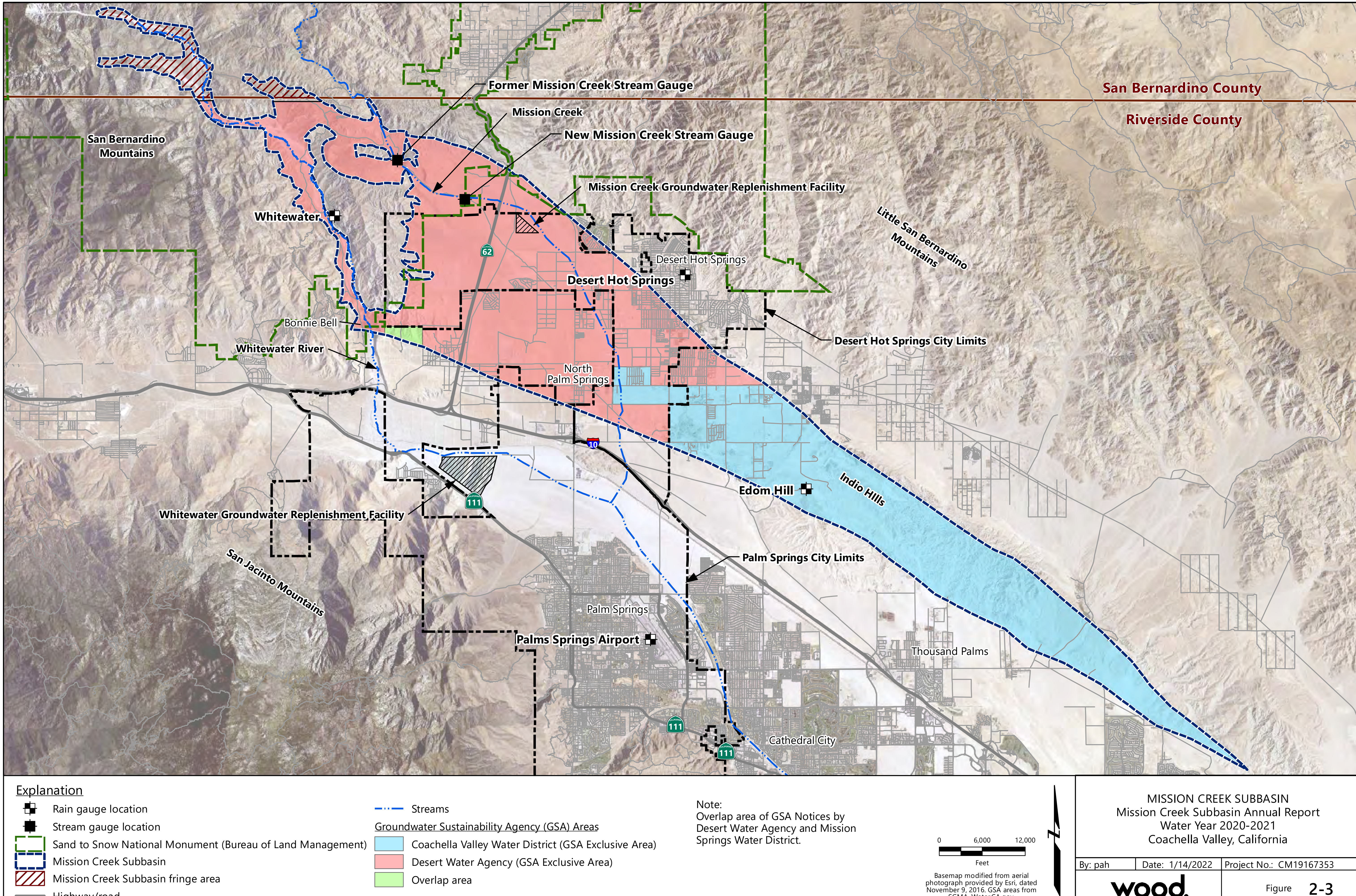

MISSION CREEK SUBBASIN
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

Figure 2-3

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The Whitewater River is the major drainage in the Mission Creek Subbasin and flows between the eastern foothills of the San Bernardino Mountains and the elevated impermeable bedrock and low permeability sediments in the western side of the Mission Creek Subbasin before flowing south into the Garnet Hill Subarea of the Indio Subbasin. The Whitewater River is perennial in its upper reaches but flows intermittently in its lower reaches. Mission Creek, Morongo Wash, Little Morongo Wash, and other washes have intermittent flows in the Mission Creek Subbasin that occur only during or following heavy precipitation events. These washes flow out of the canyons located northwest and north of the Mission Creek Subbasin and flow south and southeast across the Mission Creek Subbasin. The location of Mission Creek is shown on **Figure 2-3**.

Table 2-2 provides a summary of climate statistics based on nearly 30 years of temperature and precipitation data at the Palm Springs Airport, located approximately 2 miles south of the Mission Creek Subbasin's southern boundary (**Figure 2-3**). Average high temperatures exceed 100 degrees Fahrenheit (°F) in the months of June, July, August, and September. Average high temperatures in May and October are in the low to mid 90s°F and average high temperatures in the months of November through April range from about 69°F to 87°F. Average low temperatures range from 46°F in December to 80°F in August. Most of the precipitation occurs during December through February with an average precipitation of 0.68 inches in December and 1.14 inches January, and 1.11 inches in February. Brief, but heavy, rains occur from thunderstorms in the summer months (referred to as desert monsoons) resulting in an average monthly precipitation of 0.25 inches in July, 0.14 inches in August, and 0.24 inches in September.

Annual precipitation from Water Year (WY) 1960-1961 to WY 2020-2021 for the Riverside County Flood Control and Water Conservation District station at Desert Hot Springs is shown on **Figure 2-4**. The station is located approximately one-mile northeast of the northeast boundary of the Mission Creek Subbasin in the adjoining Desert Hot Springs Subbasin (**Figure 2-3**). This station is used for the plot of annual precipitation because it has the longest record (61 years) of the three stations located within or near the Mission Creek Subbasin. The other two stations, Whitewater and Edom Hill, have shorter periods of record (extending back to WY 1975-1976 and WY 2008-2009, respectively).

The mean annual precipitation for the water year over the period of record was 5.1 inches, with a standard deviation of 3.5 inches. The maximum precipitation was just over 16 inches in WY 2004-2005. No precipitation was recorded at the station in WY 1961-1962 and WY 1963-1964.

Table 2-2
Climate Summary 1991 to 2020, Palm Springs Airport

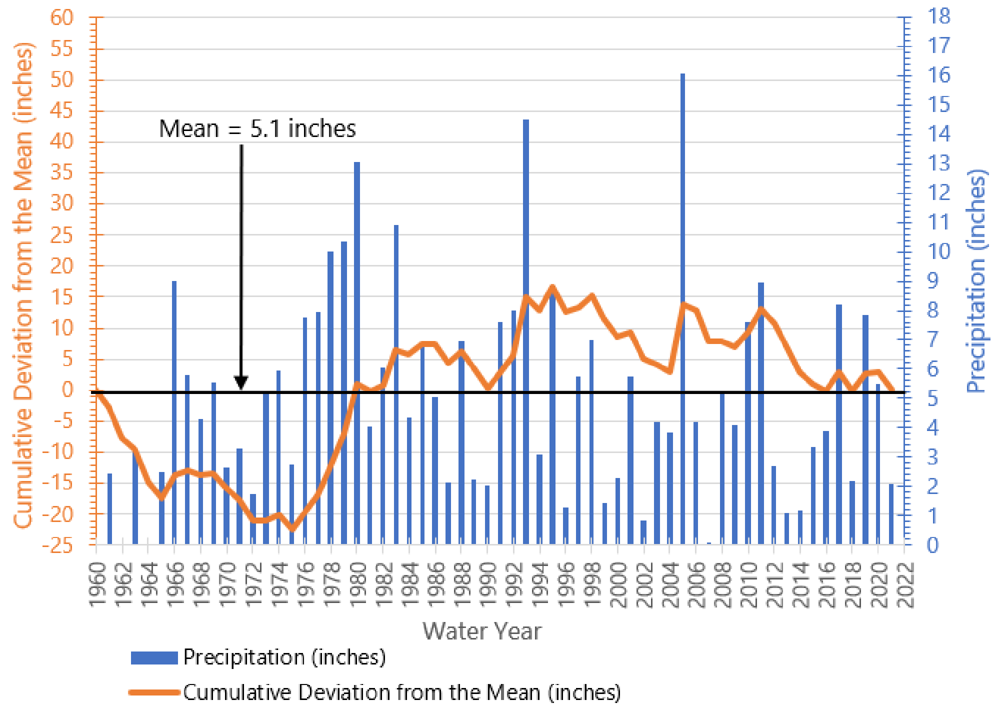
	January	February	March	April	May	June
Average Maximum Temperature (°F)	70.5	73.7	80.6	86.7	94.7	103.6
Average Minimum Temperature (°F)	47.6	49.7	54.4	59.1	65.9	72.7
Average Temperature (°F)	59.0	61.7	67.5	72.9	80.3	88.2
Average Precipitation (inches)	1.14	1.11	0.51	0.09	0.02	0.00
	July	**August**	**September**	**October**	**November**	**December**
Average Maximum Temperature (°F)	108.6	108.1	101.8	91.1	78.7	69.2
Average Minimum Temperature (°F)	79.4	79.8	74.4	64.5	53.4	46.2
Average Temperature (°F)	94.0	94.0	88.1	77.6	66.0	57.7
Average Precipitation (inches)	0.25	0.14	0.24	0.20	0.23	0.68
					Average Temperature (°F)	**75.6**
					Average Annual Precipitation (inches)	**4.61**

Notes:

Temperature and precipitation based on data collected from the Palm Springs Airport from 1991 through 2020, NOAA NCEI 1991-2020 Normals Access.

Figure 2-4 includes a plot of the cumulative deviation from the mean (CDFM) that shows general wet and dry periods over time based on increasing or decreasing trends of the CDFM plot line. For example, a generally dry period is observed from WY 1960-1961 through WY 1974-1975, when precipitation exceeded the average or mean precipitation in only two of fourteen years and only one of those years (WY 1965-1966) included substantial precipitation above the mean. The CDFM plot line shows a downward trend over this period. Conversely, this dry period is followed by a wet period extending from WY 1975-1976 to WY 1982-1983. During this wet period, below average precipitation was observed in only one year (WY 1980-1981) and three of the eight years received precipitation that approached or exceeded twice the average annual precipitation. The CDFM plot line for this period shows a steep upward trend. WY 2016-2017 ended five consecutive years of below average precipitation in the Mission Creek Subbasin area. Since WY 2016-2017, cumulative deviation from the mean has been relatively flat, indicating a generally average precipitation for the period from WY 2016-2017 to WY 2020-2021. The precipitation total for WY 2020-2021 was 2.1 inches, below the mean annual precipitation of 5.1 inches.

Figure 2-4
Annual Precipitation and Cumulative Deviation from the Mean, Desert Hot Springs



Notes:
No precipitation reported in WY 1961-1962 and WY 1963-1964.
Cumulative Deviation from Mean starts WY 1959-1960 with an assumed mean precipitation.

2.2.2 Subbasin Geology

Figure 2-5 shows the geology of the Mission Creek Subbasin within the confines of the bounding, relatively impermeable bedrock of the San Bernardino Mountains and Little San Bernardino Mountains, and the relatively low permeability resulting from faulting along the Mission Creek fault and the Banning fault. The bedrock and faults define the Mission Creek Subbasin on the Regional Geologic Map (**Figure 2-2**). Geologic materials/units within the Mission Creek Subbasin (not all differentiated on the Regional Geologic Map, **Figure 2-2**) include relatively impermeable Precambrian metamorphic and Tertiary volcanic rocks; relatively impermeable massive, consolidated conglomerate of the Coachella fanglomerate (Tc); relatively impermeable shale, sandstone, and siltstone of the Imperial Formation (Ti); semi-consolidated Quaternary/Tertiary sediments of the Painted Hill (TQph) and Palm Springs (TQps) formations; unconsolidated and relatively unconsolidated sediments of the Quaternary Ocotillo conglomerate (Qa); Cabezon fanglomerate (Qc); recent and older alluvial fan deposits (Qf); and active channel and stream wash deposits (Qr) (CDWR, 1964). The consolidated Coachella fanglomerate, metamorphic rocks, and semi-consolidated rocks are located in the northwestern portion of the Mission Creek Subbasin between the Whitewater River channel deposits and the main Mission Creek Subbasin (east of the Whitewater River channel). Although the relatively permeable Ocotillo fanglomerate is mapped as the surface geology in the Indio Hills, the exposure of the Palm Springs Formation and Imperial Formation in the Indio Hills suggests that semi-consolidated sediments and consolidated sediments occur at relatively shallow depths in this area.

2.2.3 Subbasin Hydrogeology

The Mission Creek Subbasin is designated Number 7-21.02 in the CDWR's Bulletin 118 (2003). The wedge-shaped Mission Creek Subbasin is bounded by relatively impermeable rocks of the San Bernardino Mountains and Little San Bernardino Mountains to the west/northwest and north/northeast, respectively, and by faults that represent partial barriers to groundwater flow including the Banning fault to the southwest and the Mission Creek fault to the northeast. These two faults trend subparallel to each other along a northwest to southeast transect and intersect to form the southeastern end of the Mission Creek Subbasin. Groundwater level differences across the Banning fault, between the Mission Creek Subbasin and the Garnet Hill Subarea of the Indio Subbasin, are on the order of 200 feet to 250 feet. Similar groundwater level differences exist across the Mission Creek fault between the Mission Creek Subbasin and Desert Hot Springs Subbasin (MWH, 2013). The groundwater level differences indicate that the faults form partial barriers to groundwater flow in and out of the Mission Creek Subbasin.

Measured depths to groundwater in the Mission Creek Subbasin in WY 2020-2021 ranged from more than 595 feet below ground surface (bgs) in the northwest part of the Mission Creek Subbasin where ground surface elevations are more than 1,300 feet above msl to less than 5 feet bgs within the southern portion of the Mission Creek Subbasin west of the Indio Hills where ground surface elevations are approximately 700 feet above msl.

The Whitewater River and Mission Creek are the only perennial surface water features in the Mission Creek Subbasin (perennial only at the higher elevation reaches). Under low-flow conditions along the Whitewater River, surface water infiltrates into the channel after crossing south of the Banning fault (i.e., outside of the Mission Creek Subbasin).

As described in Section 2.2.2 and shown on **Figure 2-5**, relatively impermeable bedrock, a fault, and semi-permeable sediments are found east of the Whitewater River and most of the Whitewater River area is hydraulically isolated from the main portion of the Mission Creek Subbasin. However, the very northern portion of the Whitewater River recent channel deposits and alluvial sediments of the Mission Creek Subbasin may be hydraulically connected through paleo channels indicated by Pleistocene-age deformed gravels of the Whitewater River (CDWR, 1964) that are known to occur in the older alluvium in the northwest corner of the Mission Creek Subbasin. Subsurface mountain front recharge may flow through permeable sediments in this gap into the main part of the Mission Creek Subbasin.

In the southeastern part of the Mission Creek Subbasin, consolidated and semi-consolidated low-permeability sediments are exposed in the Indio Hills. In the area of the Indio Hills, these low-permeability sediments occur at much shallower depths than in other portions of the Mission Creek Subbasin. The structure of the semi-consolidated sediments is depicted by Geotechnical Consultants Inc. (GCI, 1979) as rising steeply toward the surface approaching the Indio Hills. Geologic maps that include the Indio Hills area show exposures of these Tertiary, semi-consolidated sediments (CDWR, 1964 and USGS, 2007). Although alluvial sediments considered to be permeable are mapped as surficial deposits through much of the Indio Hills, these sediments are likely thin and much of the Indio Hills is composed of semi-consolidated sediments at the depths of regional groundwater occurrence; thus, the Indio Hills are described by the USGS (1974) as "semi-consolidated deposits that yield little water" and by the CDWR (1964) as "essentially semi-water-bearing rocks." Low permeability sediments and non-water bearing rocks within the Mission Creek Subbasin are identified on **Figure 2-5** and are included on the Mission Creek Subbasin maps to supplement the CDWR Mission Creek Subbasin boundary geometry.

The area of the Mission Creek Subbasin between the bedrock exposures to the northwest and Indio Hills to the southeast reflects the estimated geographic limit of effective groundwater storage within the Mission Creek Subbasin (CDWR 1964).

2.2.4 Hydrogeologic Conceptual Model

A hydrogeologic conceptual model is a working interpretation of the characteristics and dynamics of the physical hydrogeologic system. Hydrogeologic conceptual models for the Mission Creek Subbasin are described in the 2016 Bridge Document, in the 2013 Mission Creek-Garnet Hill Water Management Plan (2013 MC-GH WMP), by Psomas (2010), and in the Mission Creek Subbasin Alternative Plan Update (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]). **Figure 2-6** is a graphical presentation of the hydrogeologic conceptual model for the Mission Creek Subbasin.

The following paragraphs summarize the main components of the hydrogeologic conceptual model for the Mission Creek Subbasin.

Groundwater is stored in the alluvial sediments, which extend to a depth as great as 3,000 feet bgs and are underlain by semi-consolidated, semi-permeable sediments (GCI, 1979).

Faults bounding the Mission Creek Subbasin are partial barriers to groundwater flow resulting in a steep drop in groundwater levels from the Mission Creek Subbasin into the Garnet Hill Subarea of the Indio Subbasin across the Banning fault, and a steep drop in groundwater levels from the Desert Hot Springs Subbasin into the Mission Creek Subbasin across the Mission Creek fault. Because these faults are only partial barriers to groundwater flow, the steep hydraulic gradients across the faults result in subsurface outflow from the Mission Creek Subbasin to the Garnet Hill Subarea of the Indio Subbasin and subsurface inflow from the Desert Hot Springs Subbasin into the Mission Creek Subbasin. Bedrock, semipermeable sediments, and a fault at the north end of the main Mission Creek Subbasin restrict inflow from the Whitewater River channel portion of the Mission Creek Subbasin to the main Mission Creek Subbasin. Alluvial sediments in a gap between bedrock and low permeability sediments provide a potential source of subsurface inflow from the northern part of the Whitewater River channel area and mountain front recharge that occurs along the west side of the Mission Creek Subbasin.

The primary natural inflows to the Mission Creek Subbasin include infiltration of runoff in the creeks and washes fed by highland precipitation, subsurface mountain front recharge, and subsurface inflow from the Desert Hot Springs Subbasin. A significant source of recharge to the Mission Creek Subbasin is artificial recharge of imported water to the Mission Creek Subbasin at the Mission Creek Groundwater Replenishment Facility (GRF). Additional sources of recharge include wastewater percolation, septic tank percolation, and return flow infiltration from water applied for municipal, agricultural, recreational (such as golf course irrigation), and industrial uses. In this document, municipal and recreational uses are combined into the category urban water use unless identified separately.

The primary outflow of groundwater from the Mission Creek Subbasin is through groundwater production for urban, agricultural, and industrial use. The Agencies produce most of the groundwater for delivery to their customers in the Mission Creek Subbasin or for export to customers in the adjacent Desert Hot Springs Subbasin. Groundwater produced from the adjacent Garnet Hill Subarea of the Indio Subbasin is also imported for use in the Mission Creek Subbasin. Private wells used to pump for golf course irrigation, agricultural, and industrial use are metered to assesses for the cost to import water for groundwater replenishment. Additionally, there are private wells located in the Mission Creek Subbasin that, due to low levels of use, are not required to report their well production to the Coachella Valley Water District (CVWD) or Desert Water Agency (DWA), and some of these wells may produce groundwater on a regular basis.[8] Other outflows of groundwater from the Mission Creek Subbasin include evapotranspiration from plants with deep roots that draw water at or near the groundwater surface (phreatophytes) in shallow groundwater areas and previously mentioned subsurface outflow to the Indio Subbasin including the Garnet Hill Subarea of the Indio Subbasin.

The updated groundwater model for the Mission Creek Subbasin developed as part of the 2022 Alternative Plan Update enhanced and expanded the understanding of groundwater recharge, groundwater flow, and groundwater storage in the Mission Creek Subbasin. The updated groundwater model included more of the northwestern part of Mission Creek Subbasin where the Whitewater River paleochannel and Mission Creek stream channel are located. This area is remote and topographically and hydraulically upgradient of the main Mission Creek Subbasin where groundwater production wells are located. Conceptually, groundwater in this area will continue to drain into the main Mission Creek Subbasin during periods of drought and will be replenished during wet periods. This is a natural condition that occurs with or without groundwater production in the main Mission Creek Subbasin. However, the updated groundwater model storage calculations incorporate this area and therefore will have greater fluctuation in groundwater storage over drought and wet periods than calculations based on previous groundwater models or presented in previous Annual Reports.

2.3 Mission Creek Subbasin Groundwater Management

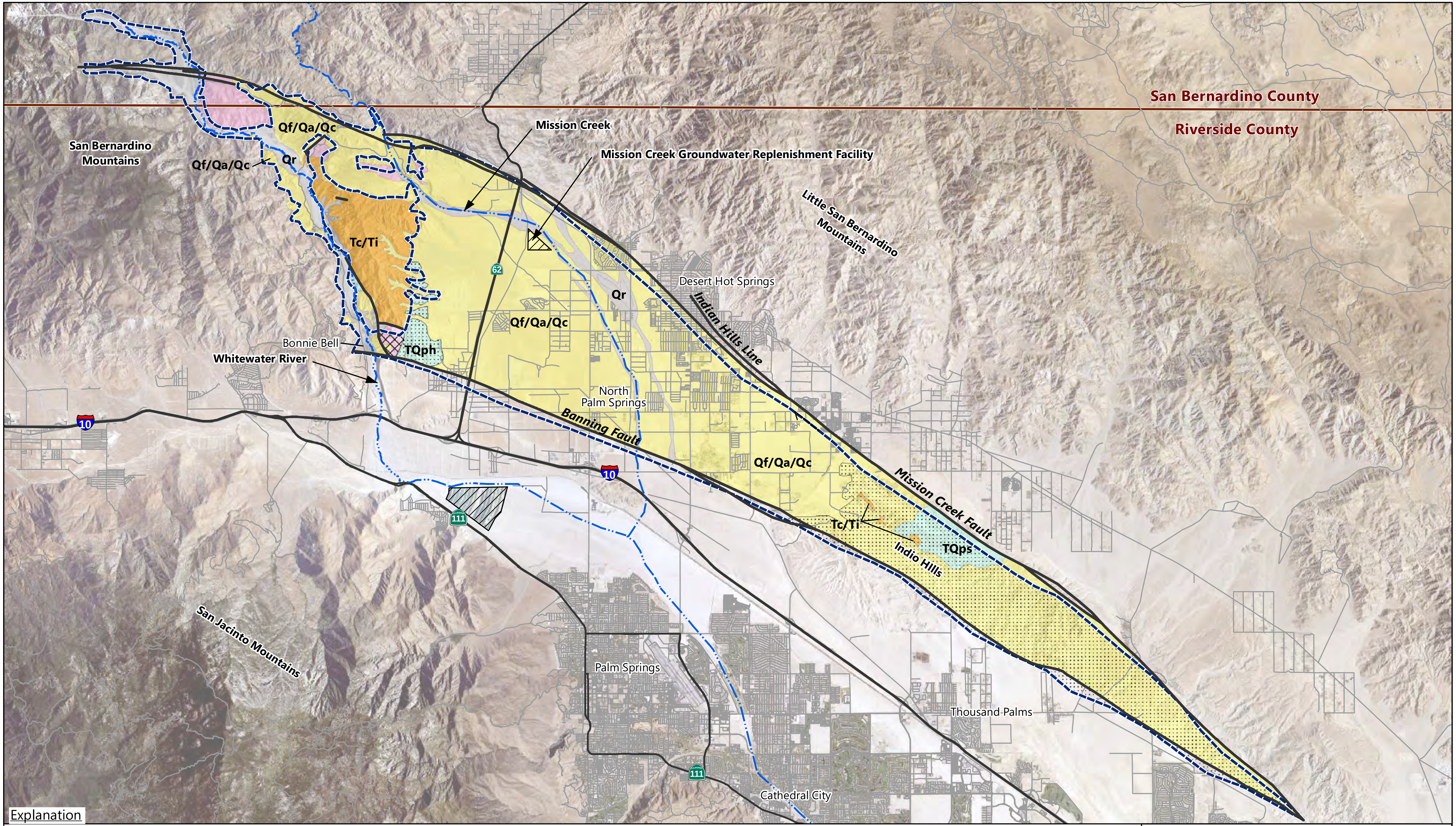
In December 2004, CVWD, DWA, and Mission Springs Water District (MSWD) signed the Mission Creek Settlement Agreement (2004 Settlement Agreement). The parties to the 2004 Settlement Agreement created a Mission Creek Subbasin Management Committee (Management Committee) made up of the General Managers from CVWD, DWA, and MSWD that meets quarterly to discuss on-going topics regarding management of the Mission Creek Subbasin and the Garnet Hill Subarea of the Indio Subbasin.

CVWD and DWA executed the Mission Creek Groundwater Management Agreement in 2014 to replace the previous 2003 Management Agreement. The 2014 Management Agreement provides for replenishing the Mission Creek Subbasin and sharing the costs of replenishment between CVWD and DWA. The 2004 Settlement Agreement and the 2014 Management Agreement specify that the available State Water Project water will be allocated between the Mission Creek Subbasin and the western portion of the Indio Subbasin in proportion to the amount of water produced or diverted from each subbasin.

[8] Minimal pumpers are small pumpers who are not required to report production to CVWD (<25 AFY) or DWA (<10 AFY). As reported in the 2022 Alternative Plan Update, the amount of unmetered private well pumping in the Mission Creek Subbasin was estimated at approximately 480 AFY. This estimate agrees with previous estimates of approximately 500 AFY. Given the uncertainty in estimating this pumping, it is rounded to 500 AFY for WY 2020-2021.

Cumulative replenishment water deliveries between the Mission Creek and Indio Subbasins will be balanced as determined by the Management Committee but no later than 20 years from December 7, 2004.

Under the authority of their enabling legislation, the CVWD and DWA have each designated an "Area of Benefit" for the purpose of assessing groundwater replenishment charges on groundwater production from their respective portions of the Mission Creek Subbasin. The funds derived from these charges recover costs of recharging State Water Project (SWP) water that is exchanged with the Metropolitan Water District of Southern California (MWD) for Colorado River water from MWD's Colorado River Aqueduct (SWP Exchange Water) at the Mission Creek GRF.



Explanation

- Fault
- Streams
- Mission Creek Subbasin
- Highway/road

Hydrostratigraphic Characteristic Unit/Materials

- Low permeability
- Non-water bearing

Geologic Unit/Materials

- Qr: active channel and stream wash deposits (Recent)
- Qf/Qa/Qc: unconsolidated sediments (Quaternary)
- TQps/TQph: semi-consolidated sediments (Tertiary-Quaternary, low permeability)
- Tc/Ti: consolidated sediments (Tertiary, non-waterbearing)
- Metamorphic and volcanic rocks, non-waterbearing

Source:

California Department of Water Resources Bulletin No. 108, 1964.

Note:

Fault and groundwater basin boundary alignments differ due to different sources. Geologic unit/material names differ from Figure 2-2 due to different sources.

0 6,000 12,000
Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016.

N

GEOLOGY OF MISSION CREEK SUBBASIN
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: pah | Date: 1/14/2022 | Project No.: CM19167353

wood.

Figure 2-5

Date: 1/14/2022 Printed by: pat.herring
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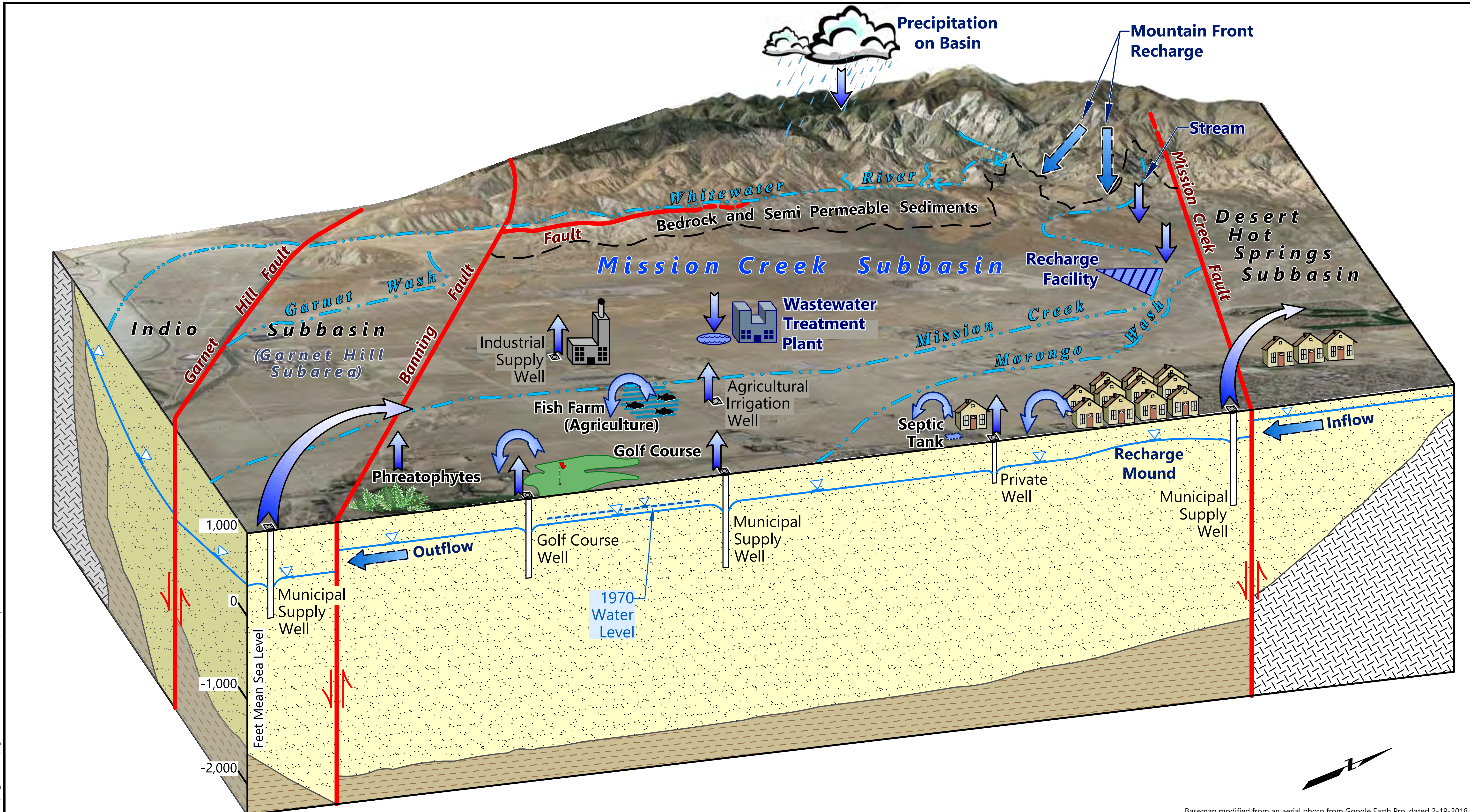


Explanation

- Subsurface flow
- Return flow
- Recharge
- Discharge
- Import/ Export
- Groundwater surface
- Sand
- Semi-permeable Sediments
- Bedrock

Notes:

1. Land use features are shown for conceptual purposes and do not indicate land use activity in a specific portion of the subbasin.
2. Geology and structure conceptualized from GCI, 1979, and CDWR, 1964.
3. All locations are approximate.

HYDROGEOLOGIC CONCEPTUAL MODEL
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: pah	Date: 09/08/2021	Project No. CM19167353
wood.	Figure	2-6

Section 3 – Groundwater Elevation Data

Section 356.2(b) of the Sustainable Groundwater Management Act (SGMA) Emergency Regulations requires:

> *A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*
>
> *(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:*
>
> *(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.*
>
> *(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.*

3.1 Monitoring Wells

The Mission Creek Subbasin Alternative Plan Update, (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]), established nine Key Wells for monitoring of groundwater levels in the Mission Creek Subbasin (also referred to as the Subbasin). Additional agency monitoring well data are also used to assist in groundwater contouring and in preparing change in groundwater storage maps. **Table 3-1** identifies the Key Wells and the rationale for selecting these wells. The locations and construction information of the Key Wells are provided on **Figure 3-1**.

As of the beginning of 2022, the SGMA Portal Monitoring Network Module (MNM) replaced the California Statewide Groundwater Elevation Monitoring (CASGEM) program as the database for SGMA groundwater well data and water level data. Data upload to CASGEM is no longer required for SGMA reporting purposes. One of the Key Wells was in CASGEM and data from this well were migrated to the MNM. Data for the remaining non CASGEM Key Wells were uploaded to the MNM in December 2021 and January 2022. For compliance with the SGMA, the well reference point elevations and ground surface elevations were converted from National Geodetic Vertical Datum of 1929 (NGVD29) to North American Vertical Datum of 1988 (NAVD88) using the software program VDatum, published by the National Oceanic and Atmospheric Administration (NOAA).[9] The Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD)(collectively the Agencies), plan to resurvey all of the Key Wells relative to NAVD88 within two years.

In addition to monitoring groundwater levels in the nine Key Wells for SGMA compliance, the Agencies monitor groundwater levels in 15 additional wells in the Mission Creek Subbasin. Nine of these wells were used to supplement the Key Well data for groundwater contouring and change in storage maps. These supplemental wells are shown as other agency wells on **Figure 3-1**.

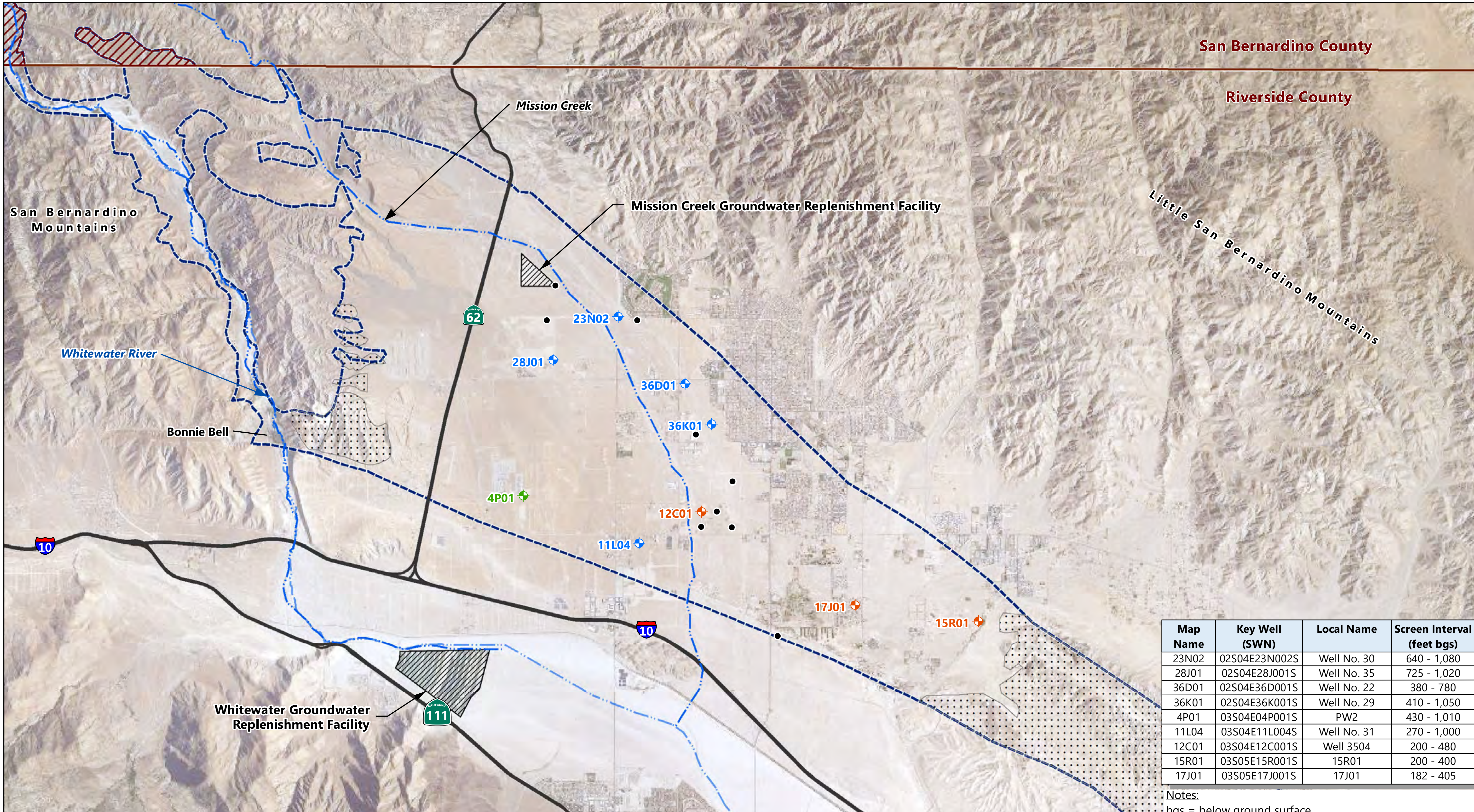
MSWD monitors groundwater levels in its wells monthly, while CVWD monitors groundwater levels in its wells three times per year. DWA monitors groundwater levels monthly in its monitoring well located near the Mission Creek Groundwater Replenishment Facility (GRF) and monitors two private production wells

[9] https://vdatum.noaa.gov/about/currentevents.html

monthly. Groundwater level data utilized for this Mission Creek Subbasin Annual Report for Water Year (WY) 2020-2021 (Annual Report) are provided in **Appendix A**.

Table 3-1
Key Wells in the Mission Creek Subbasin - WY 2020-2021

State Well Number	Local Name	Map Name	Rationale for Selection as a Key Well
02S04E23N002S	Well No. 30	23N02	Long monitoring history. Northern portion of the northwestern Subbasin
02S04E28J001S	Well No. 35	28J01	Spatial coverage of northwestern Subbasin
02S04E36D001S	Well No. 22	36D01	Long monitoring history. North central portion of the Subbasin
02S04E36K001S	Well No. 29	36K01	Long monitoring history. North central portion of the Subbasin
03S04E04P001S	PW2	4P01	Spatial coverage of south portion of northwestern Subbasin
03S04E11L004S	Well No. 31	11L04	South central part of the main Subbasin
03S04E12C001S	Well 3405	12C01	Long monitoring history. Near the center of the main Subbasin
03S05E15R001S	15R01	15R01	Southern end of the main Subbasin
03S05E17J001S	17J01	17J01	Long monitoring history. South central part of the main Subbasin



Map Name	Key Well (SWN)	Local Name	Screen Interval (feet bgs)
23N02	02S04E23N002S	Well No. 30	640 - 1,080
28J01	02S04E28J001S	Well No. 35	725 - 1,020
36D01	02S04E36D001S	Well No. 22	380 - 780
36K01	02S04E36K001S	Well No. 29	410 - 1,050
4P01	03S04E04P001S	PW2	430 - 1,010
11L04	03S04E11L004S	Well No. 31	270 - 1,000
12C01	03S04E12C001S	Well 3504	200 - 480
15R01	03S05E15R001S	15R01	200 - 400
17J01	03S05E17J001S	17J01	182 - 405

Notes:
bgs = below ground surface.
SWN=State Well Number

Explanation

- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Other Agency Well
- Streams
- Highway/road
- Facility
- Low permeability/non-water bearing sediments/bedrock
- Mission Creek Subbasin fringe area
- Mission Creek Subbasin

KEY WELLS AND OTHER AGENCY WELLS WITH WATER LEVEL DATA
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: pah/jrw | Date: 2/11/2022 | Project No.: CM19167353

wood.

Figure 3-1

Date: 2/11/2022 Printed by: pat.herring
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3.2 Groundwater Levels

Figure 3-2 presents the average groundwater elevations in the Mission Creek Subbasin based on WY 2020-2021 monitoring data. The extreme northwestern part of the Mission Creek Subbasin and the southeastern part of the Mission Creek Subbasin (Indio Hills) lack sufficient data to contour groundwater levels and these areas are delineated by a "Water level data boundary" on the figure. The Indio Hills area is underlain by low permeability sediments, and the northwestern part of the Mission Creek Subbasin is sparsely populated and wells in this area are privately owned.

Note that non-uniform groundwater contour intervals are used on **Figure 3-2**; a 100-foot contour interval is used to show the relatively steep hydraulic gradient in the northwest around the Mission Creek GRF, 20-foot contour intervals are used to show the hydraulic gradient west, east, and south of the Mission Creek GRF, and 10-foot contour intervals are used for contours in the remainder of the Mission Creek Subbasin.

Average groundwater levels for the water year are presented because the Mission Creek Subbasin does not exhibit strong seasonal trends. Significant groundwater level fluctuations, however, are observed near the groundwater replenishment facility as groundwater levels respond directly to replenishment water deliveries and have varied by more than 100 feet during periods of high replenishment. Greater variability is also observed in areas of greater groundwater pumping. Throughout the remainder of the Mission Creek Subbasin, groundwater level variations in wells monitored during the WY 2020-2021 were about 3.6 feet or less. In addition to averaging of groundwater elevations, the groundwater level data used for contouring are subject to other factors such as well construction, dates of measurement, spatial distribution, proximity to pumping wells, etc. Therefore, the contours shown on **Figure 3-2** reflect generalized conditions for the water year rather than a precise snapshot of groundwater elevations at a specific time.

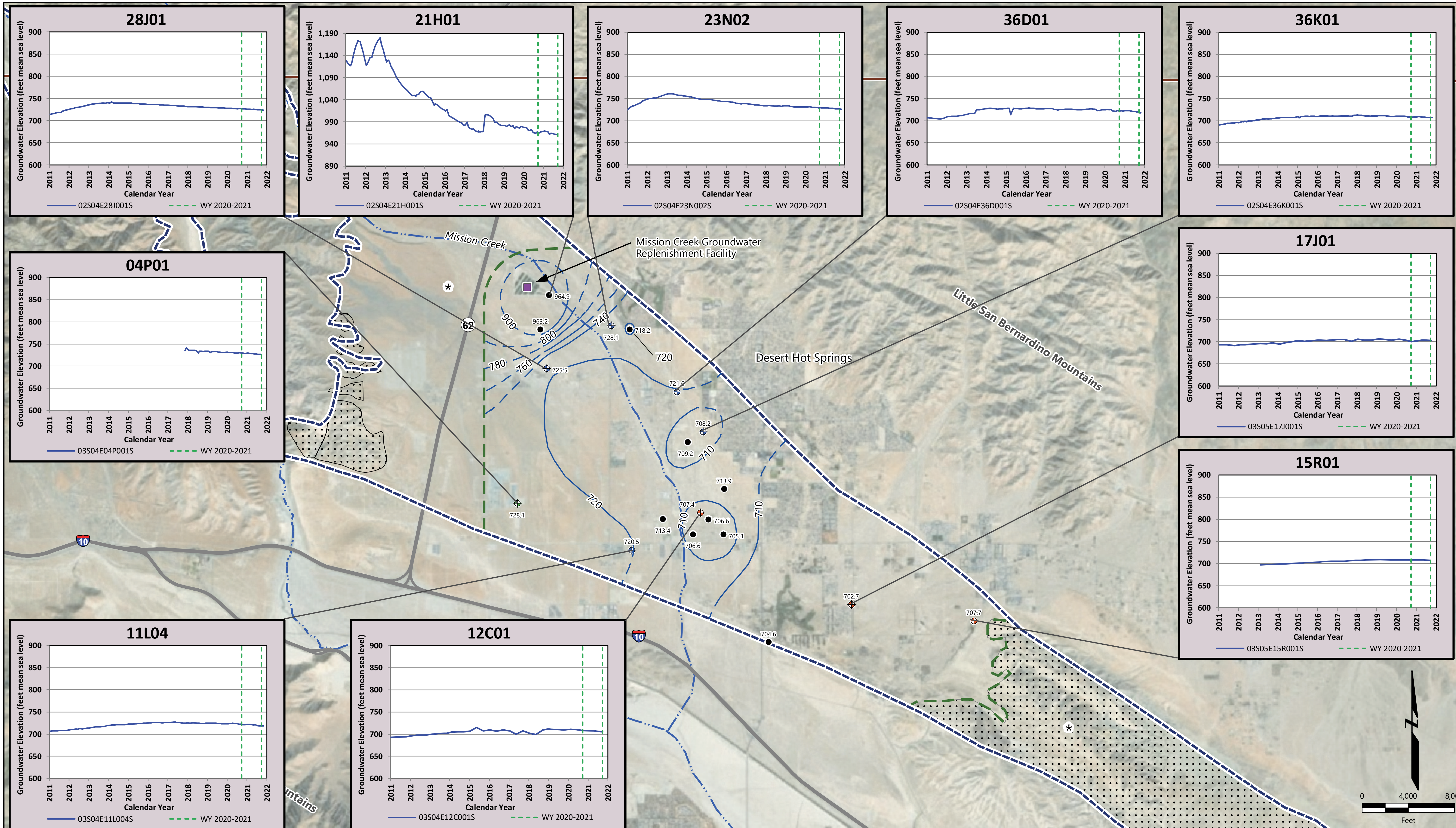
Groundwater level trend plots for the Key Wells and well 02S04E21H001S (21H01) are shown as insets on **Figure 3-2** to provide historical context of groundwater elevation fluctuations over time. Although 21H01 is not a Key Well, it is shown to illustrate that historically high groundwater levels occurred near the Mission Creek GRF because of groundwater replenishment. Groundwater elevation contours were developed using professional hydrogeological judgment. For example, groundwater contours are terminated roughly perpendicular to faults that impede groundwater flow and high groundwater elevations in the northwestern portion of the Mission Creek Subbasin are contoured to represent a recharge mound at the Mission Creek GRF superimposed on a natural steepening of the groundwater gradient toward the northwestern part of the Mission Creek Subbasin (MWH, 2013).

Groundwater elevation contours interpreted for WY 2020-2021are similar to the contours interpreted previously for WY 2019-2020 (Wood, 2021). Similarities were expected based on similar water management activities in the Subbasin, including recharge at the Mission Creek GRF and similar groundwater pumping as the previous water year.

3.3 Hydrographs

Figure 3-3 presents a hydrograph of groundwater levels at a well near the Mission Creek GRF and annual recharge at the Mission Creek GRF. This figure shows long-term changes in the groundwater level near the facility. Hydrographs for the Key Wells are provided in **Appendix B**. Each hydrograph in **Appendix B** is marked with a vertical red line indicating the commencement of replenishment activities in the Mission

Creek Subbasin at the Mission Creek GRF in 2002. The hydrographs indicate that groundwater levels throughout the Mission Creek Subbasin have either increased, stabilized, or remained relatively constant since commencement of groundwater replenishment activities and conservation efforts (described in Section 9).



Explanation

- Groundwater Replenishment Facility

Monitoring Agency Well

- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Other Agency Well
- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Groundwater elevation contour (feet NAVD88)
- Streams
- Highway/road
- Water Level hydrograph for well indicated
- Water year (WY) 2020-2021
- * Water level data not available

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016.

Notes

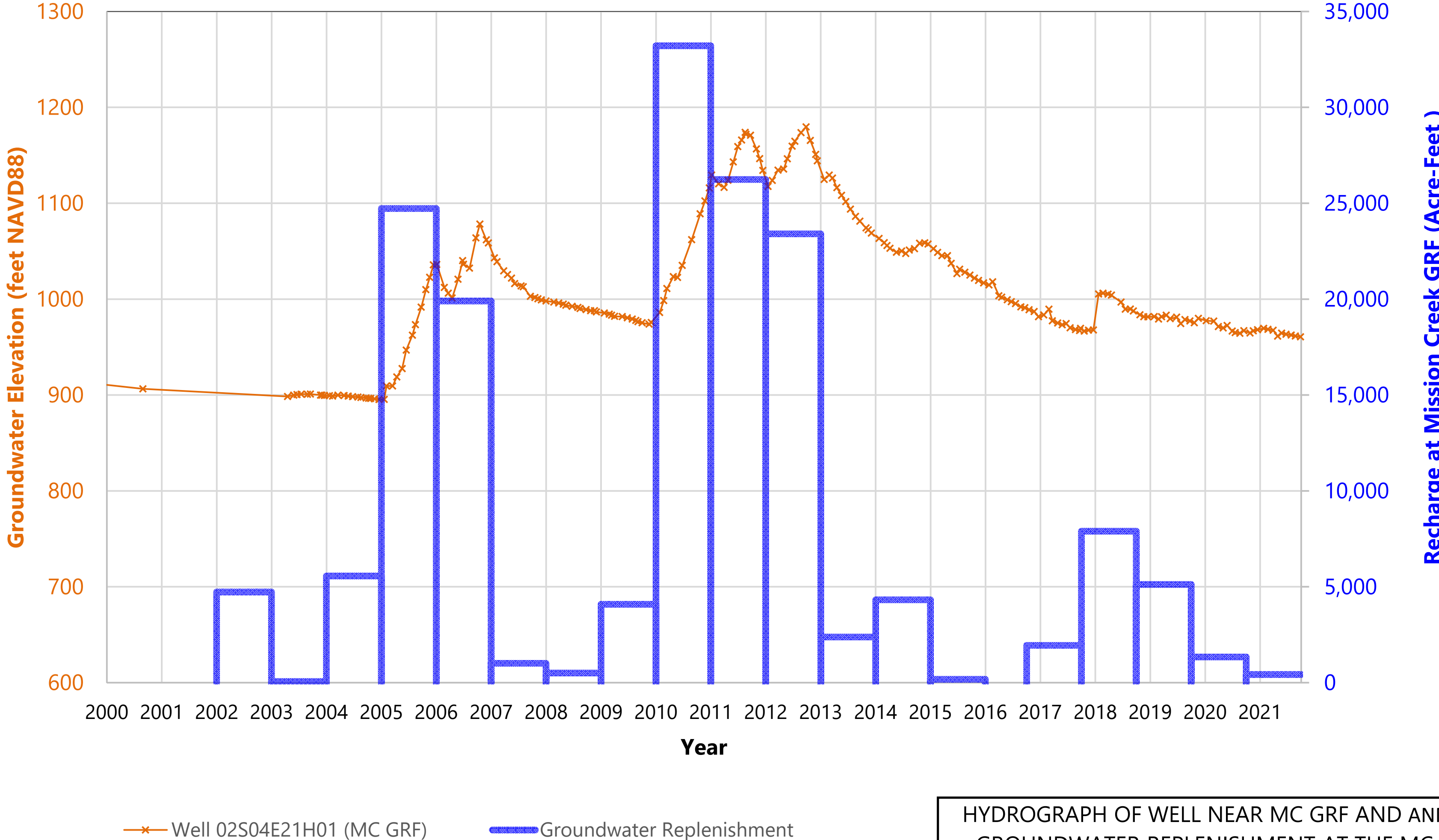
1. Groundwater elevation in feet above North American Vertical Datum (NAVD88). Multiple contour intervals are used to accommodate groundwater gradient variation across the Subbasin. 100-foot contour interval for elevations greater than 800 feet NAVD88, 20-foot contour interval between 720 and 800 feet NAVD88, and 10-foot contour below 740 feet NAVD88. Contours dashed where projected.
2. Water level boundary lines based on a lack of water level data. The eastern water level boundary line also corresponds to the boundary of low permeability sediments of the Indio Hills.

AVERAGE GROUNDWATER ELEVATION CONTOURS - WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww	Date: 1/4/2022	Project No.: CM19167353

wood.

Figure 3-2



Notes:
Replenishment by calendar year through 2015 and water year thereafter.
No recharge occurred from January 2016 to October 2016.
MC GRF = Mission Creek Groundwater Replenishment Facility

HYDROGRAPH OF WELL NEAR MC GRF AND ANNUAL GROUNDWATER REPLENISHMENT AT THE MC GRF Mission Creek Subbasin Annual Report Water Year 2020-2021 Coachella Valley, California		
By: GRR	Date: 1/12/2021	Project No.: CM19167353
wood.		Figure 3-3

Section 4 – Groundwater Extraction

Section 356.2(b) of the Sustainable Groundwater Management Act (SGMA) Emergency Regulations requires:

> *A detailed description and graphical representation of the following conditions of the basin managed in the Plan: …*
>
> *(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.*

This section presents the groundwater extraction monitoring program results for the Mission Creek Subbasin (also referred to as the Subbasin) for Water Year (WY) 2020-2021.

During WY 2020-2021, 14,548 acre-feet (AF) of groundwater was extracted from 23 metered wells, and an estimated 500 AF from minimal pumpers[10], for a total of 15,048 AF of groundwater production in the Mission Creek Subbasin. Because the Coachella Valley Water District (CVWD) and Desert Water Agency (DWA) are authorized to collect replenishment assessments from groundwater producers, their respective legislations mandate the installation of water meters on all wells when the collective production for a producer's wells exceeds 25 acre-feet per year (AFY) in CVWD's service area, and 10 AFY in DWA's service area. **Table 4-1** summarizes groundwater pumping by water use sector. Approximately 90 percent of the metered groundwater produced in the Mission Creek Subbasin is produced for urban water use (as noted previously municipal and recreational use are combined into the category of urban water use). The remaining approximately 10 percent of metered groundwater is produced for agricultural, industrial, or undetermined (unmetered) purposes.

As indicated in **Table 4-1**, all production wells that participate in the replenishment assessment programs are metered. As described above, an estimated 500 AFY of unreported pumping of groundwater by minimal pumpers (less than 25 AFY in CVWD and 10 AFY in DWA) occurs in the Subbasin from unmetered wells.

Figure 4-1 presents a map showing the general locations of groundwater production in the Mission Creek Subbasin. This map summarizes total WY 2020-2021 production within Public Land Survey System sections (i.e., township, range, and sections). Sections are arranged in a grid and each section overlies an area of approximately one square mile. Where township sections extend beyond the Mission Creek Subbasin boundary, the sections have been trimmed to show only that part of the township section that overlies the Mission Creek Subbasin. Total groundwater production for each section is indicated by a color representing a range of production.

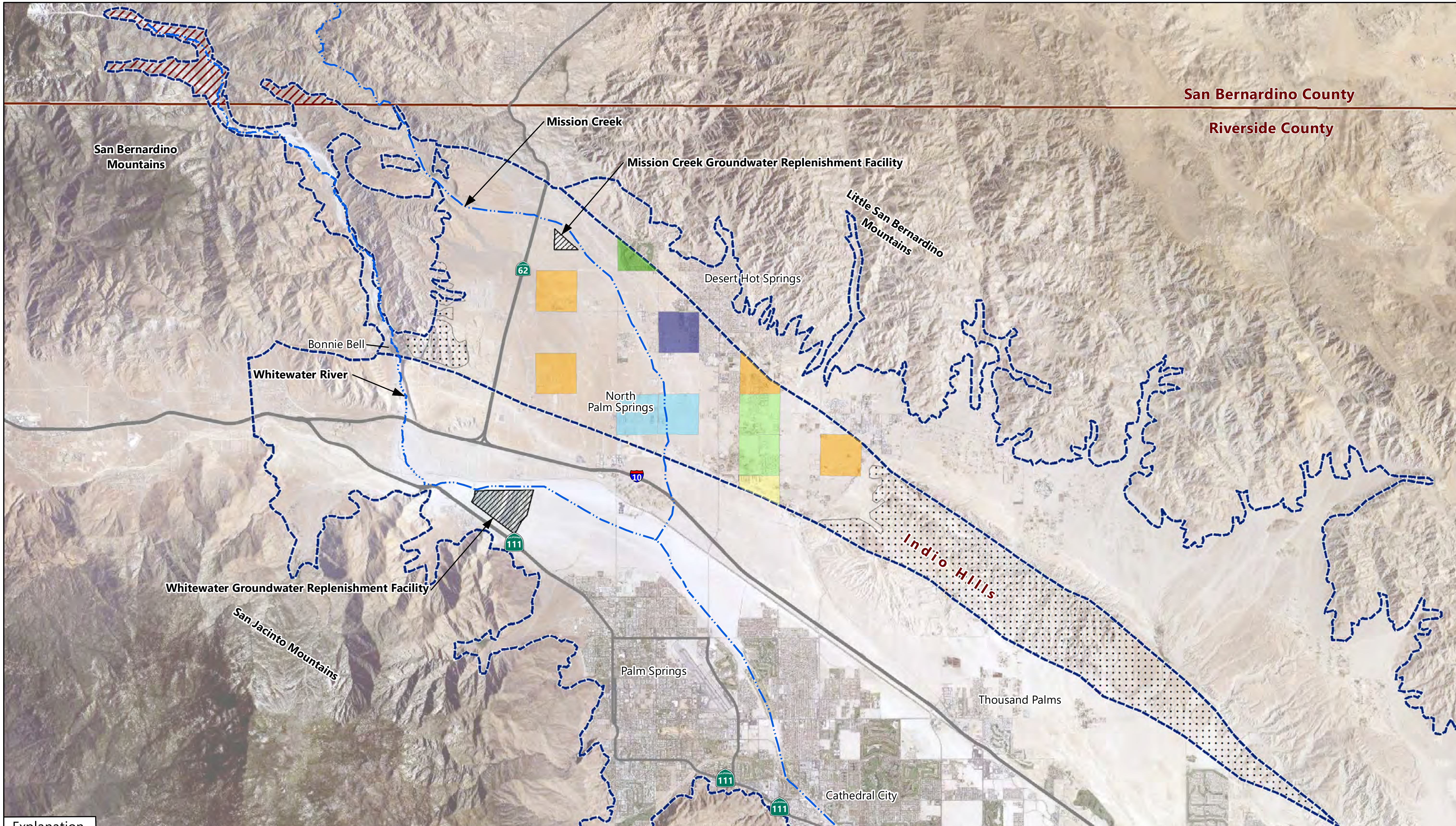
[10] As reported in the 2022 Alternative Plan Update, the amount of unmetered private well pumping in the Mission Creek Subbasin was estimated at approximately 480 AFY. This estimate agrees with previous estimates of approximately 500 AFY. Given the uncertainty in estimating this pumping, it is rounded to 500 AFY for WY 2020-2021.

Table 4-1
Groundwater Extractions by
Water Use Sector in the Mission Creek Subbasin - WY 2020-2021

Water Use Sector	Groundwater Extractions (AF)	Method of Measurement	Accuracy of Measurement[4]
Agriculture[1]	699	100% metered	±2%
Industrial	354	100% metered	±2%
Urban[2]	13,495	100% metered	±2%
Environmental	0	Not applicable	Not applicable
Undetermined[3]	500	100% estimated	±25%
Total Production	**15,048**		

Notes:

1. Includes fish farms.
2. Includes municipal and recreational uses.
3. Estimated production by minimal pumpers who are not required to report production to CVWD (<25 AFY) or DWA (<10 AFY).
4. Percent values are approximate.



Explanation

- Streams
- Highway/road
- Facility
- Mission Creek Subbasin
- Mission Creek Subbasin fringe area
- Low permeability/non-water bearing sediments/bedrock

Groundwater Production by Area (Acre-Feet per Year)

- 10 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 2,500
- 2,501 - 4,000
- 4,001 - 5,000

Note:

Grid squares are based on township section and are approximately one square mile except where truncated by subbasin boundary. Total pumping is shown in sections where recent historical pumping exceeded minimal producer thresholds.

0 6,000 12,000
Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016.

N

GROUNDWATER PRODUCTION
WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: pah	Date: 1/17/2022	Project No.: CM19167353

wood.

Figure 4-1

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Section 5 – Surface Water

Section 356.2(b)(3) of the Sustainable Groundwater Management Act (SGMA) Emergency Regulations requires:

> *A detailed description and graphical representation of the following conditions of the basin managed in the Plan: …*
>
> *(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.*

This section presents the surface water availability and use for the Mission Creek Subbasin for Water Year (WY) 2020-2021. For purposes of this report, surface water supplies consist of local surface water, imported water consisting of State Water Project (SWP) water exchanged for Colorado River water (SWP Exchange Water), and treated wastewater produced by publicly owned wastewater treatment plants.

5.1 Precipitation

Table 5-1 presents the monthly and annual precipitation data for areas in or near the Mission Creek Subbasin with rain gauge stations monitored by the Riverside County Flood Control and Water Conservation District (RCFCWCD) for WY 2020-2021. Precipitation on the local mountain watersheds generates runoff that infiltrates and contributes to groundwater recharge. The arid climate greatly reduces the contribution of direct precipitation as a source of recharge in general. Precipitation that occurred in the Mission Creek Subbasin during WY 2020-2021 based on three precipitation stations within or near the Mission Creek Subbasin included 2.03 inches (Edom Hill station), 2.10 inches (Desert Hot Springs station), and 7.44 inches (Whitewater North station). Among these precipitation stations, the Desert Hot Springs station is the only one with a sufficient record for comparison of annual values with its long-term average. The 2.10 inches of recorded precipitation at the Desert Hot Springs station in WY 2020-2021 is less than the 61-year (water year) mean of 5.1 inches for this station.

Table 5-1
Mission Creek Subbasin Area, Monthly and Annual Precipitation (Inches) - WY 2020-2021

Station Name: Location:	Whitewater North Mission Creek Subbasin (inches)	Desert Hot Springs Desert Hot Springs Subbasin (inches)	Edom Hill Mission Creek Subbasin (inches)
October	0.00	0.00	0.00
November	0.92	0.02	0.00
December	1.17	0.20	0.12
January	2.14	0.50	0.43
February	0.46	0.09	0.05
March	1.68	0.15	0.04
April	0.00	0.00	0.00
May	0.00	0.00	0.00
June	0.03	0.00	0.00
July	1.04	0.66	1.27
August	0.00	0.00	0.07
September	0.00	0.48	0.05
Total	**7.44**	**2.10**	**2.03**
Average	**3.86**		

Note:
Data provided by Riverside County Flood Control and Water Conservation District.

5.2 Streamflow

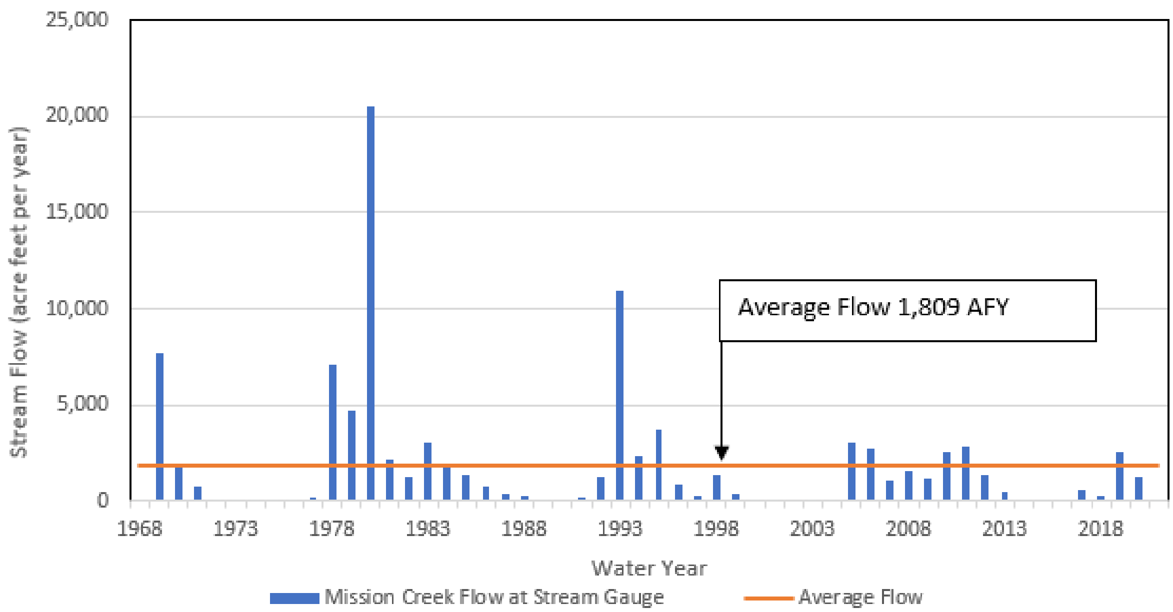
The United States Geological Survey (USGS) measures streamflow at one gauging station in the Mission Creek Subbasin. **Figure 5-1** shows stream gauge flow by water year from 1968 to 2021 and average stream flow for this period was 1,809 acre-feet per year (AFY). This gauging station is located on Mission Creek, as shown on **Figure 2-3**. On February 14, 2019, runoff generated by a storm event altered the channel of Mission Creek at the gauging station to a degree that the USGS was no longer able to gauge streamflow at the former stream gauge location shown on **Figure 2-3** and relocated the stream gauge to its current location approximately 1.4 miles downstream of the old location in December 2019 (Wood, 2021)

Table 5-2 presents the total estimated runoff of 98 acre-feet (AF) for WY 2020-2021. This runoff naturally replenishes the Mission Creek Subbasin. Although the Mission Creek runoff is quantified in this Annual Report it is not used in the water balance (Section 7). It is included as part of the natural recharge component simulated in the updated groundwater model for the Mission Creek Subbasin, which includes mountain front recharge (surface and subsurface inflow) from all watersheds with inflow to the Mission Creek Subbasin. There is no direct use of local surface water in the Mission Creek Subbasin.

Table 5-2
Local Streamflow Data in the Mission Creek Subbasin – WY 2020-2021

Gauge Number	Gauge Name	Stream Flow (AF)
10257600	Mission C Nr Desert Hot Springs CA	98

Figure 5-1
Measured Stream Flow at the Mission Creek Gauge Station



Abbreviation:
AFY = Acre feet per year
Note: The Mission Creek gauging station was moved approximately 1.4 miles south in December 2019.
Source: USGS Current Water Conditions, https://waterdata.usgs.gov/ca/nwis/inventory/?site_no=10257600

5.3 Imported Water Deliveries

In addition to natural replenishment from precipitation and stream flow, the Mission Creek Subbasin receives artificial replenishment from importation of State Water Project (SWP) Exchange Water. The Desert Water Agency (DWA) and Coachella Valley Water District (CVWD) provide artificial replenishment of the Mission Creek Subbasin through their Groundwater Replenishment Programs (GRPs). Groundwater replenishment is accomplished through direct replenishment, in which imported surface water is infiltrated directly into the aquifer.

The CVWD and DWA each have a Water Supply Contract with the California Department of Water Resources (CDWR) for SWP water with a combined Table A Amount[11] of 194,100 acre-feet per year (AFY) as shown in **Table 5-3**, which includes 100,000 AFY transfer from MWD under the Agreement for Exchange and Advance Delivery of Water. There are no physical facilities to deliver SWP water to the Coachella Valley. Rather than construct physical connections to the SWP, CVWD and DWA entered into separate agreements in 1967 with the Metropolitan Water District of Southern California (MWD), under which CVWD and DWA deliver their SWP water to MWD, and in exchange, MWD delivers an equal amount of Colorado River water to CVWD and DWA. The original 1967 Exchange Agreements have been updated over the years, most recently in 2019. CVWD's and DWA's SWP Exchange Water is delivered at the Whitewater and Mission Creek turnouts from MWD's Colorado River Aqueduct (CRA), which extends from Lake Havasu through the Coachella Valley to MWD's Lake Mathews.

SWP Exchange Water has been used to recharge the Mission Creek Subbasin at the Mission Creek Groundwater Replenishment Facility (GRF) since 2002. The MWD, DWA, and CVWD executed an Advance Delivery Agreement in 1984 that allows the MWD to pre-deliver up to 600,000 acre-feet (AF) of SWP water into the Coachella Valley. The MWD then has the option to deliver CVWD's and DWA's SWP allocation either from the CRA or from previously stored groundwater in the basin (i.e., credit from advance deliveries). This agreement was subsequently amended to increase the pre-delivery amount to a maximum of 800,000 AF.

Table 5-3
State Water Project Table A Amounts

	Acre Feet Per Year					
Agency	**Original SWP Table A**	**Tulare Lake Basin Transfer #1**	**Tulare Lake Basin Transfer #2**	**Metropolitan Transfer**	**Berrenda Mesa Transfer**	**Total**
CVWD	23,100	9,900	5,250	88,100	12,000	138,350
DWA	38,100	--	1,750	11,900	4,000	55,750
Total	61,200	9,900	7,000	100,000	16,000	194,100

Each year, the CDWR determines the amount of water available for delivery to SWP contractors based on hydrology, reservoir storage, the requirements of water rights licenses and permits, water quality, and environmental requirements for protected species in the Sacramento-San Joaquin Delta. The available supply is then allocated according to each SWP contractor's Table A Amount. In 2020, the CDWR allocated 20 percent of Table A Amounts to contractors. In 2021, the CDWR allocated 5 percent of Table A amounts to contractors.

[11] Each SWP contract contains a "Table A" exhibit which defines the maximum annual amount of water each contractor can receive excluding certain interruptible deliveries. Table A amounts are used by CDWR to allocate available SWP supplies and some of the SWP project costs among the contractors.

During WY 2020-2021 as shown in **Table 5-4**, the MWD received, on behalf of CVWD and DWA, 25,940 AF of SWP Table A water and 2,174 AF of Dry Year (Yuba) water. On behalf of CVWD, the MWD received 11,875 AF of Rosedale-Rio Bravo water. CVWD also received 25,162 AF of MWD Table A water transferred to CVWD under the Quantification Settlement Agreement (QSA) provided as SWP Exchange Water. The total deliveries of SWP Exchange Water to the MWD for WY 2020-2021 were 65,151 AF. The 2019 Second Amendment to the Delivery and Exchange Agreement (CVWD, 2019) allows CVWD to receive 15,000 AF of the 20,000 AF from the 1988 MWD/IID Approval Agreement at the Whitewater GRF through 2026; MWD retains 5,000 AF. In WY 2020-2021, 4,532 AF from the 1988 MWD/IID Approval Agreement was delivered by MWD. Including this transfer, the total exchanged with MWD in WY 2020-2021 was 69,683 AF.

Table 5-4
Deliveries of CVWD and DWA State Water Project Water to Metropolitan Water District - WY 2020-2021

Description	CVWD (AF)	DWA (AF)	Total (AF)
Table A	18,491	7,449	25,940
Article 21 "Interruptible"	0	0	0
Turnback Pool A and B	0	0	0
Multi-Year Pool	0	0	0
Dry Year (Yuba)	1,440	734	2,174
Flex Storage Payback	0	0	0
Article 56 (c) "Carryover" from 2019 delivered in 2020	0	0	0
Rosedale-Rio Bravo	11,875	0	11,875
CVWD QSA Transfer	25,162	0	25,162
Total Delivered to MWD	**56,968**	**8,183**	**65,151**
1988 MWD/IID Approval Agreement Exchange			4,532
Total Exchanged			**69,683**
Water Delivered to CVWD and DWA at Whitewater	--	--	106,181
Water Delivered to CVWD and DWA at Mission Creek	--	--	427
Total Water Delivered to Coachella Valley			**106,608**
Credit to/from Advance Delivery Account[1]			**+36,925**

Notes:

1. Credit to/from Advance Delivery Account is the difference between Total Water Delivered to Coachella Valley and Total Exchanged.

The provisions of the Advance Delivery agreement allow CVWD and DWA to receive direct deliveries of SWP Exchange Water or water delivered from the Advance Delivery storage account. As shown in **Table 5-4**, the CVWD and DWA took delivery of 106,608 AF of SWP Exchange Water, MWD/IID Approval Agreement, and Advance Delivery water. Of this amount, 106,181 AF were delivered at the Whitewater River GRF and 427 AF were delivered to the Mission Creek GRF.

Table 5-5 summarizes the imported water deliveries to the Mission Creek Subbasin by water use sector and source during WY 2020-2021. Total imported water deliveries were 427 AF, all for aquifer recharge. Historically, the Mission Creek GRF has recharged an average of about 8,300 AFY with as much as 33,200 AF in a given year as a part of advance deliveries.

Table 5-5
Imported Water Use in the Mission Creek Subbasin - WY 2020-2021

Water Use Sector	Water Source	Imported Water Use (AF)	Method of Measurement	Accuracy of Measurement[1]
Aquifer Recharge	SWP Exchange Water	427	100% metered	±2%
	Total Imported Water	**427**		

Note:

1. Percent values are approximate.

5.4 Recycled Water

There is no recycled water use in the Mission Creek Subbasin. However, the municipal wastewater treated in the Mission Creek Subbasin is disposed of through percolation/evaporation ponds at the treatment plants and disposal volumes listed in **Table 5-6**. In WY 2020-2021, a total of 2,216 AF of wastewater was treated, all of which was disposed through percolation/evaporation.[12]

Table 5-6
Wastewater Treatment and Disposal in the Mission Creek Subbasin - WY 2020-2021

Water Treatment Plant	Wastewater Treatment and Disposal (AF)
MSWD – Horton WWTP	2,167
MSWD – Desert Crest WWTP	49
Total	**2,216**

[12] The evaporation component is calculated based on volume of total percolated effluent as described in Section 7.

Section 6 – Total Water Use

Section 356.2(b)(4) of the Sustainable Groundwater Management Act (SGMA) Emergency Regulations requires:

> *A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*
>
> *Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.*

This section presents the total water use for the Mission Creek Subbasin (also referred to as the Subbasin) for Water Year (WY) 2020-2021. For purposes of this report, water use is only direct water use (i.e., consumptive use). There is no direct use of surface water in the Mission Creek Subbasin.

Table 6-1 lists the net water use by sector, the source type of the water, method of measurement, and estimated accuracy of the measurements. The information presented in this table is derived from the tables in Sections 4 and 5. To calculate the total water use in the Mission Creek Subbasin, the volumes for water sources (i.e., groundwater production and imported groundwater delivered from the Garnet Hill Subarea of the Indio Subbasin) were added together to calculate the total water volume. Water exported from the Mission Creek Subbasin for use in the adjacent communities of Desert Hot Springs Subbasin, which is part of the planning area defined in the Mission Creek Alternative Plan Update (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]), is shown in a separate column as a negative value indicating that it is deducted out of the total water use in the Mission Creek Subbasin. Note that aquifer recharge is not included in this table because it is not a direct use of water in the Mission Creek Subbasin. In the Mission Creek Subbasin, imported water consists of State Water Project (SWP) water that is exchanged with the Metropolitan Water District of Southern California (MWD) for Colorado River water from MWD's Colorado River Aqueduct (SWP Exchange Water). SWP Exchange Water is only used for aquifer recharge and treated wastewater is not recycled for direct use; however, the disposal of wastewater in the Mission Creek Subbasin results in return flow though percolation.

Table 6-1 shows that groundwater production amounted to 15,048 acre-feet (AF) for direct use in WY 2020-2021. **Table 6-1** also shows 52 AF of groundwater was imported from the Garnet Hill Subarea of the Indio Subbasin to partially meet Mission Springs Water District's (MSWD's) water demands, and 2,622 AF and 4,257 AF of groundwater were exported to the Desert Hot Springs Subbasin by the Coachella Valley Water District (CVWD) and MSWD, respectively, for a total of 6,879 AF of exported groundwater. Total direct use for WY 2020-2021 in the Mission Creek Subbasin was 8,221 AF.

Table 6-1
Total Direct Water Use by Sector and Source in the Mission Creek Subbasin - WY 2019-2020

Water Use Sector	Water Source		Exported for Use Outside Subbasin[2] (AF)	Total Water Use Within Subbasin[3] (AF)	Method of Measurement	Accuracy of Measurement[4]
	Groundwater Production (AF)	Imported from Adjacent Subbasins[1] (AF)				
Agriculture[5]	699	0	0	699	100% metered	±2%
Industrial	354	0	0	354	100% metered	±2%
Urban[6]	13,495	52	-6,879	6,668	See note 6	See note 6
Environmental	0	0	0	0	Not applicable	Not applicable
Undetermined[7]	500	0	0	500	100% estimated	±25%
Total	15,048	52	-6,879	8,221		

Notes:

1. Consists of groundwater imported from the Garnet Hill Subarea of the Indio Subbasin.
2. Exported water is delivered to customers overlying the adjacent Desert Hot Springs Subbasin, which is part of the 2022 Alternative Plan Update planning area and is estimated based on customer billing records and non-revenue water values from annual water distribution system audits.
3. Total Water Use within the Mission Creek Subbasin is the sum of Groundwater Production in the Mission Creek Subbasin and Imported from Adjacent Subbasins less Water Exported for Use Outside the Mission Creek Subbasin.
4. Percent values are approximate.
5. Includes fish farms.
6. Includes municipal and recreational uses. Measurement is based on urban pumping that is 100% metered and on metered consumption in communities outside the Subbasin and corrected for system water loss. Accuracy of metered groundwater production is ±2%. See note 2 regarding measurement of exported water.
7. Estimated production by minimal pumpers who are not required to report production to CVWD (<25 AFY) or DWA (<10 AFY).

Section 7 – Groundwater Balance and Change in Groundwater Storage

Section 356.2(b)(4) of the Sustainable Groundwater Management Act (SGMA) Emergency Regulations requires:

> *A detailed description and graphical representation of the following conditions of the basin managed in the Plan: …*
>
> *(5) Change in groundwater in storage shall include the following:*
>
> *(A) Change in groundwater in storage maps for each principal aquifer in the basin.*
>
> *(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.*

This section presents the groundwater balance and change in storage for the Mission Creek Subbasin (also referred to as the Subbasin) for Water Year (WY) 2020-2021. A groundwater balance is a budget comparing inflows of groundwater into a basin/subbasin against outflows of groundwater from the basin/subbasin. The difference between inflows and outflows for a given period (typically one year) is defined as the change in storage for that period.

7.1 Groundwater Inflows

Mission Creek Subbasin groundwater inflows consist of:

- Mountain front inflow and infiltration.
- Inflows from adjacent subbasins.
- Infiltration of return flows from use (e.g., urban and agricultural use).
- Artificial recharge.

Groundwater inflows are described by category in the following subsections.

7.1.1 Mountain Front Recharge

Precipitation in the bordering San Bernardino Mountains produces surface runoff and subsurface inflow that are the principal natural sources of recharge to the Mission Creek Subbasin. The volume of this natural recharge referred to as mountain front recharge varies dramatically annually due to wide variations in precipitation. Outside of the Whitewater River channel area where there is a potential limited hydrogeologic connection with the main part of the Mission Creek Subbasin, the only perennial flow is limited to Mission Creek and this perennial flow only occurs at the upper reaches of the creek outside of the Mission Creek Subbasin.

In previous Annual Reports, the annual natural recharge estimates were 7,500 acre-feet per year (AFY).[13] An update to the Mission Creek Subbasin groundwater model in the Mission Creek Subbasin Alternative Plan Update (2022 Alternative Plan Update; [Wood and Kennedy Jenks, 2021]) included new methodology

[13] Based on groundwater modeling and analyses performed for the Mission Creek-Garnet Hill Water Management Plan (MWH, 2013; Psomas, 2013).

for calculating mountain front recharge using the United States Geological Survey (USGS) Basin Characterization Model (BCM). The BCM is a grid-based model that utilizes the Parameter-elevation Relationships on Independent Slopes Model (PRISM) monthly 800 x 800-meter grid precipitation data set compiled by the PRISM Climate Group, Oregon State University. BCM calculates the monthly water balance for California watersheds by using climate inputs including local stream gauge data and PRISM precipitation, minimum and maximum air temperature, evapotranspiration, and topography (USGS, 2021). Natural recharge estimates used in this Annual Report are based on the BCM calculated mountain front recharge for the 25-year period 1995 through 2019 as documented in the updated groundwater model for the Mission Creek Subbasin, which is 5,700 AFY. The decrease in the average natural recharge results from using a shorter, more recent period that has been dominated by hydrologic conditions drier than the long-term average of years since 1978.

Although direct precipitation occurs across the surface of the Mission Creek Subbasin, the arid conditions and the significant depth to groundwater across most of the Subbasin preclude substantial deep direct percolation of precipitation to groundwater under typical conditions. The limited precipitation that infiltrates into the Subbasin soil is readily absorbed into the dry soils and is subject to evaporation. Under rare, wet precipitation years, sustained precipitation events and multiple precipitation events result in ponding of water on the valley floor and provide more substantial recharge contributions.

7.1.2 Inflows from Adjacent Subbasins

Inflow from outside the Mission Creek Subbasin consists of natural underflow from the adjacent Desert Hot Springs Subbasin across the Mission Creek fault. This inflow was estimated using the updated groundwater model as documented in the 2022 Alternative Plan Update. The value was estimated using model results for simulated underflow from 2019 and rounded to the nearest 50 AFY. The period 2019 is the most recent simulation in the updated groundwater model and most representative of current conditions. Underflow from the Desert Hot Springs Subbasin into the Mission Creek Subbasin for WY 2020-2021 is estimated to have been about 1,150 AFY (**Table 7-1**). This is a relatively small component of the water balance (less than 3 percent) and is relatively stable. From 2009 to 2019, the underflow ranged from 1,128 AFY to 1,291 AFY and averaged 1,178 AFY.

Table 7-1
Estimated Average Subsurface Inflow from Adjacent Subbasins into the Mission Creek Subbasin - WY 2020 - 2021

Mission Creek Subbasin Boundary	Estimated Average Subsurface Inflow (AF)
Desert Hot Springs Subbasin to Mission Creek Subbasin	1,150[1]

Note:

1. Based on the subsurface underflow in 2019 (Wood and Kennedy Jenks, 2021) and rounded to the nearest 50 AF.

7.1.3 Return Flows from Use

Return flow for water use in the Mission Creek Subbasin is the difference between the amount of water applied for irrigation (agricultural, golf course, or urban) and the amount consumed by plants to satisfy their evapotranspiration requirement. Water is also returned to the Mission Creek Subbasin through percolation of treated wastewater and septic tank return flows. For this report, a relatively rigorous calculation of return flows[14] for the infiltration of applied irrigation water was used that considers types of water use, irrigation efficiency, and water conservation impacts. For WY 2020-2021, the irrigation component of the return flow was 1,593 AF.

Other components of return flows are wastewater disposal and septic return flow. A portion of the Mission Creek Subbasin is served by municipal sewer systems that convey wastewater to municipal treatment plants operated by Mission Springs Water District (MSWD). All of the treated wastewater is disposed to percolation/evaporation ponds as described in Section 5. Wastewater disposal to percolation/evaporation was 2,216 AF in WY 2020-2021 (evaporation is accounted for based on an evaporation factor applied to the total amount of wastewater disposal by percolation, see Section 7.2.2). Portions of the Mission Creek Subbasin that do not currently have access to the sewer systems use septic tank/leachfield systems to treat and dispose wastewater. It is estimated that about 821 AF of septic effluent was discharged to the Mission Creek Subbasin in WY 2020-2021 based on the estimated number of water users with septic tanks, including unmetered minimal pumpers. For WY 2020-2021, the total return flows to the Mission Creek Subbasin, including infiltration of applied irrigation water (1,593 AF), wastewater percolation (2,216 AF), and septic tank percolation (821 AF) was 4,630 AF, or approximately 68 percent of the total inflow budget for WY 2020-2021.

Both return flows and wastewater disposal are affected by water use efficiency and overall demands. As conservation efforts increase, groundwater production and the amount of return flow will decrease, reducing both groundwater outflow from pumping and return inflow to the Mission Creek Subbasin.

7.1.4 Artificial Recharge

Artificial recharge is performed at the Mission Creek Groundwater Replenishment Facility (Mission Creek GRF) using State Water Project (SWP) Exchange Water as described in Section 5. Recharge at the Mission Creek GRF is variable based on availability of SWP Exchange Water and deliveries by the Metropolitan Water District of Southern California (MWD). During WY 2020-2021 a total of 427 AF of imported water was recharged at the Mission Creek GRF.

7.1.5 Summary of Groundwater Inflows

Mountain front recharge in the amount of 5,700 AF is based on a 25-year average of mountain front recharge for the period 1995 through 2019 using the BCM documented in the updated Mission Creek Subbasin groundwater model. Subsurface inflows from adjacent subbasins (1,150 AF) are based on 2019 inflow as derived from the updated Mission Creek Subbasin groundwater model presented in the 2022 Alternative Plan Update. Combined, these inflows are considered as natural inflows totaling 6,850 AF for WY 2020-2021. Return flows from use are based on WY 2020-2021 data and include an irrigation

[14] Return flow calculations are documented in Appendix B, Computation of Non-Consumptive Return, in: Engineer's Report on Water Supply and Replenishment Assessment 2018-2019, prepared by Krieger & Stewart Engineering Consultants (K&SEC) and Stantec (K&SEC and Stantec, 2018) and in K&SCE and Stantec, 2017.

component of 1,593 AF, a wastewater treatment management component of 2,216 AF, and a septic system component of 821 AF. The combined inflow for return flows from these uses for the water year is 4,630 AF. Artificial recharge for WY 2020-2021 totaled 427 AF. The estimated total WY 2020-2021 groundwater inflow to the Mission Creek Subbasin based on natural recharge, returns from use, and artificial recharge is 11,907 AF.

7.2 Groundwater Outflows

Mission Creek Subbasin groundwater outflows consist of:

- Groundwater pumping to meet customer demands.
- Evaporative losses from recharge and percolation facilities.[15]
- Evapotranspiration from vegetation in shallow groundwater areas.
- Natural subsurface outflow from the Mission Creek Subbasin into the adjacent subbasins.

Groundwater outflows are described by category in the following subsections.

7.2.1 Groundwater Pumping

Groundwater pumping refers to the amount of groundwater pumped for agricultural, industrial, urban, and other uses. Groundwater pumping is the largest component of outflow from the Mission Creek Subbasin. During WY 2020-2021, a total of 15,048 AF of groundwater was pumped for beneficial uses within the Mission Creek Subbasin or exported for beneficial use in the adjacent Desert Hot Springs Subbasin.

7.2.2 Evapotranspiration and Evaporation

Native vegetation on undeveloped land receives its water supply from precipitation and shallow groundwater. Evapotranspiration from vegetation was previously estimated at 900 AFY using a long-term average modeled evapotranspiration (Psomas, 2013). For the WY 2020-2021 the evapotranspiration was estimated at 950 AF using the evapotranspiration derived from the updated Mission Creek Subbasin model for 2019 (presented in the 2022 Alternative Plan Update) and rounded to the nearest 50 AF. The year 2019 was selected because it is the most recent year simulated by the updated groundwater model and is most representative of current conditions.

In addition to evapotranspiration, a portion of the imported water used for recharge (2 percent) is estimated to be lost to evaporation. Similarly, a portion of the wastewater disposal (3 percent) is estimated to be lost to evaporation. The basin outflows from evaporation of these two operations are estimated at approximately 75 AF for WY 2020-2021.

7.2.3 Subsurface Outflow from the Mission Creek Subbasin

Subsurface outflows from the Mission Creek Subbasin occur primarily across the Banning fault and through semi-permeable sediments of the Indio Hills. Combined, these outflows were estimated to have been 5,100 AFY during previous years based on the long-term average modeled outflow (Psomas, 2013).

[15] Evaporative losses from recharge and percolation facilities are shown as groundwater outflows for the purpose of these calculations. They are outflows from the subbasin.

For WY 2020-2021, the total outflow was estimated based on the outflows for 2019 in the updated Mission Creek groundwater model described in the 2022 Alternative Plan Update and rounding to the nearest 50 AF. The combined subsurface outflow across the Banning fault and Indio Hills for WY 2020-2021 is estimated to be 2,350 AF. A breakdown of this outflow is provided by area in the following paragraph.

The Banning fault, separating the Mission Creek Subbasin from the Indio Subbasin (and Garnet Hill Subarea of the Indio Subbasin), is not impermeable to groundwater flow. Groundwater elevation differences ranging from 100 to 300 feet across the Banning fault result in subsurface outflow from the Mission Creek Subbasin to the Indio Subbasin. The updated groundwater model in the 2022 Alternative Plan Update indicates that the average subsurface outflow across the fault in 2019 was about 2,000 AF. For this same period, the updated model estimates an outflow into the semi-permeable sediments of the Indio Hills of about 350 AF.

Table 7-2
Estimated Average Subsurface Outflows from the Mission Creek Subbasin – WY 2020-2021

Mission Creek Subbasin Boundary	Estimated Average Subsurface Outflow (AF)
Mission Creek Subbasin to Indio Subbasin/Garnet Hill Subarea	2,000[1]
Mission Creek Subbasin to Indio Hills	350[1]
Total Boundary Outflow	**2,350**

Note:

1. Based on the subsurface underflow from 2019, derived from the updated Mission Creek Subbasin groundwater model in the 2022 Alternative Plan Update and rounded to the nearest 50 AF.

7.2.4 Summary of Groundwater Outflows

Pumping records for the water year and estimates of unreported groundwater pumping indicate groundwater outflow from pumping was 15,048 AF. Outflows from evaporation associated with facilities for wastewater treatment and recharge of imported water are 75 AF and are based on WY 2020-2021 operation data. Outflows resulting from subsurface flow out of the Mission Creek Subbasin into adjacent subbasins or into the semi-permeable sediments in the Indio Hills portion of the Mission Creek Subbasin was estimated at 2,350 AF. Evapotranspiration was estimated at 950 AF. Both evapotranspiration and subsurface flow are based on estimates for 2019 using the updated groundwater model documented in the 2022 Alternative Plan Update. The total outflow from subsurface outflow, evapotranspiration, and evaporation from wastewater treatment and imported water recharge is 3,375 AF. With groundwater pumping added, the total WY 2020-2021 groundwater outflow from the Mission Creek Subbasin is 18,423 AF.

7.3 Annual Change in Groundwater Storage

The annual change in groundwater storage represents the difference between inflows and outflows in the Mission Creek Subbasin. During wet years or periods of high artificial recharge, the change in storage is positive (water in storage increases). In dry years or periods of lower artificial recharge, the change in storage is often negative (storage decreases). Lower delivery of imported water for aquifer recharge to the Mission Creek Subbasin resulted in a decrease in groundwater storage for the Mission Creek Subbasin of 6,516 AF for WY 2020-2021. A breakdown of the water balance components for WY 2020-2021 is provided in **Table 7-3**. A generalized graphical representation of the water balance components is provided on **Figure 7-1**.

Table 7-3
Groundwater Balance in the Mission Creek Subbasin - WY 2020-2021

Component	WY 2020-2021 (AF)
Inflows	
Natural inflows - mountain front recharge	5,700
Subsurface inflows from adjacent subbasins	1,150
Infiltration of applied irrigation water	1,593
Wastewater percolation	2,216
Septic tank percolation	821
Artificial recharge	427
Total Inflow	**+11,907**
Outflows	
Groundwater pumping	15,048
Evaporative losses	75
Evapotranspiration from the shallow aquifer	950
Subsurface outflow to adjacent subbasins	2,350
Total Outflow	**-18,423**
Change in Groundwater Storage	**-6,516**

wood.

Figure 7-1
Annual Groundwater Balance in the Mission Creek Subbasin - WY 2020-2021

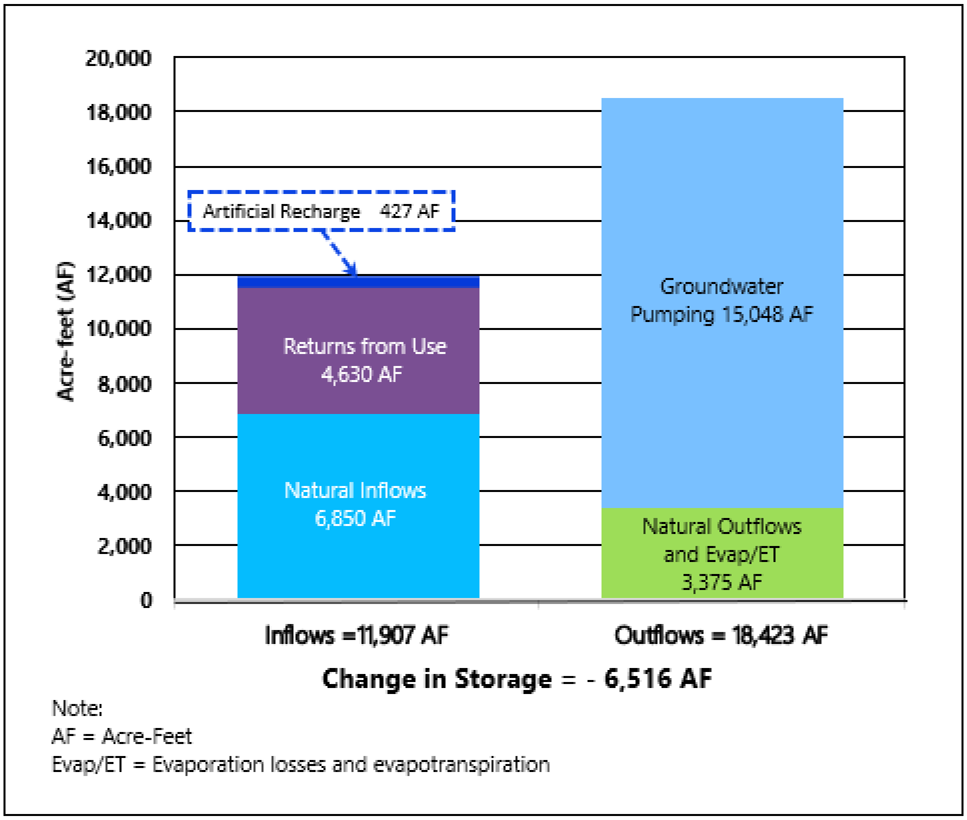
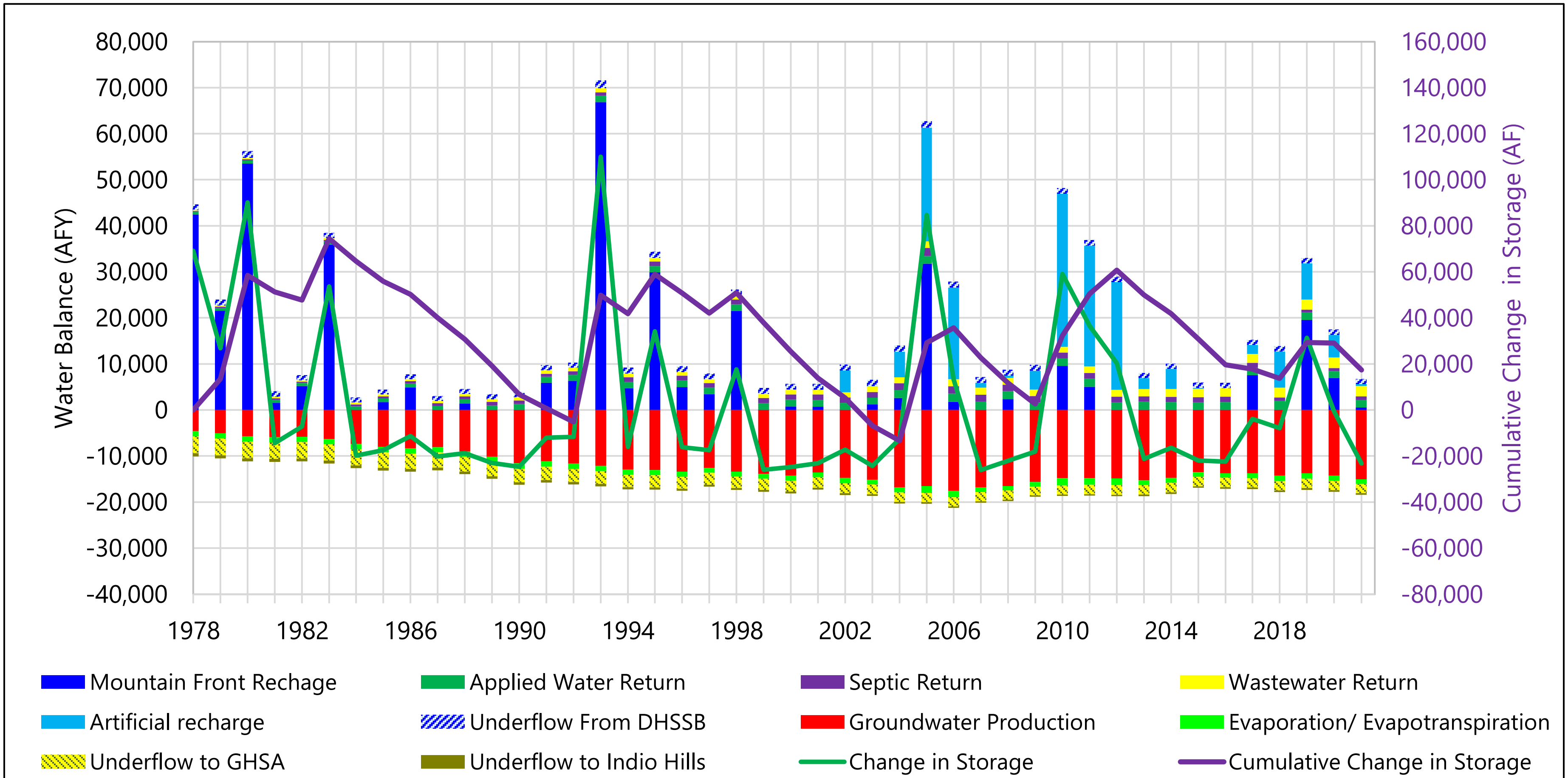


Figure 7-2 shows the water balance components, change in groundwater storage, and cumulative change in storage in the Mission Creek Subbasin from 1978 to the present. The chart begins in 1978 because relatively complete and reliable groundwater production records were available for the Mission Creek Subbasin from that point forward. Mountain front recharge into the Mission Creek Subbasin was estimated for each year through and including 2019 using USGS BCM and the BCM data were in turn used in the updated Mission Creek Subbasin groundwater model, documented in the 2022 Alternative Plan Update, to derive subsurface flow each year into and out of the Mission Creek Subbasin. Water balance data after 2019 were estimated using the information described in the 2019-2020 Annual Report (Wood, 2021) and this Annual Report. This new approach to displaying the groundwater balance components, change in groundwater storage and cumulative change in groundwater storage using annual estimates derived from the updated groundwater model for 1978 through 2019 is different than that used in previous Annual Reports where mountain front recharge and subsurface inflows and outflows were estimated based on long-term averages for these parameters derived from previous groundwater modeling (Psomas, 2013). Consequently, **Figure 7-2** shows greater fluctuations for mountain front recharge, change in storage, and cumulative change in storage than shown in previous Annual Reports.



Abbreviations:

AF= Acre feet; AFY = Acre feet per year

DHSSB = Desert Hot Springs Subbasin

GHSA = Garnet Hill Subarea

Notes:

Water balance inflows and outflows for 1978 to 2019 derived from the updated Mission Creek groundwater model in the Alternative Plan Update (Wood and Kennedy Jenks, 2021).

Water balance accounting based on calendar year through 2016 and water year thereafter.

HISTORICAL WATER BALANCE AND CUMULATIVE CHANGE IN GROUNDWATER STORAGE

Mission Creek Subbasin Annual Report

Coachella Valley, California

By: grr	Date: 1/13/2022	Project No.: CM19167353
wood.	Figure	7-2

Figure 7-2 shows that groundwater pumping peaked in 2006 during the development boom and has decreased since 2006. In WY 2020-2021, groundwater pumping was lower than the 2006 peak pumping by approximately 13.3%. **Figure 7-2** shows that the groundwater storage in the Mission Creek Subbasin is currently more than 12,000 AF above groundwater storage levels in 2009 due to groundwater replenishment efforts.

Figure 7-3 shows annual inflows, outflows, groundwater production, and 10-year and 20-year running average changes in groundwater storage in the Mission Creek Subbasin. The Mission Creek Subbasin inflows vary significantly from year to year due to the variability in mountain front recharge and imported water replenishment deliveries. Replenishment activities vary annually in response to imported water availability, averaging approximately 4,076 AFY over the past four water years (WY 2016-2017 through 2019-2020). Years of high inflows correspond to wet years and high mountain front recharge or periods when increased SWP deliveries occurred. Both the 10- and 20-year running average change in groundwater storage have been relatively stable. The 20-year running average shows that the Mission Creek Subbasin has been in balance (i.e., no appreciable net change in storage) since 2013.

Figure 7-3
Historical Annual Change in Groundwater Storage in the Mission Creek Subbasin

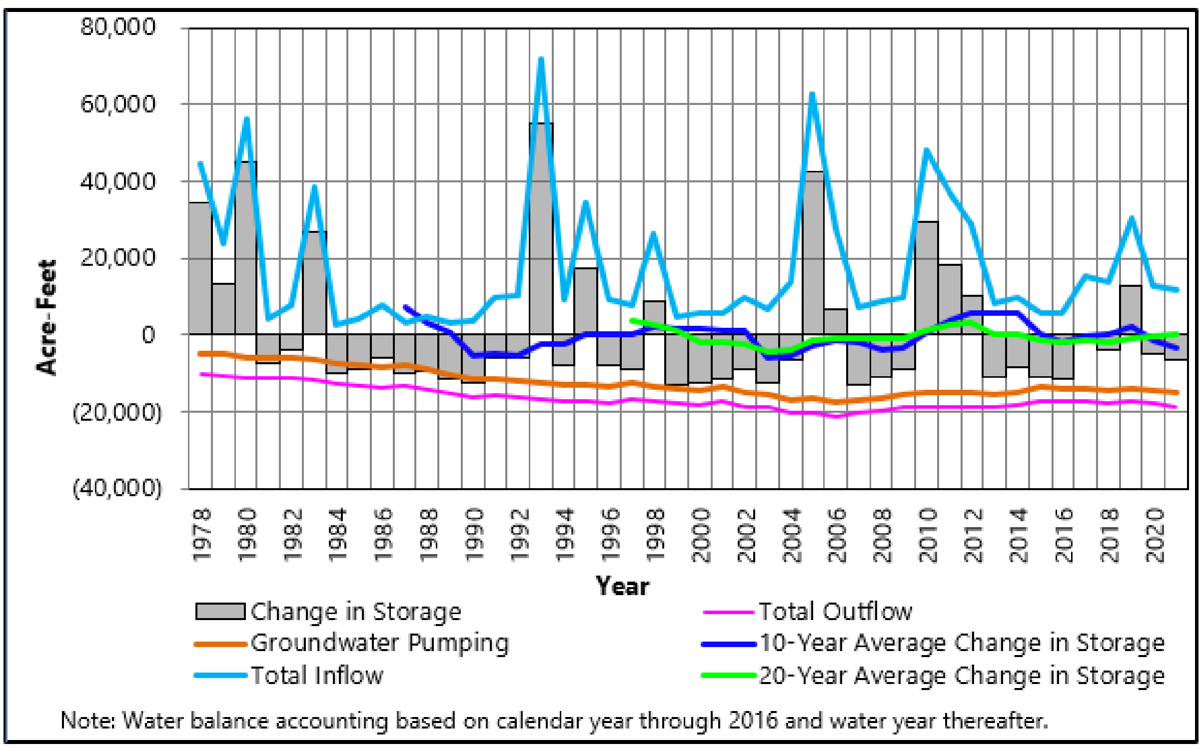
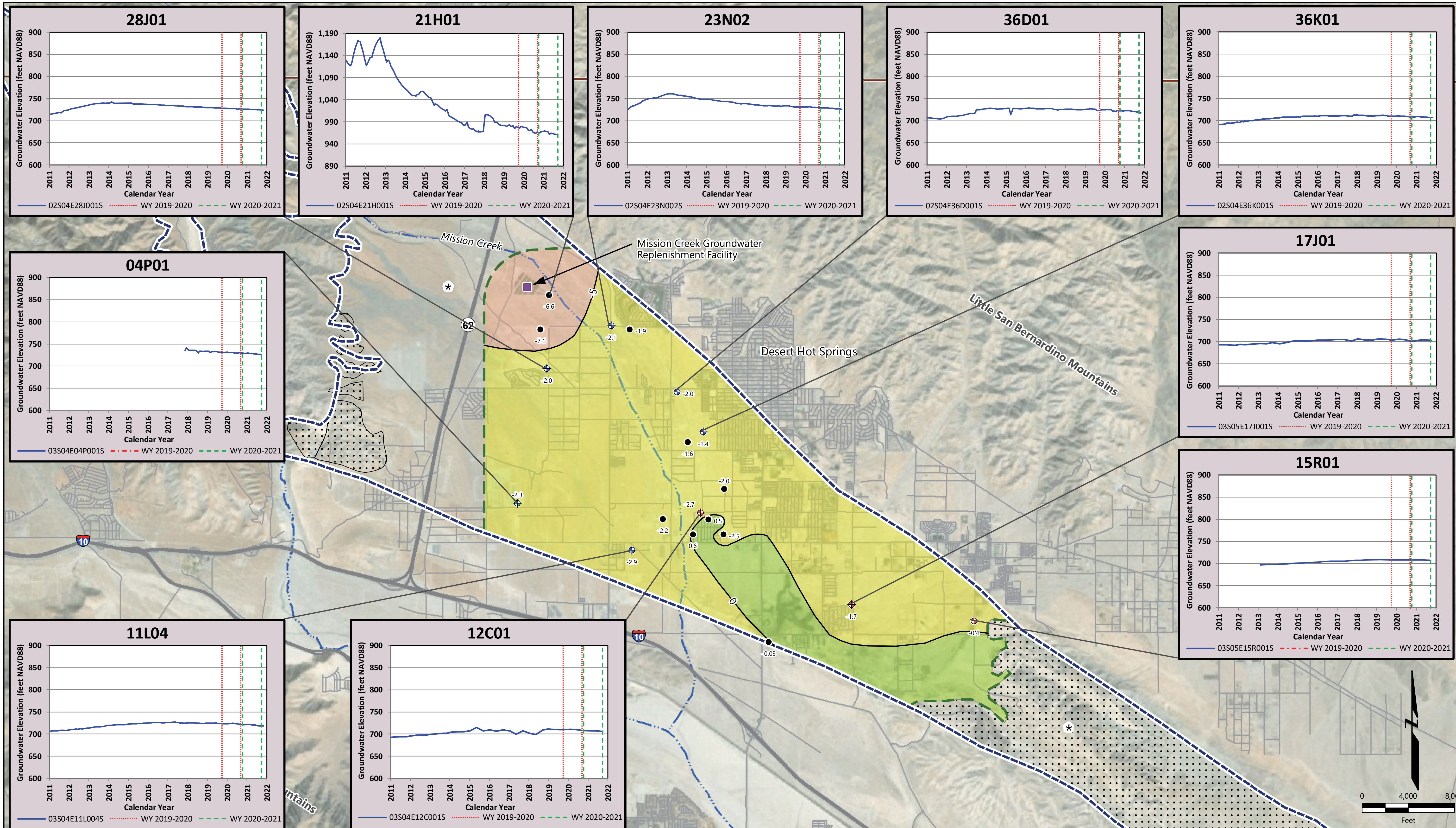


Figure 7-4 and **Figure 7-5** show one-year and ten-year changes in groundwater storage, represented by change in groundwater levels in the Mission Creek Subbasin. The maps show the difference in average groundwater elevations for wells in the Mission Creek Subbasin monitored by Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) (collectively the Agencies). Hydrographs for Key Wells and well 02S04E21H001S (21H01), located adjacent to the Mission Creek GRF, are provided on the maps for context of water level trends over time. Cool colors (green, blue, and purple) depict increases in groundwater storage, while warm colors (yellow, orange, pink, reddish brown) depict decreases in groundwater storage.

Figure 7-4 depicts the change in average groundwater storage from WY 2019-2020 to WY 2020-2021 in the Mission Creek Subbasin. Based on the Key Wells and supplemental monitoring data from 10 additional agency wells, the change in groundwater levels observed in 19 wells monitored with data in both WY 2019-2020 and WY 2020-2021 ranged from 0.6 feet of increase near the central part of the Mission Creek Subbasin to 7.6 feet of decrease south of the Mission Creek GRF. The declines in water levels near the Mission Creek GRF appears to result from the decrease in recharge at the Mission Creek GRF between the two water years (see **Figure 3-3** for recharge and hydrograph of well 21H01). Throughout the remainder of the Mission Creek Subbasin, average annual groundwater levels in the wells monitored typically indicated no more than approximately 0.5 feet of rise or 2.9 feet of decline from the previous water year. Overall, groundwater levels in the Mission Creek Subbasin in WY 2020-2021 are similar to those of WY 2019-2020, with an average change in groundwater levels of approximately 2.1 feet of decrease based on the 19 monitored wells representing the contouring shown on **Figure 7-4**

Figure 7-5 depicts the change in average groundwater storage over a 10-year period from WY 2010-2011 to WY 2020-2021 in the Mission Creek Subbasin. The change in groundwater levels observed in the 15 wells with groundwater level data in both WY 2010-2011 and WY 2020-2021 in the Mission Creek Subbasin ranged from approximately 19.6 feet of increase in the central-south part of the Mission Creek Subbasin to 172.2 feet of decrease in the Mission Creek GRF area of the Mission Creek Subbasin. Two wells with substantial water level decreases near the Mission Creek GRF (172.2 feet and 143.1 feet) represent a localized condition that is explained in the hydrograph for well 21H01 shown on **Figure 7-5**. Groundwater levels representative of WY 2010-2011 appear to be under the influence of a second round of intense recharge at the Mission Creek GRF that began in calendar year 2010 (see **Figure 3-3** for groundwater levels and annual recharge volumes near the recharge facility). Groundwater replenishment volumes approaching 20,000 AF or more in calendar years 2005 and 2006 were followed by recharge of approximately 33,000 AF in 2010 and more than 20,000 AF in calendar years 2011 and 2012. These recharge efforts resulted in significant groundwater mounding near the Mission Creek GRF as shown in hydrograph 21H01 on **Figure 7-5**. This mounding has dissipated over the 10-year period resulting in an apparent steep water level decline for this area. The long-term effect of this recharge and a reduction in groundwater pumping has resulted in the rise of groundwater levels throughout the remainder of the Mission Creek Subbasin since WY 2010-2011. Excluding the two wells nearest the Mission Creek GRF, the average groundwater level change over the ten-year period was an increase of about 11.0 feet.

wood.



Explanation

Groundwater Replenishment Facility

Monitoring Agency Well

- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Other Agency Well

Mission Creek Subbasin

Water level data boundary line

Low permeability/non-water bearing sediments/bedrock

Change in average water level (feet)

Streams

Highway/road

* Water level data not available

0 to 5 foot increase

0 to 5 foot decrease

>5 to 10 foot decrease

Water Level hydrograph for well indicated

Water year (WY) 2020-2021

Water year (WY) 2019-2020

Notes

1. Groundwater storage based on change in average water levels between the respective Water Years.
2. Groundwater elevation in feet above North American Vertical Datum (NAVD88).

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016.

ONE-YEAR CHANGE IN GROUNDWATER STORAGE WY 2019-2020 to WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww	Date: 1/4/2022	Project No.: CM19167353

wood.

Figure 7-4

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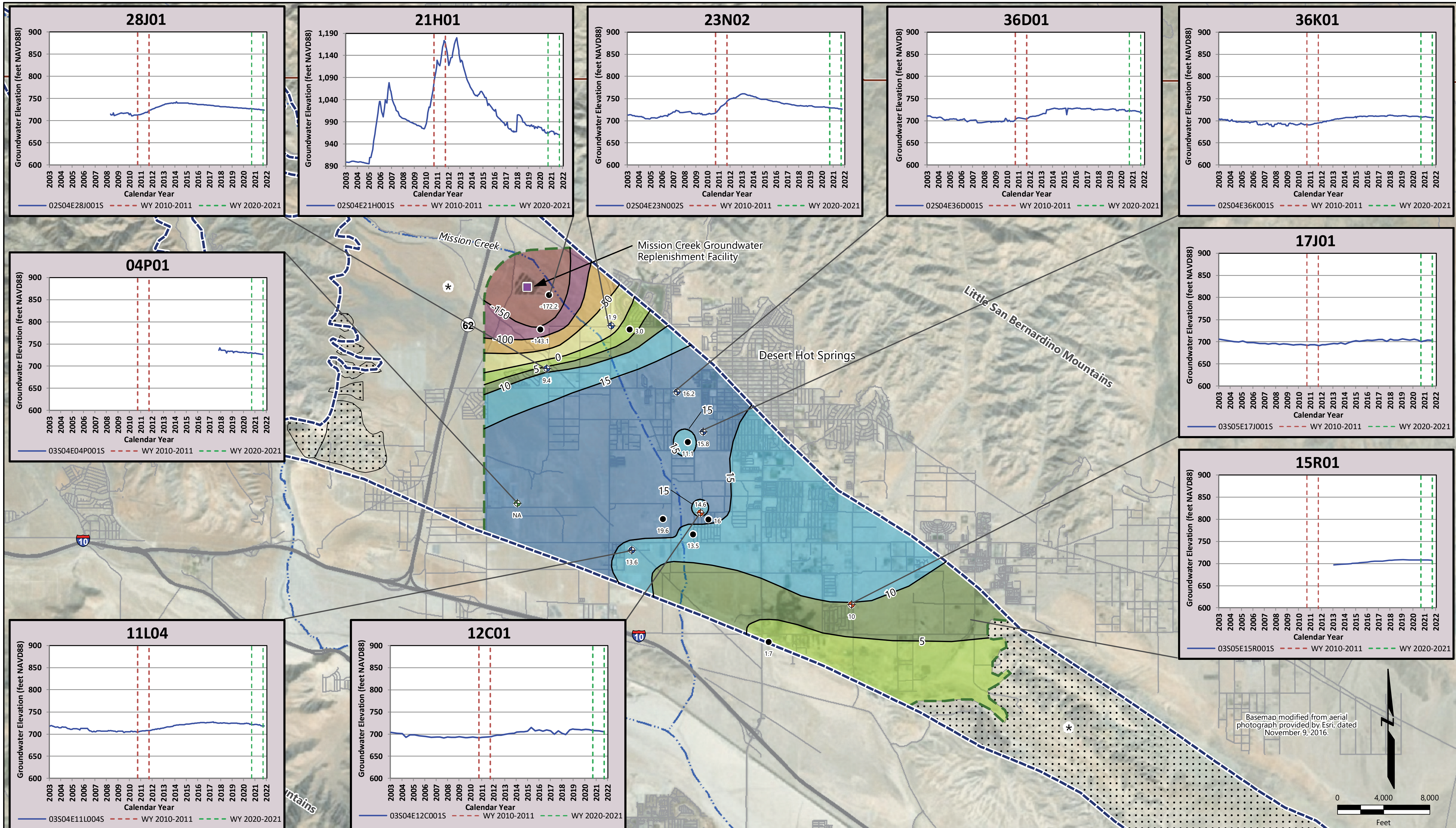

Explanation

- ■ Groundwater Replenishment Facility

Monitoring Agency Well

- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Other Agency Well

- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Change in average water level (feet)
- Streams
- Highway/road

- >15 to 20 foot increase
- >10 to 15 foot increase
- >5 to 10 foot increase
- 0 to 5 foot increase
- 0 to 50 foot decrease
- >50 to 100 foot decrease
- >100 to 150 foot decrease
- >150 foot decrease
- Water Level hydrograph for well indicated
- Water year (WY) 2020-2021
- Water year (WY) 2010-2011
- * Water level data not available

Notes

1. Groundwater storage based on change in average water levels between the respective Water Years.
2. Five-foot change in water level intervals shown except near the groundwater recharge facility where fifty-foot intervals are shown.
3. Groundwater elevation in feet above North American Vertical Datum (NAVD88).
4. NA = Water level unavailable in Water Year 2011.

TEN-YEAR CHANGE IN GROUNDWATER STORAGE WY 2010-2011 to WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww | Date: 1/4/2022 | Project No.: CM19167353

wood.

Figure 7-5

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Section 8 – Sustainable Management Criteria

The Sustainable Groundwater Management Act (SGMA) defines sustainable groundwater management as the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. The Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) (collectively the Agencies) recognize that establishing metrics to avoid undesirable results and to maintain sustainability is a valuable tool in groundwater management, and incorporated SGMA Sustainable Management Criteria into the Mission Creek Subbasin Alternative Update (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]) to guide water resources management in the Mission Creek Subbasin (also referred to as the Subbasin).

8.1 Sustainable Management Criteria Overview

Sustainability Indicators are any of the effects caused by groundwater conditions occurring throughout the Subbasin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 107211(x). The 2022 Alternative Plan Update identified four Sustainability Indicators relevant to the Mission Creek Subbasin based on historical or current conditions as described below:

- **Chronic lowering of groundwater levels** – Historically, groundwater levels declined by up to approximately 60 feet in the Mission Creek Subbasin between 1970 and 2009 but have since rebounded as a result of management actions.
- **Reduction of groundwater storage** – Declining groundwater levels between 1970 and 2009 resulted in a reduction in groundwater storage in the Mission Creek Subbasin, but groundwater storage has since increased due to recharge of imported water and reduced groundwater pumping.
- **Land subsidence** – No evidence of land subsidence in the Mission Creek Subbasin has been documented. The Subbasin is an alluvial basin with some fine-grained sediments at depth. Therefore, the potential for subsidence cannot be eliminated without gathering additional information.
- **Degraded water quality** – No water quality issues have been identified in active groundwater supply wells in the Mission Creek Subbasin. However, sustainability criteria for degraded water quality have been identified based on the potential for future degraded water quality. Naturally occurring uranium activity historically exceeded drinking water regulatory thresholds in two municipal water supply wells that were removed from use. Nitrate concentrations are below the maximum contaminant level (MCL) at all municipal wells but have the potential to increase over time due to fertilizer use and wastewater percolation in the Mission Creek Subbasin. Total dissolved solids (TDS) have been increasing in the Subbasin over time due to groundwater use and return flow, fertilizer use, wastewater percolation, and recharge of higher TDS imported water.

The SGMA allows for a Sustainability Indicator to not apply in a subbasin if there is evidence that the indicator does not exist and could not occur. In the Mission Creek Subbasin, there is sufficient evidence to eliminate two of the Sustainability Indicators from further consideration:

- **Depletion of interconnected surface waters** – The SGMA defines interconnected surface waters as water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. Although surface water flows occur in the upper reaches of the Whitewater River in the Mission Creek Subbasin, the surface waters and groundwaters in this area are hydraulically isolated from the main Mission Creek Subbasin. Because there are no interconnected surface waters in the Mission Creek Subbasin that could be impacted by groundwater management activities, this Sustainability Indicator is not considered relevant for the Mission Creek Subbasin.

- **Seawater intrusion** – There are no saltwater bodies in the vicinity of the Mission Creek Subbasin. This Sustainability Indicator is not considered further.

Table 8-1 provides a summary of the Sustainable Management Criteria for each of the four relevant Sustainability Indicators identified in the 2022 Alternative Plan Update. The following subsections describe the current water year monitoring in context of these criteria.

Table 8-1
Sustainable Management Criteria Summary

Sustainability Indicator	Minimum Thresholds	Measurement	Measurable Objectives	Undesirable Result
Chronic lowering of groundwater levels	Set to one standard deviation of water levels in the well between 2002 and 2019 below the known or estimated 2009 water level of the well	Measured through nine Key Wells (see **Table 3-1**) spatially distributed throughout the main Mission Creek Subbasin	Set to 2009 low groundwater elevations in Key Wells	Four Key Wells (~45%) each exceed their Minimum Threshold for three consecutive years
Reduction in groundwater storage	Set at the storage volume represented by the Average Minimum Threshold for groundwater levels in the nine Key Wells. (i.e., the average of the Minimum Thresholds in all nine Key Wells is 694.5 feet NAVD88).	Comparison of average annual groundwater levels in Key Wells with the average of Key Well water level Minimum Thresholds (694.5 feet NAVD88)	Set to 2009 subbasin groundwater storage as indicated by the average Measurable Objective of levels in Key Wells	The average groundwater level in the Key Wells falls below the average Minimum Threshold for three consecutive years
Subsidence	To be evaluated based on results of a USGS study currently in progress (see Section 8.3.2)	To be evaluated based on results of a USGS study. In the interim, review CDWR ground level vertical displacement data and use the groundwater minimum thresholds as a proxy for subsidence potential	To be evaluated based on USGS study (see Section 8.3.2)	To be evaluated based on USGS Study (see Section 8.3.2)
Degraded groundwater quality	For constituents of concern (COCs; currently only nitrate and naturally occurring uranium), the Minimum Threshold will be no exceedances of California MCLs for drinking water. Exceedances only apply to drinking water supply wells that regularly test for the parameters. A Minimum Threshold for TDS will be determined based on the findings of the CV-SNMP Update (in progress, see Section 8.4.2).	Groundwater quality data provided by the Agencies and downloaded annually from state and local sources	Same as the Minimum Threshold	For the COCs identified, the concentration/activity of the constituent shall not exceed the MCL. If there is an exceedance, the exceedance will be investigated. Undesirable results for TDS will be determined based on the findings of the CV-SNMP Update (in progress, see Section 8.4.2).

8.2 Groundwater Levels

In the 1990s, the Agencies recognized that continued lowering of groundwater levels in the Mission Creek Subbasin was not sustainable and, if continued, could have undesirable results ranging from increased energy costs for groundwater pumping to the need to deepen existing private and public wells. As a result, CVWD and DWA developed and implemented plans to recharge imported water into the Mission Creek Subbasin. Groundwater levels in the Mission Creek Subbasin began to increase after an imported water recharge program began in 2002 at the Mission Creek Groundwater Replenishment Facility (GRF).

The Agencies further understand that although groundwater level declines may not be avoidable during recurring below normal precipitation periods, when imported water deliveries and mountain front recharge are reduced, they intend to manage the Subbasin to maintain long-term average groundwater levels at or above 2009 conditions, which are generally considered to be the historically low groundwater levels throughout much of the Mission Creek Subbasin. During the 2009 period of historically low groundwater levels, no incidents of groundwater production wells going dry or losing production capacity due to low groundwater levels were observed by or reported to the Agencies. In addition, no dry wells are identified in the Mission Creek Subbasin in the California Department of Water Resources (CDWR) "Reported Dry Water Sources" database that was initiated in 2014.[16]

In 2013, the Agencies identified the need to maintain average groundwater water levels in the Mission Creek Subbasin above 2009 levels and made this one of the objectives of the 2013 Mission Creek-Garnet Hill Water Management Plan (2013 MC-GH WMP). The 2013 MC-GH WMP became the basis for the Mission Creek Subbasin Alternative Plan for groundwater sustainability submitted to the CDWR in 2016, as described in Section 1.2.2.

The 2022 Alternative Plan Update identified groundwater-level criteria for specific monitoring wells that will be used to demonstrate compliance with the 2009 groundwater level threshold. These levels were established as the SGMA Measurable Objectives. Minimum Thresholds, set slightly below the Measurable Objectives (from 2.5 feet to 16.3 feet below the Measurable Objective, with the greater values near the groundwater replenishment facility), were established based on groundwater level variability. Measurable Objectives and Minimum Thresholds for the Key Wells are summarized in **Table 8-2**. Elevation data for this Annual Report were converted to the North American Vertical Datum of 1988 (NAVD88) as discussed in Section 3.1**. Table 8-2** shows Measurable Objectives and Minimum Thresholds relative to NAVD88 and National Geodetic Vertical Datum of 1929 (NGVD29).

[16] https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels

Table 8-2
Key Wells Measurable Objective and Minimum Threshold

State Well Number	Map Name	Measurable Objective[1] (feet NGVD29)	Minimum Threshold[2] (feet NGVD29)	Measurable Objective[1] (feet NAVD88)	Minimum Threshold[2] (feet NAVD88)	Comments
02S04E23N002S	**23N02**	711.3	695.0	713.9	697.5	
02S04E28J001S	**28J01**	709.5	700.3	712.1	702.9	
02S04E36D001S	**36D01**	694.6	683.1	697.1	685.6	
02S04E36K001S	**36K01**	686.1	678.8	688.6	681.3	
03S04E04P001S	**4P01**	NA	NA	727.4	719.5	Original survey was in NAVD88. Provisional model estimated 2009 water levels[3]
03S04E11L004S	**11L04**	701.3	693.8	703.8	696.3	
03S04E12C001S	**12C01**	689.6	682.9	692.1	685.4	
03S05E15R001S	**15R01**	698.0	691.3	700.5	693.8	Provisional model estimated 2009 water levels[3]
03S05E17J001S	**17J01**	689.8	686.1	692.2	688.5	

Notes:

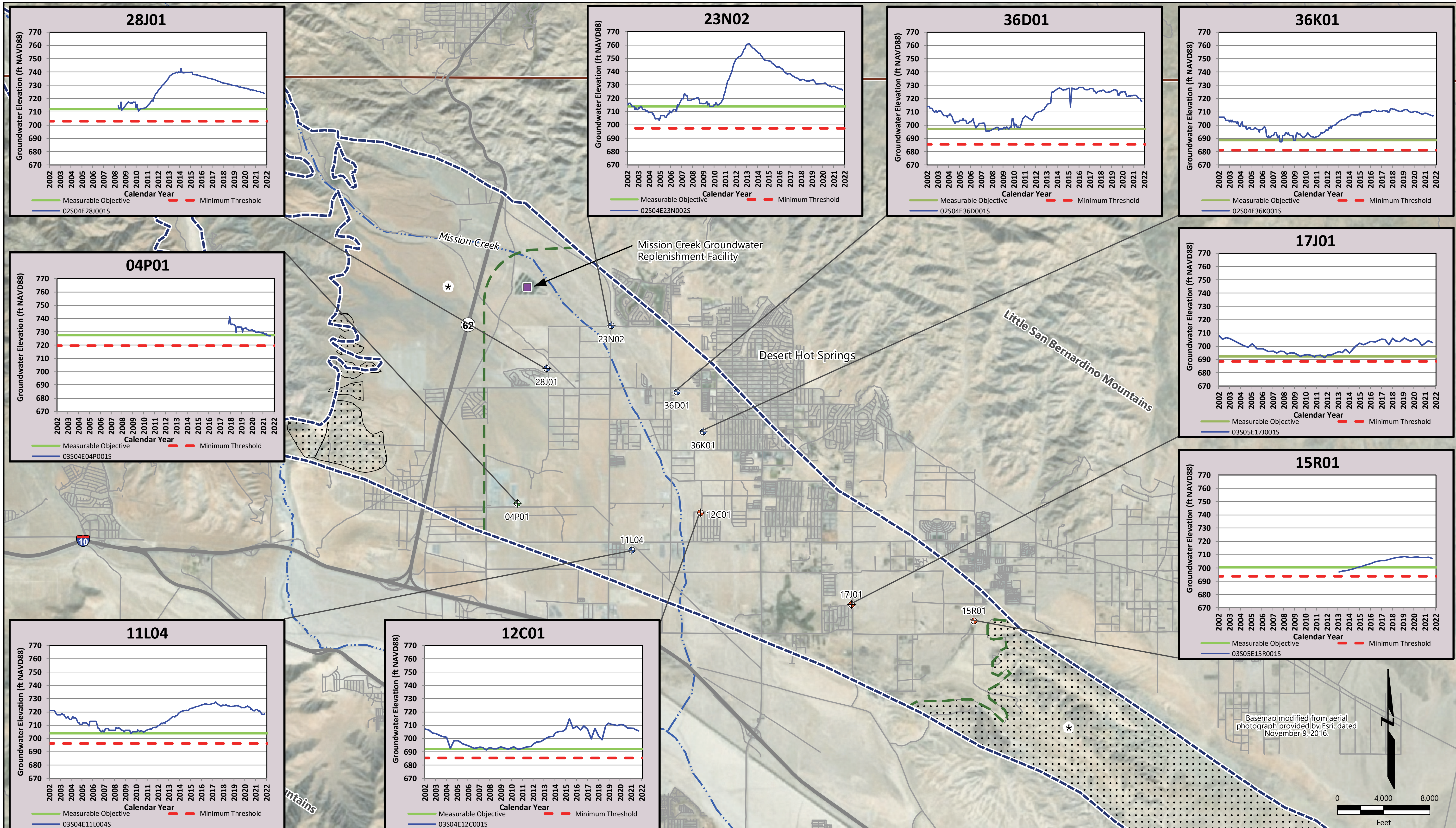
1. Measurable Objectives are based on the minimum groundwater level at the well in 2009 or estimated groundwater level in 2009 (see note 3).
2. Minimum Thresholds are based on the Measurable Objective less the standard deviation of water levels for the well between 2002 and 2019 except for well 4P01. Well 4P01 has limited data to estimate variability and the average standard deviation for all Key Wells (7.9 feet) was used to set the Minimum Threshold.
3. Wells 4P01 and 15R01 have limited groundwater monitoring histories that do not extend back to 2009 water level conditions. The Measurable Objective for these wells was derived using groundwater model simulation fit to the available data and extracting the minimum simulated groundwater level in 2009. These Measurable Objectives are considered provisional and may be adjusted based on groundwater level response in these wells relative to other wells in the basin.

Table 8-3 shows a comparison of the Measurable Objectives and Minimum Thresholds with the low water levels for the Key Wells in Water Year (WY) 2020-2021. All of the Key Wells are above the Measurable Objectives with the exception of well 03S04E04P01S (4P01) located in the southwesterly part of the Mission Creek Subbasin. Historical data from this well are limited and the Measurable Objective was estimated based on 2009 groundwater levels extracted from the updated groundwater model presented in the 2022 Alternative Plan Update. Consequently, the Measurable Objective for this well was identified as provisional and subject to revision based on groundwater level trends and comparison with other wells.

Table 8-3
Average Groundwater Levels in Key Wells Compared to Measurable Objectives and Minimum Thresholds

State Well Number	Map Name	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	WY 2020-2021 Low Water Level (feet NAVD88)	Difference Between WY 2020-2021 and Measurable Objective (feet)	Difference Between WY 2020-2021 and Minimum Threshold (feet)
02S04E23N002S	**23N02**	713.9	697.5	726.8	12.9	29.3
02S04E28J001S	**28J01**	712.1	702.9	724.6	12.5	21.7
02S04E36D001S	**36D01**	697.1	685.6	719.7	22.6	34.1
02S04E36K001S	**36K01**	688.6	681.3	707.0	18.4	25.7
03S04E04P001S	**4P01**	727.4	719.5	726.8	-0.6	7.3
03S04E11L004S	**11L04**	703.8	696.3	718.3	14.5	22.0
03S04E12C001S	**12C01**	692.1	685.4	706.9	14.8	21.5
03S05E15R001S	**15R01**	700.5	693.8	707.3	6.8	13.5
03S05E17J001S	**17J01**	692.2	688.5	700.3	8.1	11.8
Average		**703.1**	**694.5**	**715.3**	**12.2**	**20.8**

Figure 8-1 shows the hydrographs for each of the nine Key Wells along with their Measurable Objectives and Minimum Thresholds. The figure shows that water levels at each of the Key Wells are above measurable objectives except for 04P01. Water levels drop below the Measurable Objective for this well beginning in July of 2021. As described above, 2009 groundwater levels for this well were estimated to determine its provisional Measurable Objective and Minimum Threshold. Historical groundwater level trends in the Mission Creek Subbasin in general, and water level in the Key Well to the north (02S04E28J001S) and to the east (03S04E11L004S) in particular, suggest that the provisional Measurable Objective for well 04P01 may have been set approximately 10 to 15 feet too high. An adjustment to the provisional Measurable Objective and Minimum Threshold for this well will be considered in future Annual Reports and/or Alternative Plan Updates.



Explanation

- Groundwater Replenishment Facility
- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Streams
- Highway/road
- Water Level hydrograph for well indicated
- Measurable objective
- Minimum threshold
- * Water level data not available

Monitoring Agency Well

- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well

Notes

1. Groundwater elevation in feet above North American Vertical Datum (NAVD88).
2. Water level boundary lines based on a lack of water level data. The eastern water level boundary line also corresponds to the boundary of low permeability sediments of the Indio Hills.

KEY WELL HYDROGRAPHS WITH MEASURABLE OBJECTIVES AND MINIMUM THRESHOLDS
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww	Date: 1/4/2022	Project No.: CM19167353
wood.	Figure	8-1

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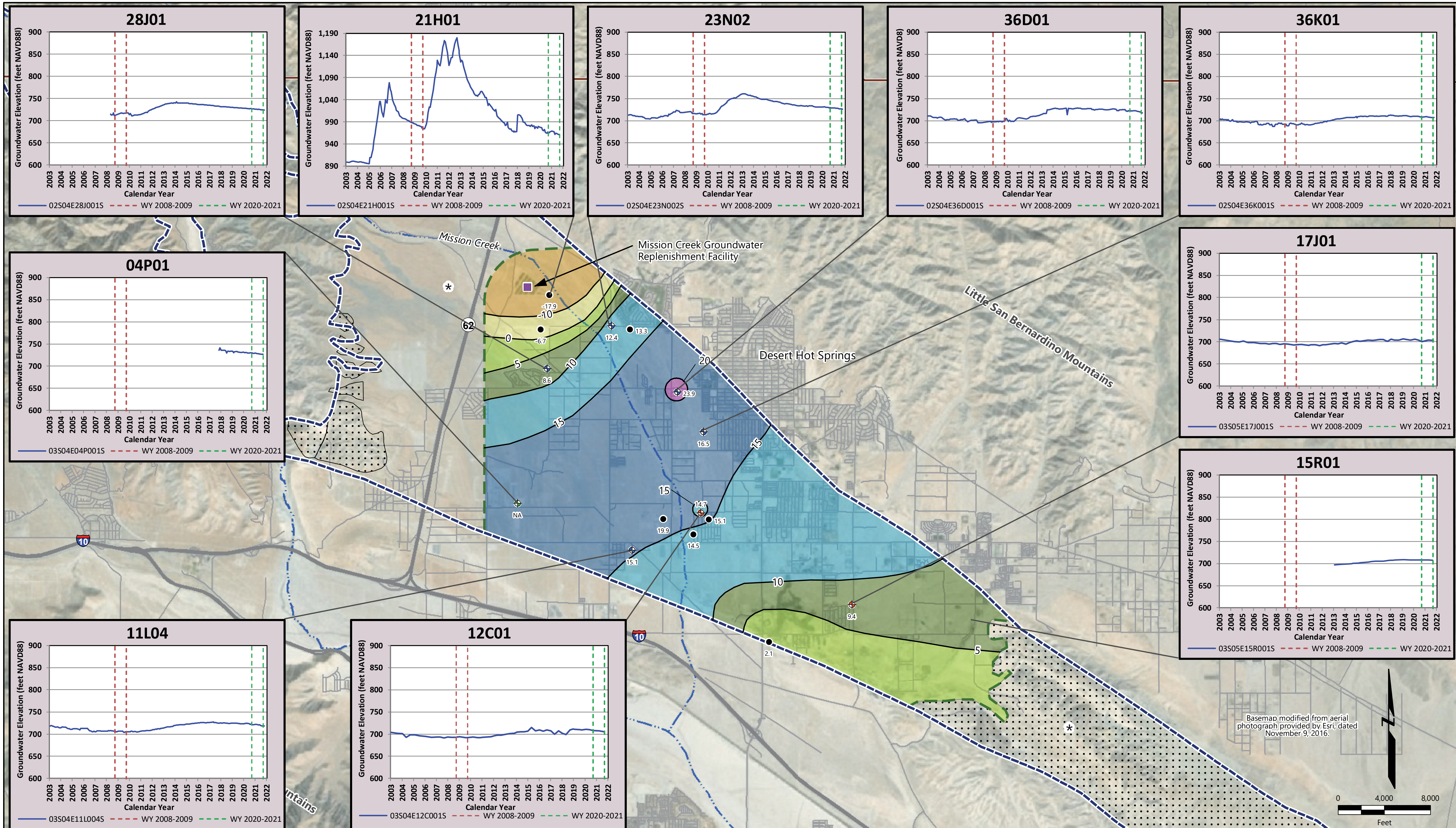
8.3 Groundwater Storage

The storage capacity of the Mission Creek Subbasin has been estimated at 2,600,000 acre-feet (AF) (CDWR, 1964). The storage capacity is based on the thickness and lateral extent of alluvial sediments that extend to depths as great as 3,000 feet below ground surface in the Mission Creek Subbasin (GCI, 1979). Available groundwater in storage, however, is limited by the level to which groundwater levels may be lowered without causing undesirable results. The Mission Creek Subbasin consists of a single aquifer laterally and vertically. Groundwater storage is directly related to groundwater levels for the Subbasin. Groundwater storage Measurable Objectives and Minimum Thresholds were based on the average of the groundwater levels Measurable Objectives and Minimum Thresholds for the nine Key Wells shown in **Table 8-3**. **Table 8-4** summarizes groundwater storage for WY 2020-2021 based on Key Well minimum water levels, Measurable Objective and Minimum Threshold for groundwater storage, and the differences between WY 2020-2021 groundwater storage and the Measurable Objective and Minimum Threshold. The average water level in the Mission Creek Subbasin in WY 2020-2021 was 715.3 feet NGVD88, which is 12.2 feet above the Measurable Objective for groundwater storage and 20.8 feet above the Minimum Threshold for groundwater storage.

Table 8-4
Groundwater Storage Compared to the
Measurable Objective and Minimum Threshold

Key Well Average Minimum Water Levels WY 2020-2021 (feet NAVD88)	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	Difference Between WY 2020-2021 Storage and Measurable Objective (feet)	Difference Between WY 2020-2021 Storage and Minimum Threshold (feet)
715.3	703.1	694.5	12.2	20.8

Figure 8-2 shows change in water levels between WY 2008-2009 and WY 2020-2021. Change in water levels is a proxy for storage in the Mission Creek Subbasin because the Subbasin comprises a single aquifer system. **Figure 8-2** shows a decrease in water levels in the immediate vicinity of the Mission Creek GRF with the remainder of the main Subbasin showing groundwater level increases ranging from more than 20 feet in the central north portion of the main Subbasin to 2.1 feet in the south part of the main Subbasin. Lower water levels near the Mission Creek GRF are due to the dissipation of groundwater mounding that resulted from historical recharge at the Mission Creek GRF. Overall, the Mission Creek Subbasin shows higher WY 2020-2021 groundwater levels compared to WY 2008-2009 groundwater levels and thus higher groundwater storage.



Explanation

- ■ Groundwater Replenishment Facility
- Monitoring Agency Well
  - Coachella Valley Water District - Key Well
  - Mission Springs Water District - Key Well
  - Desert Water Agency - Key Well
  - ● Other Agency Well
- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Change in average water level (feet)
- Streams
- Highway/road
- >20 foot increase
- >15 to 20 foot increase
- >10 to 15 foot increase
- >5 to 10 foot increase
- 0 to 5 foot increase
- 0 to 10 foot decrease
- >10 foot decrease
- Water Level hydrograph for well indicated
- Water year (WY) 2020-2021
- Water year (WY) 2008-2009
- ★ Water level data not available

Notes

1. Groundwater storage based on change in average water levels between the respective Water Years.
2. Five-foot change in water level intervals shown except near the groundwater recharge facility where ten-foot intervals are shown.
3. Groundwater elevation in feet above North American Vertical Datum (NAVD88).
4. NA = Water level unavailable in Water Year 2009.

CHANGE IN GROUNDWATER STORAGE WY 2008-2009 to WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww | Date: 1/4/2022 | Project No.: CM19167353

wood.

Figure 8-2

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8.4 Land Subsidence

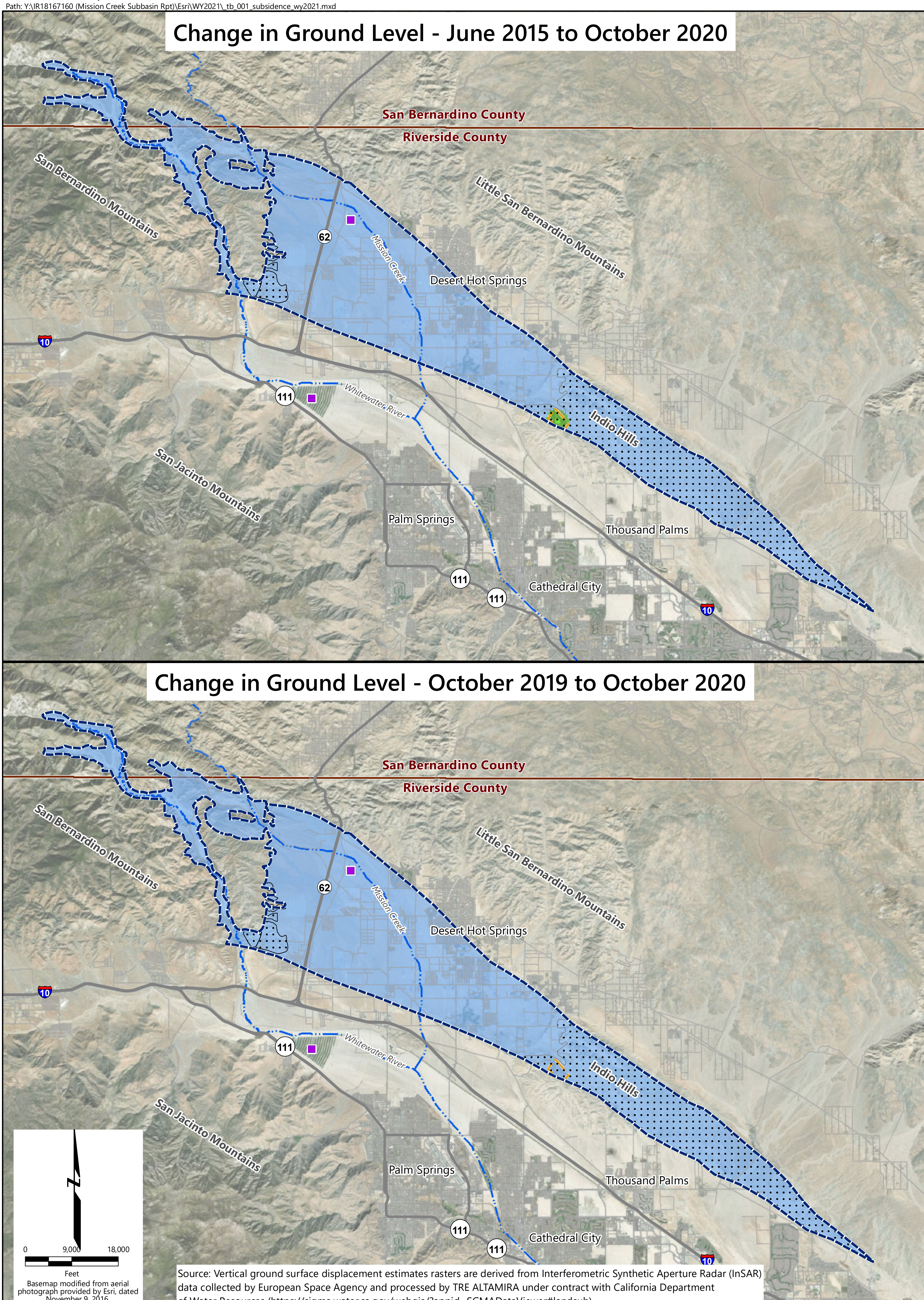
Neither subsidence nor impacts to structures potentially caused by subsidence have been identified historically in the Mission Creek Subbasin. Geologic conditions of generally coarse-grained sediments and lack of thick, laterally extensive fine-grained sediments in the Mission Creek Subbasin aquifer reduce the likelihood of subsidence. In addition, ground level displacement monitoring using Interferometric Synthetic Aperture Radar (InSAR) data available from CDWR has not shown evidence of subsidence during the period this technology has been available for monitoring in the Mission Creek Subbasin (beginning in June 2015). Although subsidence has not been observed, it is considered to have a potential to result in significant and unreasonable conditions. Subsidence is most likely to occur if groundwater levels are lowered significantly below their historical low levels (i.e., under conditions of maximum reconsolidation stress). Consequently, Minimum Thresholds for groundwater levels in the Key Wells are used as a screening level for the potential of subsidence. Currently groundwater levels in the Key Wells are above the water level Minimum Thresholds.

In addition to using Minimum Thresholds for water levels in the Key Wells as a screening level for potential subsidence, available ground level displacement monitoring data available through CDWR were reviewed and the United States Geological Survey (USGS) is conducting an evaluation of potential subsidence in the Mission Creek Subbasin. These are described in the following subsections.

8.4.1 Ground Level Displacement Monitoring

Figure 8-3 shows the estimated vertical displacement of ground level as derived from InSAR data collected by the European Space Agency Sentinel-1A satellite and processed by TRE ALTAMIRA Inc., under contract with the CDWR. The vertical displacement data were obtained from CDWR (CDWR, 2021) for the approximately five-year monitoring period available for this technology (June 2015 to October 2020) and also for the most recent annual record of vertical ground level displacement (October 2019 to October 2020). The raster images were modified for vertical ground level displacement ranges displayed on the CDWR SGMA Data Viewer website. The SGMA Data Viewer is set up for viewing data on a regional scale. **Figure 8-3** shows that with the exception of the former Edom Hill Landfill area in the northwestern part of the Indio Hills for the period October 2015 to October 2020, ground level change in the Mission Creek Subbasin has exhibited less than an absolute vertical displacement of 0.1 feet. Vertical ground level displacement at the former Edom Hill Landfill area over the five-year period October 2015 to October 2020 was up to 0.4 feet downward (-0.4 feet). This is likely due to settlement at the former landfill. Vertical displacement in the former landfill area over the one-year period from October 2019 to October 2020 was no more than 0.1 feet.

The conditions shown by the processed InSAR data indicate an opposite vertical ground motion trend than described in the Annual Report for WY 2019-2020, but of a similarly small magnitude. In the previous Annual Report, vertical ground displacement was primarily upward by as much as 0.25 feet in the main Mission Creek Subbasin for the period June 2015 to September 2019 and for the period October 2018 to September 2019 (Wood, 2021). All the images obtained and reviewed for this and the previous Annual Report, however, show changes only within the lowest increment of change indicated by CDWR's raster setting, further indicating ground levels are relatively stable and fluctuations around zero vertical displacement are small (potentially due to elastic ground level displacement). Small changes over large areas that appear to be unrelated to pumping patterns in the Mission Creek Subbasin suggest that there is no systematic downward vertical displacement of ground levels caused by groundwater withdrawal.



Explanation

- Groundwater Replenishment Facility
- Mission Creek Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Streams
- Highway/road
- Former Edom Hill Sanitary Landfill

Vertical displacement raster (feet)

- -0.1 to 0.1
- -0.2 to -0.1
- -0.4 to -0.2

CHANGE IN GROUND LEVEL
2015 to 2020
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww | Date: 1/4/2022 | Project No.: CM19167353

wood.

Figure 8-3

8.4.2 Additional Land Subsidence Study

CVWD, in collaboration with the other Agencies, has engaged the USGS to study land subsidence in the Mission Creek Subbasin. The USGS initiated this study in 2021 and is currently gathering data including groundwater level data that the Agencies provided for the Mission Creek Subbasin.

8.5 Groundwater Quality

The 2022 Alternative Plan Update identified two categories of water quality criteria to be used for establishing Minimum Thresholds. These include: (1) water quality based on California drinking water maximum contaminant levels (MCLs), and (2) total dissolved solids (TDS), which will be evaluated through the update to the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP). These two categories are described in the following subsections.

8.5.1 Water Quality for Constituents with Primary MCLs

The 2022 Alternative Plan Update identified uranium and nitrate as constituents of concern (COCs). Uranium was identified because it historically (in the last five years) exceeded its MCL in a drinking water supply well in the Mission Creek Subbasin. Nitrate was identified as a COC based on ongoing sources for this constituent, including wastewater infiltration to the groundwater system (through septic systems and disposal of treated wastewater effluent), and fertilizer application for agriculture and at golf courses. Nitrate has not exceeded its MCL in any municipal supply well.

The Minimum Threshold for groundwater quality was established as no drinking water supply wells exceeding the primary MCLs for drinking water. Water quality data provided by the Agencies and obtained from the State Water Resources Control Board (SWRCB) database for water supply (SWRCB, 2022) were reviewed to determine if any COC exceeded its primary MCL in any municipal water supply well. **Table 8-5** summarizes the results of this review. A total of nine wells were sampled for the COC nitrate during the water year and no wells reported nitrate as nitrogen above the MCL of 10 milligrams per liter (mg/L) for this COC. Uranium was not sampled in any water supply wells in the Mission Creek Subbasin in WY 2020-2021. This analyte is not required to be sampled every year in the water supply wells in the Mission Creek Subbasin. **Figure 8-4** shows the locations of wells with water quality analyses including the analyses for nitrate.

Table 8-5
Minimum Thresholds for Groundwater Quality – COCs with MCLs

Constituent of Concern (COC)	Maximum Contaminant Level (MCL)/ Minimum Threshold	Standard Units	Number of Wells Sampled for COC in WY 2020-2021	Number of Wells Exceeding MCL in WY 2020-2021
Uranium	20	pCi/L	0	0
Nitrate (N)	10	mg/L	9	0

Water quality data were also reviewed for any constituent other than uranium and nitrate exceeding its primary MCLs in municipal water supply wells to identify potential new COCs. None were identified. **Figure 8-4** identifies the locations of wells that were reviewed for water quality data.

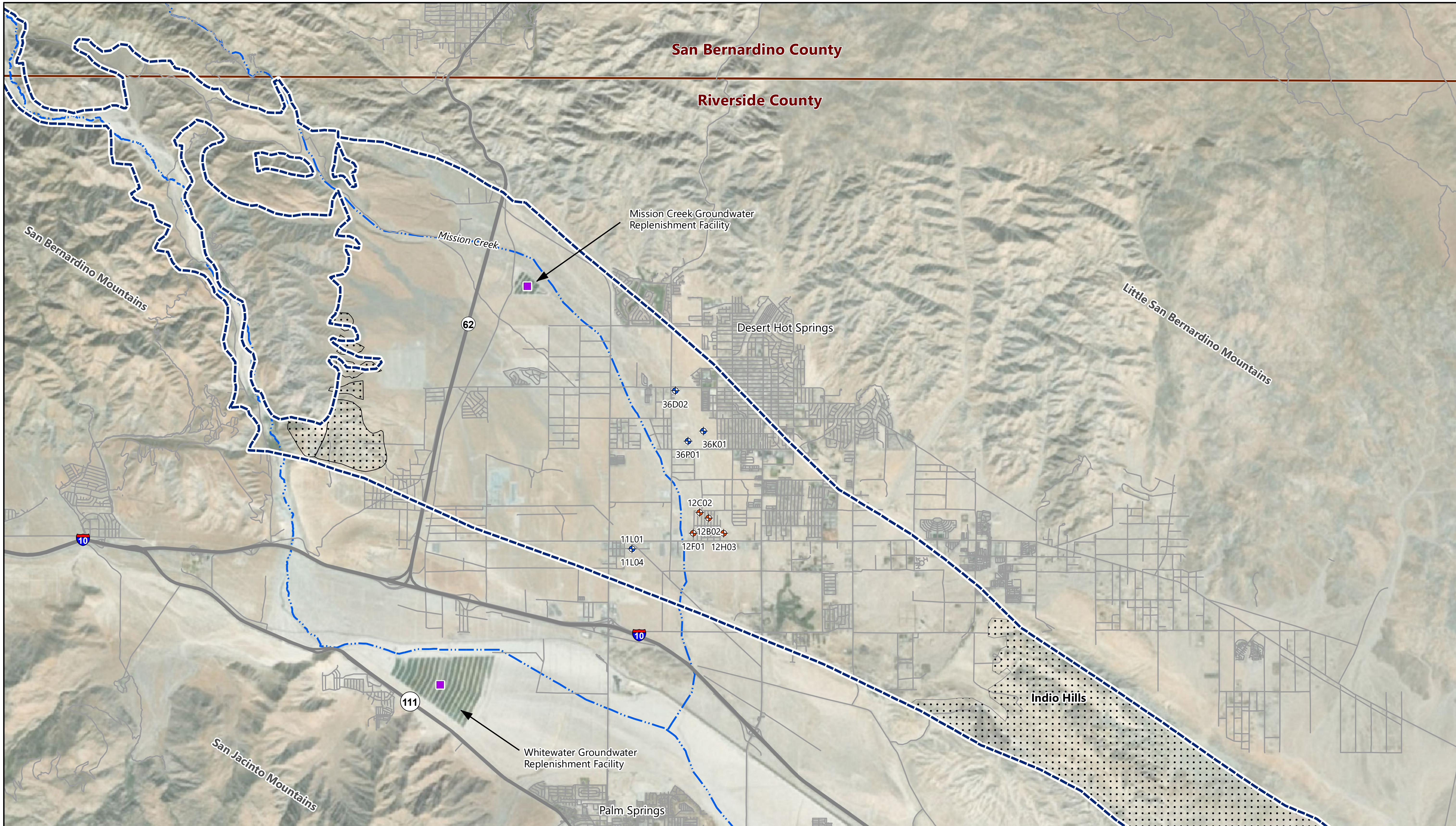
In addition, the GeoTracker and EnviroStor website databases were reviewed for potential environmental sites that may impact groundwater and specifically municipal water supply wells. Within the Mission Creek Subbasin, the only open regulatory site identified with environmental impacts to groundwater was the former Edom Hill Class III landfill (GeoTracker Global ID L10009373801), located in the Indio Hills within the Mission Creek Subbasin (see Figure 8-3). The Indio Hills consist of consolidated sediments that are not directly connected to the alluvial aquifer in the main Mission Creek Subbasin. Groundwater sampling at this site for volatile organic compounds (VOCs), nitrate, sulfate, and TDS by the Riverside County Department of Waste Resources in March and May 2020 indicated that no parameters exceeded MCLs (RCDWR, 2021).

8.5.2 Total Dissolved Solids

Sources of TDS in the Mission Creek Subbasin include groundwater used for irrigation (with evaporative concentration of dissolved constituents), wastewater infiltration to the groundwater system (through septic systems and disposal of treated wastewater effluent), fertilizer application for agriculture and at golf courses, and recharge of Colorado River Aqueduct (CRA) water at the Mission Creek GRF.

TDS is currently being evaluated through update of the CV-SNMP. The CV-SNMP Agencies – which include CVWD, Coachella Water Authority (CWA)/Coachella Sanitary District, City of Palm Springs, DWA, Indio Water Authority (IWA), MSWD, Myoma Dunes Mutual Water Company, and Valley Sanitary District – prepared a workplan entitled "*Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan*" (Development Workplan, West Yost, 2021) that was submitted to the Colorado River Basin Regional Water Quality Control Board (RWQCB) in September 2021 and approved in October 2021. The Development Workplan outlines the steps and schedule to update the CV-SNMP, with a scheduled completion by October of 2026. The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects beneficial uses. When completed, the update to the CV-SNMP will provide a basis for establishing Monitoring Thresholds for TDS within the Mission Creek Subbasin.

The Development Workplan was required to include a groundwater monitoring workplan with an enhanced monitoring network, identification of data gaps, and a plan to fill the gaps. The CV-SNMP Agencies submitted this workplan entitled "*Groundwater Monitoring Program Workplan*" (Groundwater Monitoring Workplan) to the RWQCB in December 2020 (West Yost, 2020), and the RWQCB approved this workplan in February 2021. The Groundwater Monitoring Workplan outlines an expanded groundwater monitoring program that will sufficiently determine whether concentrations of nitrates and TDS, (collectively N/TDS), in groundwater are consistent with water quality objectives. The CV-SNMP Agencies initiated work on the CV-SNMP Groundwater Monitoring Workplan in 2021. A general application for the California Department of Water Resources Technical Support Services (CDWR TSS) program for construction of wells to fill monitoring data gaps identified in the Monitoring Workplan and will complete application for specific wells (including a new monitoring well in the Mission Creek Subbasin) once the general application is approved. The first progress report for the Monitoring Workplan will be submitted to the RWQCB by March 31, 2022. In addition, the CV-SNMP Agencies have prepared a request for proposal to implement the Development Workplan and expect to select a technical and stakeholder engagement consultant to conduct this work by early May of 2022.



Explanation

- Groundwater Replenishment Facility
- Streams
- Highway/road

Monitoring Agency Well

- Coachella Valley Water District
- Mission Springs Water District
- Mission Creek Subbasin
- Low permeability/non-water bearing sediments/bedrock

Note

Only wells with water quality for Water Year 2020- 2021 are shown.

0 4,000 8,000
Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016.

WATER SUPPLY WELLS WITH GROUNDWATER QUALITY DATA - WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: mww	Date: 1/4/2022	Project No.: CM19167353
wood.		Figure 8-4

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Section 9 – Summary of Projects and Management Actions and Description of Progress

This report section provides an update on Projects and Management Actions (PMAs) that are identified in the Mission Creek Subbasin Alternative Plan Update (2022 Alternative Plan Update [Wood and Kennedy Jenks, 2021]) and are currently being implemented and PMAs that will be implemented in the future, collectively referred to as Active Projects.

The 2022 Alternative Plan Update modified the designations for PMA categories to incorporate a more descriptive letter combination, listed below, followed by a sequential number (e.g., WC indicates a water conservation PMA and WC-1 is the first water conservation project listed).

- WC: Water Conservation
- WS: Water Supply
- WQ: Water Quality Protection, including Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) activities
- SGMA: Sustainable Groundwater Management Act (SGMA) Implementation
- WELL: Well Management

The following sections summarize PMAs in each of these categories and provide an update or description of progress, where relevant.

9.1 Water Conservation

Active water conservation activities have supported the water management achievements in the Mission Creek Subbasin and are important to continue. The ongoing and future water conservation projects include:

- Project WC-1: Continue to implement urban water conservation and education programs,
- Project WC-2: Track water conservation effectiveness through the Coachella Valley Regional Urban Water Management Plan (CV-RUWMP),
- Project WC-3: Regional conservation study, and
- Project WC-4: Implement water shortage contingency plans.

Project WC-1 and Project WC-2 summaries are combined as they are interrelated while Project WC-3 and Project WC-4 are standalone descriptions.

9.1.1 Project WC-1: Continue to Implement Urban Water Conservation and Education Programs and Project WC-2: Track Water Conservation Effectiveness Through the RUWMP

Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) were participants (along with Coachella Water Authority [CWA], Indio Water Authority [IWA], and Myomas Dunes Water Company) in the 2020 Coachella Valley RUWMP that provides detailed descriptions of each of the Agencies' water conservation programs (2020 CV-RUWMP [WSC, 2021]). The effectiveness of the water conservation efforts is documented in the Water Conservation Act of 2009 Senate Bill X7-7

(SB X7-7) compliance for each agency. In SB X7-7, the State set a goal of reducing urban water use by 20% by the year 2020. Each retail urban water supplier was required to determine its water use during a baseline period and establish water use targets for the years 2015 and 2020 to help the State achieve the 20% reduction. All the Agencies exceeded the 20% reduction from their baseline water use by achieving savings of 36% for CVWD, 32% for DWA, and 35% for MSWD.

As described in the 2020 CV-RUWMP, the Agencies continue to implement demand management measures (DMMs) to maintain these savings and to encourage additional conservation; these DMMs include:

- Water waste and landscape ordinances;
- Metering;
- Conservation pricing including water budget-based tiered billing;
- Public education and outreach including conservation kits, workshops/seminars on water use efficiency, water audits, and water waste patrols;
- Programs to assess and manage distribution system losses;
- Landscape conservation and incentive programs including irrigation system upgrades, grass replacement, drought tolerant landscape installations, and conservation demonstration gardens;
- Rebate programs for high efficiency appliances including toilets, washers, and dishwashers; and
- Staff support for water conservation activities.

The Agencies collaborate on regional conservation messaging through CV Water Counts (www.CVWaterCounts.com), originally funded with California Department of Water Resources (CDWR) Proposition 84 grant funding and currently sustained by local water agencies. The group has a web and social media presence in addition to an ongoing advertising campaign. The group also holds an annual Water Counts Academy to educate community members and leaders about key water issues. The Agencies continue to implement DMMs and will track effectiveness of water conservation efforts during future updates of the 2020 CV-RUWMP. Project WC-2 also includes tracking of new conservation standards that are currently under development and will include updates to conservation programs, if needed, to implement those standards.

9.1.2 Project WC-3: Regional Conservation Study

As a supplement to existing Projects WC-1 and WC-2, the Agencies have initiated planning to conduct a study specific to the unique climate, soil, and occupancy conditions of the Coachella Valley. Project WC-3: Regional conservation study, will take an econometric approach to estimating water savings for grass removal rebate programs and may be used to evaluate incentive amounts for residents and businesses.

The study will likely focus on outdoor irrigation to refine estimates of water savings per square foot if grass were replaced by alternative landscape such as artificial turf or desertscape. The water savings study will analyze information from ongoing programs and may include:

- Analysis of historical grass replacement rebate data from the Agencies from 2014-present including consideration of square foot grass replaced and water usage before and after the replacement;

- Validation of low-water use landscape maintenance by surveying customers and spot checking grass replacement sites;
- Consideration of customers that removed grass without receiving a rebate and/or replaced grass with private patios, side yards, and/or backyards;
- Potential for additional grass replacement among existing customers (i.e., percent saturation achieved by existing conservation programs); and
- Preparation of a report to document the analyses.

The Agencies continue to seek grant funding for this study. In 2021, the Agencies began developing a scope of work for the study and submitted the study concept to the University of California, Santa Barbara Bren School of Environmental Science & Management as a potential Master's group project. Once completed, the study can support more competitive water conservation implementation grant applications such as those funded by the United States Bureau of Reclamation and CDWR. Additional grant funding for implementation would support expansion of water conservation programs to serve more customers, result in increased water savings, and reduce groundwater pumping.

9.1.3 Project WC-4: Implement Water Shortage Contingency Plans

The 2020 CV-RUWMP that was adopted in 2021 includes standalone Water Shortage Contingency Plans (WSCPs) for each of the Agencies. The WSCPs contain Annual Water Supply and Demand Assessment procedures, defines six standard shortage levels from less than10% shortage up to greater than 50% shortage, and identifies shortage response actions including demand reduction actions and mandatory use restrictions and supply augmentation as well as communication protocols for implementing the WSCP. The WSCPs are another tool to be implemented by the Agencies. The Agencies have implemented Level 1 of their respective WSCPs.

9.2 Water Supply

Imported water is critical to groundwater sustainability in the Mission Creek Subbasin. CVWD and DWA continue to invest in long-term, statewide water projects and are working with Metropolitan Water District of Southern California (MWD) and the CDWR to improve the reliability of State Water Project (SWP) water and acquire additional supplies. Ongoing and future water supply projects are listed below and described in the sections that follow.

- Project WS-1: Continue existing imported water replenishment programs,
- Project WS-2: Recycled water for reuse in the Mission Creek Subbasin,
- Project WS-3: SWP-Delta Conveyance Facility (DCF),
- Project WS-4: SWP Lake Perris Dam Seepage Recovery Project, and
- Project WS-5: SWP- Sites Reservoir Delivery.

SWP supplies to the region are expected to increase by approximately 14,300 acre-feet (AF), along with increased SWP reliability of 26,500 acre-feet per year (AFY) following construction of the DCF. A portion of these supplies and increased SWP reliability will be provided to the Mission Creek Subbasin for groundwater replenishment.

9.2.1 Project WS-1: Continue Existing Imported Water Replenishment Program

CVWD and DWA both have authority to operate imported water replenishment in the Coachella Valley. Imported water replenishment operations will deliver as much imported water to the Coachella Valley as possible given the constraints of SWP contract and delivery and MWD Colorado River Aqueduct (CRA) operations. During Water Year (WY) 2020-2021, in addition to their Table A water, CVWD and DWA purchased 1,440 AF and 734 AF of water, respectively, for aquifer replenishment from the Yuba River Accord Dry Year Water Purchase Program (Yuba Accord).

CVWD and DWA intend to continue regular recharge activities at the Mission Creek Groundwater Replenishment Facility (GRF) to maintain sustainable groundwater levels.

CVWD, DWA, and MSWD periodically review local and imported water supply availability and needs as part of the routine Mission Creek Subbasin Management Committee (Management Committee) activities per the 2004 Settlement Agreement.

9.2.2 Project WS-2: Recycled Water for Reuse in Mission Creek Subbasin

Project WS-2 will be to plan, design and construct tertiary treatment at MSWD's Regional Water Reclamation Facility (RWRF) where the recycled water can be used for groundwater recharge or for non-potable reuse for irrigation of parks, golf courses, schools, resorts, homeowner's associations, agricultural uses, etc. Project WS-2 is directly related to Project WQ-1: Convert from septic to sewer in MSWD area and Project WQ-2: The project was bid and awarded in 2021, and construction began in early 2022. Implementation of Projects WQ-1 and WQ-2 will result in construction of wastewater treatment and evaporation/percolation ponds in the Garnet Hill Subarea of the Indio Subbasin.

As identified in the 2022 Alternative Plan Update, recharge of treated effluent in the Mission Creek Subbasin could be important to groundwater sustainability by returning treated wastewater that would otherwise be evaporated/percolated in the Garnet Hill Subarea. Project WS-2 may be implemented in phases with the need for initiation of additional planning in the near future. Project WS-2 also has the advantage of being a water supply project that could be implemented locally.

9.2.3 Project WS-3: SWP – Delta Conveyance Facility

The DCF project is led by CDWR to improve SWP reliability. CVWD and DWA agreed to continue to participate in the DCF and advance funds for planning costs during 2021 and 2022. In 2022, CVWD and DWA will consider advancing funds for the planning costs during 2023 and 2024. The DCF will modernize SWP conveyance facilities in the Delta and increase future long-term reliability. Existing natural channels currently used for SWP conveyance are vulnerable to earthquakes, sea level rise, and pumping restrictions. The DCF will construct and operate a new tunnel to bypass these vulnerable natural channels. The new facilities will convey water from the north Delta to the south Delta operating in coordination with the existing south Delta pumping facilities. The planning process for the proposed DCF is moving forward, and a Draft Environmental Impact Report is anticipated for public review in mid-2022.

9.2.4 Project WS-4: SWP – Lake Perris Dam Seepage Recovery Project

CVWD and DWA are participating in the Lake Perris Dam Seepage Recovery Project being led by the CDWR and MWD. This project will collect and distribute SWP water seeping under the Lake Perris Dam for delivery to MWD in addition to its current allocated Table A water. The project consists of installing an integrated recovery well system down gradient from the face of the Lake Perris Dam that would include up to six new seepage recovery wells and a conveyance pipeline connecting the wells to MWD's Colorado River Aqueduct (CRA). CVWD and DWA were invited to partner in the project with MWD, and the parties signed an agreement with CDWR in 2021 to fund environmental analysis, planning, and preliminary design. The project is estimated to recover approximately 7,500 AFY, with approximately 2,750 AFY for delivery to CVWD and DWA that will allocate a portion of this water to the Mission Creek Subbasin. This project is estimated to result in delivery of 233 AFY of water to the Mission Creek GRF in 2023 increasing to approximately 268 AFY by 2045. The project is proceeding as planned, and the Draft Environmental Impact Report was released in May 2021 for public comments.

9.2.5 Project WS-5: SWP – Sites Reservoir Delivery

The Sites Project Authority is developing the Sites Reservoir Delivery project to capture and store excess water from snowmelt and winter runoff from the Sacramento River for use during dry periods. The Sites Reservoir will be in the Sacramento Valley. The project is considered "off-stream," i.e., it will not dam or impede the Sacramento River or other streams. The Sites Reservoir will operate in conjunction with other California reservoirs to increase water supply reliability and resiliency. Project implementation will increase water storage capacity in Northern California by up to 15%. Water supply and storage capacity will be made available to water purveyors throughout California who want to purchase water supply from the Sites Reservoir Project. The project is in the early planning and permitting stages. The Sites Project Authority is currently negotiating agreements to secure funding and financing for design, construction, and operation of the project.

In 2019, CVWD and DWA entered into an agreement with the Sites Project Authority for the next phase of planning for the Sites Reservoir (Sites Project Authority 2019; 2020). In 2022, CVWD and DWA will consider continued investment in project planning costs via a Third Amendment to the 2019 Sites Reservoir Project Agreement. CVWD and DWA are participating members at 10,000 AFY (5.2%) and 6,500 AFY (3.4%) levels, respectively. Assuming a 30% conveyance loss, CVWD and DWA anticipate an average delivery of 11,550 AFY of Sites Reservoir water beginning in 2035. The portion of Sites Reservoir Project estimated to be delivered to MCSB is 1,124 AFY beginning in 2035. In WY 2020-2021, the final feasibility study for the project was issued by the United States Bureau of Reclamation, (USBR, 2021). The project was also awarded $13.7 million in the 2021 federal spending bill, authorized though the Water Infrastructure Improvements for the Nation (WIIN) Act.

9.3 Water Quality Protection

There is a broad suite of active water quality protection programs that are implemented by local agencies, as well as collaboratively in the Planning Area. Several of these projects are related to updating the CV-SNMP, including implementation of the CV-SNMP groundwater monitoring program, new wells for monitoring, and development of the CV-SNMP. Water Quality Protection projects include:

- Project WQ-1: Convert from septic to sewer in MSWD area,
- Project WQ-2: Construct RWRF with nitrogen removal,
- Project WQ-3: Track water quality regulatory actions,
- Project WQ-4: Well source assessment and protection coordination,
- Project WQ-5: Engage in planning processes to protect water quality,
- Project WQ-6: Educate public on groundwater quality issues,

- Project WQ-7: Implement CV-SNMP Development Workplan,
- Project WQ-8: Implement CV-SNMP Groundwater Monitoring Program Workplan,
- Project WQ-9: Install water quality monitoring wells, and
- Project WQ-10: Evaluate occurrence and risk of uranium migration.

The water quality protection projects are described below.

9.3.1 Project WQ-1: Convert from Septic to Sewer in MSWD Area

Project WQ-1 is MSWD's ongoing Groundwater Quality Protection Program (GQPP) to convert residences from septic to community sewers and wastewater treatment facilities. MSWD Assessment District (AD) 15 and AD-18 will support septic to sewer conversions by providing local funding to match with grant funding opportunities. MSWD has completed conversion of septic to sewer in five previous ADs to date. Design for planned conversions in AD-15 are expected to be constructed in 2022 with other completed designs planned for construction in 2023 and 2024. MSWD has other conversions in design to be constructed in future years.

9.3.2 Project WQ-2: Construct RWRF With Nitrogen Removal

In anticipation of meeting future treatment and recharge needs, MSWD has completed design, bidding, and award of construction of the RWRF (Project WQ-2), which will treat wastewater flows to secondary levels including nitrification and denitrification. Located in the Garnet Hill Subarea of the Indio Subbasin, the RWRF will divert some wastewater flows from existing wastewater treatment plants in the Mission Creek Subbasin that are nearing capacity. The RWRF will have an initial capacity of 1.5 million gallons per day (mgd). The project was bid and awarded in 2021 and construction began in March 2022. The RWRF will start receiving flow in 2023 and is projected to reach 1.5 mgd treatment capacity by approximately 2030. The RWRF is designed to be readily expanded to 3.0 mgd capacity by converting from a sequence batch reactor treatment process to a membrane bioreactor treatment process within the same footprint. Wastewater flows will be from existing sewered customers and from the septic to sewer conversions in the Desert Hot Springs Subbasin, Mission Creek Subbasin, and Garnet Hill Subarea of the Indio Subbasin.

Treated wastewater will be discharged to evaporation/percolation ponds in the Garnet Hill Subarea and will show measurable reduction in nitrogen in the effluent water quality samples in comparison to the existing septic system dischargers. The benefits of a treated RWRF effluent rather than septic discharges are reduced contributions of nitrates and ammonia to the aquifer, which results in improved groundwater quality. Upon completion of the RWRF construction, treated effluent from Project WQ-2 can be conveyed and reused in Project WS-2 with construction of additional treatment, recycled water distribution systems, and groundwater recharge facilities.

9.3.3 Project WQ-3: Track Water Quality Regulatory Actions

State Water Resources Control Board – Division of Drinking Water (SWRCB-DDW) and United States Environmental Protection Agency (USEPA) periodically update drinking water constituent lists for potential regulation. These updated lists need to be tracked and shared as they could affect the ability of CVWD, DWA, and MSWD to comply with drinking water regulations. This PMA continues the ongoing effort to track potential regulatory actions of SWRCB-DDW and USEPA and to share information during Management Committee meetings. As water quality can vary across the Planning Area, each agency will evaluate its data to assess the impact of regulations within its boundaries. This is an ongoing activity with no specific updates in WY 2020-2021.

9.3.4 Project WQ-4: Well Source Assessment and Protection Coordination

Project WQ-4 provides information for source water assessment and wellhead protection to protect sources of drinking water. Information includes potential for contaminating activities that may impact both individual wells and managed and natural recharge areas. Potential contaminating activities can include spills, landfills, and underground tank leaks which are regulated by the Riverside County Department of Environmental Health (RCDEH), the Colorado River Basin Regional Water Quality Control Board (RWQCB), and/or California Department of Toxic Substance Control. The Agencies will continue to coordinate as necessary with the appropriate regulatory agencies that are responsible for monitoring and regulating potentially contaminating activities, especially if the activity occurs within well capture zones and/or principal recharge zones. Information gathered can be shared during Management Committee meetings and appropriate follow-up actions discussed and pursued. This is an ongoing activity with no specific updates in WY 2020-2021.

9.3.5 Project WQ-5: Engage in Planning Processes to Protect Water Quality

Project WQ-5 involves assessing development proposals during the entitlement process for potential water quality and other impacts. This activity is the responsibility of each agency. Agencies are notified of new projects in the incorporated cities of Desert Hot Springs and Palm Springs and unincorporated Riverside County through receipt of the notice of preparation of environmental documents, requests for water supply assessments for larger developments, and other means. Agencies can review and comment on the documents and identify water quality and other potential impacts to the Mission Creek Subbasin. This is an ongoing activity with no specific updates in WY 2020-2021.

9.3.6 Project WQ-6: Educate Public on Groundwater Quality Issues

Project WQ-6 provides public education on groundwater quality. This project is ongoing through participation in the Groundwater Guardian program, a community educational program developed by the non-profit Groundwater Foundation. Other ongoing planning activities such as the CV-SNMP, Coachella Valley Integrated Regional Water Management Plan, and CV Water Counts provide opportunities for additional public education regarding groundwater quality. There are no specific updates for this project in WY 2020-2021.

9.3.7 Project WQ-7: Implement CV-SNMP Development Workplan

In 2015, the CV-SNMP was developed for the Coachella Valley Groundwater Basin in accordance with the Recycled Water Policy. The CV-SNMP was prepared to manage salts and nutrients on a Subbasin-wide basis, while encouraging recycled water use. However, the RWQCB made recommendations for improvements to the CV-SNMP in 2020. In 2020 and 2021, the CV-SNMP Agencies – which include CVWD, CWA/Coachella Sanitary District, City of Palm Springs, DWA, IWA, MSWD, Myoma Dunes Mutual Water Company, and Valley Sanitary District – prepared a CV-SNMP Development Workplan (Development Workplan), which is the focus of this project, and a CV-SNMP Groundwater Monitoring Program Workplan (Monitoring Workplan), which is Project WQ-8, to guide revisions to the plan.

The CV-SNMP Agencies submitted the Development Workplan to the RWQCB in September 2021 and it was approved by the RWQCB in October 2021. The goal of the Development Workplan was to outline the steps necessary to revise the 2015 CV-SNMP considering RWQCB review comments and in accordance with the 2018 Recycled Water Policy.

CVWD, DWA, and MSWD, along with the other CV-SNMP Agencies, will implement the Development Workplan. which includes conducting public outreach and creating a technical advisory committee, characterizing current groundwater quality and salt loading, developing nitrogen/total dissolved solids (N/TDS) forecasting methodologies, completing forecasting for multiple scenarios, selecting a preferred scenario, establishing management zones, and recommending TDS objectives. The implementation schedule for the Development Workplan concludes with a final CV-SNMP submitted to the RWQCB in October 2026. Development Workplan implementation will begin in 2022. A Request for Proposals from qualified technical and stakeholder engagement consultants to update the CV-SNMP was released in January 2022. It is expected that the Development Workplan will commence in May 2022.

9.3.8 Project WQ-8: Implement CV-SNMP Groundwater Monitoring Program Workplan

With the other CV-SNMP Agencies, CVWD, DWA, and MSWD are implementing the Monitoring Workplan approved by the RWQCB in February 2021. The Monitoring Workplan outlines an expanded groundwater monitoring program to sufficiently characterize nitrogen and TDS concentrations in groundwater. The Monitoring Workplan covers all subbasins within the Coachella Valley Groundwater Basin, including Mission Creek Subbasin; includes sampling from the deep, shallow, and perched zones of the aquifer; focuses on critical areas near large water reclamation plants, Groundwater Replenishment Facilities (GRFs), and other potential sources of salt and nutrient loading; and emphasizes areas near production wells. The Monitoring Workplan establishes the monitoring network, sampling frequency, and reporting of monitoring results, and identifies data gaps to be filled in the monitoring network. Efforts to install water quality monitoring wells under this workplan are described in Project WQ-9. Monitoring data for 2021 and progress toward filling data gaps will be reported to the RWQCB and to the State Water Resource Control Board’s Groundwater Ambient Monitoring and Assessment (GAMA) system annually starting in 2022. The first progress report for the Monitoring Workplan will be submitted to the RWQCB by March 31, 2022.

9.3.9 Project WQ-9: Install Water Quality Monitoring Wells

The CV-SNMP Groundwater Monitoring Workplan identified locations in the Coachella Valley Groundwater Basin, including Mission Creek Subbasin, at which monitoring wells will be constructed and sampled to address data gaps. Wells will be constructed in accordance with the schedule provided in the Monitoring Workplan to support water quality data collection. The schedule requires that wells be installed so that at least one sample is collected from each well by December 31, 2026. The Agencies received preliminary approval from Riverside County Flood Control and Water Conservation District for an easement to locate a proposed Mission Creek Subbasin monitoring well upstream of the Mission Creek GRF. CVWD, on behalf of the Agencies, has submitted a general application to the CDWR Technical Support Services (TSS). After this general application is approved, CVWD will submit an individual application to the CDWR TSS to construct this and other wells needed to fill CV-SNMP data gaps.

9.3.10 Project WQ-10: Evaluate Occurrence and Risk of Uranium Migration

MSWD plans to initiate a study in the near term to evaluate the potential sources and migration risk of uranium. The study is also intended to evaluate whether the uranium source is associated with specific alluvial sediments so that future wells can be designed to avoid those sediments if necessary. There are no specific updates for this project in WY 2020-2021.

9.4 SGMA Implementation

SGMA implementation will require continuing a range of monitoring, data management and reporting activities that have been an integral part of water management since the preparation of the 2013 Mission Creek-Garnet Hill Water Management Plan (2013 MC-GH WMP). The SGMA Implementation projects are:

- Project SGMA-1: Continue existing subbasin Management Committee structure,
- Project SGMA-2: Conduct subsidence evaluation,
- Project SGMA-3: Maintain and manage water related data,
- Project SGMA-4: SGMA Annual Reports,
- Project SGMA-5: Five-Year Alternative Plan Updates, and
- Project SGMA-6: Pursue funding opportunities.

The projects below are either required by the SGMA or otherwise support meeting SGMA requirements.

9.4.1 Project SGMA-1: Continue Existing Subbasin Management Committee Structure

This project was initiated during the preparation of the 2013 MC-GH WMP and satisfies CDWR's guidelines for a groundwater management planning committee. The Management Committee is a requirement of the 2004 Settlement Agreement and meetings between General Managers and staff occur quarterly. In addition, staff have periodic coordination meetings for items like Alternative Plan Updates, Annual Reports, or other relevant topics that may arise and will meet at least once per year to specifically discuss the Annual Report. In WY 2020-2021, the Management Committee met quarterly, and staff held regular coordination meetings to discuss the Alternative Plan Update and Annual Report.

9.4.2 Project SGMA-2: Conduct Subsidence Evaluation

The Agencies have engaged the United States Geological Survey (USGS) to conduct a more detailed evaluation of the potential for subsidence in the Mission Creek Subbasin. As part of this evaluation, the Agencies provided USGS groundwater level data in December 2021. If this initial evaluation identifies subsidence as a potential issue, the USGS will develop a subsidence monitoring workplan for the Mission Creek Subbasin and conduct ground surface monitoring.

9.4.3 Project SGMA-3: Maintain and Manage Water Related Data

Each agency maintains a broad range of groundwater information such as groundwater pumping, water levels, and water quality. Project SGMA-3 continues the Agencies' current practice of compiling and validating this information. The data will be used to evaluate groundwater management needs such as trends relative to Sustainable Management Criteria including water levels, basin storage, subsidence, and water quality to be reported in Project SGMA-4: SGMA Annual Reports and Project SGMA-5: Five-Year Alternative Plan Updates. This is an ongoing activity with no specific updates in WY 2020-2021.

9.4.4 Project SGMA-4: SGMA Annual Reports

The Management Committee will prepare and submit an Annual Report to CDWR by the April 1 deadline each year. The Annual Report is a comprehensive evaluation of water data that have been collected by each agency, per Project SGMA-3: Maintain and manage water related data. Annual reports are required to include the following components for the preceding water year:

- General information, including an executive summary and a location map depicting the basin covered by the report.
- A detailed description and graphical representation of the following conditions of the basin: groundwater elevation contour maps for each aquifer showing seasonal highs and low water levels; hydrographs of groundwater elevations; groundwater extraction by water use sector that identifies the method of measurement, accuracy of measurement and a map that illustrates the general location and volume of groundwater extractions; surface water supply used or available for use, for groundwater recharge or in-lieu use; total water use reported by water used sector, and water source type; change in groundwater storage map for each principal aquifer; and a graph depicting water year type groundwater use, annual change in groundwater storage, and the cumulative change in groundwater storage for the basin based on historical data.
- A description of progress towards implementing the Alternative Plan, including achieving interim milestones, and implementation of PMAs since the previous annual report.

9.4.5 Project SGMA-5: Five-Year Alternative Plan Updates

The 2013 MC-GH WMP identified the need for periodic review and update of the water management plan. As required by the SGMA, the Alternative Plan Update (in this section also referred to as the "Plan") will be reviewed every five years to assess changing conditions in the Mission Creek Subbasin that may warrant modification of the Plan or management objectives.

The Alternative Plan Updates will evaluate groundwater conditions and the status of PMAs to determine whether the Sustainable Management Criteria and management objectives are meeting the sustainability goals of the Mission Creek Subbasin. In addition to meeting SGMA requirements, the Agencies identified some other key areas requiring periodic review including evaluation of demand projections, imported water supply reliability, and update of the groundwater model and model forecasts. The first 5-year Alternative Plan Update was completed in November 2021 and was submitted to CDWR in December 2021. The next 5-year Alternative Plan Update is due to CDWR on January 1, 2027.

9.4.6 Project SGMA-6: Pursue Funding Opportunities

Development of the 2022 Alternative Plan Update was partially funded through a Proposition 68 Sustainable Groundwater Management Grant. Costs of overall Plan implementation are expected to be shared by the Agencies through the 2009 Memorandum of Understanding among CVWD, DWA, and MSWD, to prepare the 2013 MC-GH WMP and develop a groundwater model of the Mission Creek Subbasin and Garnet Hill Subarea of the Indio Subbasin, individual agency contributions, and/or new cost-sharing agreements yet to be developed. However, there will be a need to seek funding opportunities to support PMAs and ongoing implementation.

Outside grants will be sought to reduce the cost of implementation to participating agencies and the communities that rely on the Mission Creek Subbasin. Financing options under consideration include loans and grants for projects and management actions, as well as monitoring network improvements and other planning/feasibility analysis needed to support Plan implementation. Funding through grants or loans has varying levels of certainty and may be available for some implementation activities (including capital projects). The potential sources of loans and grants include:

- Sustainable Groundwater Management Grant Program administered by CDWR. The Round 2 solicitation, anticipated in 2022, includes approximately $77 million of grant funding for implementation projects that address drought and groundwater challenges, prevent or clean up contaminated groundwater, support supply reliability, and support water banking, exchange, or reclamation.
- Technical Support Services for Groundwater Sustainability Plans administered by CDWR. Technical Support Services provides funding for field activities (monitoring well installation, geologic logging, etc.), modeling, and mapping to provide education, data, and tools to GSAs.
- Clean Water State Revolving Fund and Drinking Water State Revolving Fund loan programs administered by SWRCB. The loan programs provide low-interest loans (typically half of the General Obligation Bond Rate) for drinking water treatment and infrastructure, water recycling, wastewater treatment, and sewer collection projects. Applications are submitted continually and are considered for a fundable list approved by the SWRCB for each fiscal year.
- Water Recycling Funding Program – Planning and Construction Grants from SWRCB. The Planning grants (for facilities planning) are available and can fund 50% of eligible costs, up to $150,000. Construction grants for recycled water have been periodically exhausted but are typically restored with new water bond funding.
- Infrastructure State Revolving Fund Loan Program administered by the California Infrastructure and Economic Development Bank (I-Bank), which are low interest loans of up to $25 million per applicant and considered on a rolling basis.
- Title XVI Water Recycling and Reclamation / Water Infrastructure Improvements for the Nation Program – Construction Grants administered by the United States Bureau of Reclamation (USBR). USBR administers a recycled water funding program that provides grants up to 25% of project costs or $20 million, whichever is less. A Title XVI Feasibility Study must be submitted to and approved by USBR to be eligible. USBR solicits grants annually.
- WaterSMART Title XVI Water Recycling and Reclamation Program – Feasibility Study Grants administered by USBR. USBR has previously funded grants of up to $150,000 for preparation of Title XVI Feasibility Studies. It is possible future rounds may be available.
- Integrated Regional Water Management (IRWM) implementation grants administered by CDWR. The Coachella Valley IRWM Region can pursue grant funding through the IRWM Implementation Grant Program. The Coachella Valley IRWM Region falls within the Colorado River Funding Area (Funding Area). The Colorado River Funding Area was allocated $22.5 million in funding through Proposition 1. Of that, roughly $7.9 million was awarded to the Funding Area during the Round 1 solicitation. The remaining funding is anticipated to be distributed during the Round 2 solicitation, which is expected in late 2022.
- Proposition 68 grant programs administered by various state agencies. Grant programs funded through Proposition 68, which was passed by California voters in 2018, and administered by

various state agencies are expected to be applicable to fund SGMA implementation activities. These grant programs are expected to be competitive, where $74 million has been set aside for Groundwater Sustainability statewide.

9.5 Well Management

Well management activities will facilitate maintaining water quality in the Mission Creek Subbasin in addition to improving data collection regarding well locations and pumping. The well management projects are:

- Project WELL-1: Well construction, abandonment, and destruction management;
- Project WELL-2: Subbasin well inventory; and
- Project WELL-3: Expand groundwater production reporting.

These projects are described below.

9.5.1 Project WELL-1: Well Construction, Abandonment, and Destruction Management

This project is an important management tool as RCDEH has regulatory authority over well construction and destruction. RCDEH has a permitting process for new or replacement wells in the Mission Creek Subbasin which are encompassed in Riverside County Ordinance 682.4. In addition, both the Riverside County General Plan and the City of Desert Hot Springs General Plan include policies related to wellhead protection and sustainable groundwater pumping. The Agencies will continue to work with RCDEH so that any new wells are constructed to current standards, artesian flow management policies are followed, and any existing wells that could be negatively impacting groundwater quality are retrofit, properly capped, or destroyed. In addition, this coordination will allow for opportunities to communicate with permitting agencies regarding groundwater levels to help ensure that future wells are screened below minimum thresholds. This is an ongoing activity with no specific updates in WY 2020-2021.

9.5.2 Project WELL-2: Subbasin Well Inventory

The Mission Creek Subbasin has a well inventory that has been compiled by CVWD and DWA to implement the Replenishment Assessment Charge (RAC) Programs for assessable groundwater production. CVWD levies and collects the RAC from groundwater producers that benefit from the Groundwater Replenishment Programs (GRPs) and extract more than 25 AFY within the CVWD Mission Creek Subbasin Area of Benefit (AOB). DWA levies and collects the RAC from groundwater producers that benefit from the GRPs and extract more than 10 AFY within DWA's Mission Creek Subbasin AOB. However, data on minimal pumpers who do not meet these criteria are incomplete. It is unclear how many wells producing less than the RAC criteria exist, and approximations of unreported production are best estimates.

The Agencies may develop a well inventory for the Mission Creek Subbasin that will identify and compile information about all production wells located in the Mission Creek Subbasin. CVWD is evaluating this effort, with DWA participating at its discretion. The well inventory would involve development of a well registry. The well inventory would support any expansion or refinement of the monitoring network, allow improvement of groundwater extraction estimates, and improve the understanding of how private wells may affect Mission Creek Subbasin conditions and how Mission Creek Subbasin management may affect private wells. Compilation of the well inventory may include the following:

- Review and organize data management systems to incorporate well inventory component;
- Gather water well drillers' reports with well construction information;
- Coordinate with well owners to identify wells and obtain relevant information on location, construction, use, status, and monitoring, if any;
- Conduct as-needed field visits to verify well location, use, and status; and
- Input well inventory information into the data management system.

The Agencies will collaborate with CDWR, local agencies, water users, landowners, and leaseholders to identify and locate wells and compile information on construction, status, and use. This is an ongoing activity with no specific updates in WY 2020-2021.

9.5.3 Project WELL-3: Expand Groundwater Production Reporting

SGMA (Section 10725.8) authorizes GSAs to require that the use of every groundwater extraction facility (production well) be measured with a water-measuring device (meter) except for de minimis extractors (domestic users extracting 2 AFY or less). Both CVWD and DWA already require metering and extraction reporting by groundwater producers pumping more than 25 and 10 AFY, respectively, based on their respective water management authorities. CVWD and DWA separately author an Engineer's Report on Water Supply and Replenishment Assessment annually to assess the groundwater supply conditions and the need for continued replenishment within their AOBs, to provide a description of the current GRF operations, and to recommend adjustments to the RACs that are levied on groundwater production (see CVWD's website: https://cvwd.org/Archive.aspx?AMID=43 and DWA's website: https://dwa.org/about-us/documents/library/).

CVWD and DWA may consider expansion of groundwater extraction reporting to include groundwater pumpers that produce less than the current assessment thresholds but more than the de minimis threshold established by the SGMA. CVWD would evaluate this effort with a Cost-of-Service Study for a SGMA fee within its AOB; DWA may require reporting within their service areas at their discretion. This project remains under consideration as of WY 2020-2021.

9.6 Summary of Active Projects

The sections above describe PMAs identified in the 2022 Alternative Plan Update that are currently being implemented (ongoing) or PMAs that will be implemented in the future (collectively Active PMAs). **Table 9-1** provides a summary of the Active PMAs and any updates that occurred in WY 2020-2021.

Table 9-1
Summary of Active Projects

Project No.	Ongoing/Planned	Project/Program	Project/Program Description and Update for WY 2020-2021
Water Conservation (WC)			
WC-1	Ongoing	Continue to implement urban water conservation and education programs	The Agencies continued education and outreach to encourage water use efficiency by urban water users, indoor and outdoor incentive programs, ordinances and conservation pricing, water loss management, and conservation staff support. In WY 2020-2021, Agencies increased messaging regarding drought water efficiency and are in the process of expanding a demonstration garden.
WC-2	Ongoing	Track water conservation effectiveness through the Urban Water Management Plans (UWMPs)	CVWD, DWA and MSWD continued to track the effectiveness of their urban water conservation programs and the progress towards achieving their water conservation goals in the UWMPs prepared at 5-year intervals. Tracking includes documentation of conservation efforts relative to SB X7-7 goal of reducing urban water use by 20% by the year 2020. All the Agencies exceeded the 20% reduction goal from their baseline water use by achieving savings of 36% for CVWD, 32% for DWA, and 35% for MSWD.
WC-3	Planned	Regional water savings study	Agencies continued progress toward a regional conservation study specific to the conditions of Coachella Valley. In 2021, the agencies applied for technical support from two different entities and reviewed grant opportunities to fund the project. Coachella Valley Regional Water Management Group Agencies began developing the scope of work and submitted the study concept to the University of California, Santa Barbara Bren School of Environmental Science & Management as a potential Master's group project.

Project No.	Ongoing/Planned	Project/Program	Project/Program Description and Update for WY 2020-2021
WC-4	Ongoing	Implement Water Shortage Contingency Plan	Agencies adopted and implemented WSCPs in 2021. The Agencies are all in Level 1 of their respective WSCPs. Agencies continued to monitor water supplies and operational changes that could result in water shortages.
Water Supply (WS) Including Reliability and New Supply Development			
WS-1	Ongoing	Continue existing imported water replenishment program	CVWD and DWA to continue recharge activities at the Mission Creek GRF with SWP Exchange water. Recharge of 427 AF of replenishment water occurred in WY 2020-2021.
WS-2	Planned	Recycled water for reuse in Mission Creek Subbasin	Initiated construction of the RWRF in WY 2020-2021.
WS-3	Planned	State Water Project (SWP) – Delta Conveyance Facility	CVWD and DWA continued to participate in DCF to improve SWP reliability. CDWR and Delta Conveyance Design and Construction Authority began preparing public draft Environmental Impact Report (EIR) and began application processes for Incidental Take Permit and Biological Assessment.
WS-4	Planned	SWP – Lake Perris Dam Seepage Recovery Project	CVWD and DWA continued to participate in the Lake Perris Dam Seepage Recovery to pump seepage from the lake into a MWD collection pipeline discharging into MWD's Colorado River Aqueduct. CDWR and MWD completed final EIR and geological investigations and began final design. CVWD Board approved entering agreement with CDWR for participation in Environmental Analysis and Planning and Preliminary Design.
WS-5	Planned	SWP – Sites Reservoir Delivery	CVWD and DWA continued to participation in Sites Reservoir, a SWP project to capture and store stormwater flows from the Sacramento River for release in dry years. Sites Project Authority led preparation of public draft EIR, and began application processes for

Project No.	Ongoing/Planned	Project/Program	Project/Program Description and Update for WY 2020-2021
			Water Rights, Clean Water Act, Incidental Take Permit, Biological Assessment, Section 106 Programmatic Agreement.
Water Quality Protection (WQ)			
WQ-1	Ongoing	Convert from septic to sewer in MSWD's service area	Continued septic to sewer conversions within MSWD service area as a part of wastewater and groundwater management.
WQ-2	Construction completion in 2023	Construct Regional Water Reclamation Facility (RWRF) with nitrogen removal	Began planning for construction in WY 2020-2021. Construction began in early 2022.
WQ-3	Ongoing	Track water quality regulatory actions	Agencies continued to track potential regulatory actions of SWRCB-DDW and USEPA that could affect ability to comply with drinking water regulations.
WQ-4	Ongoing	Well source assessment and protection coordination	Agencies continued to coordinate with the appropriate local, state, and federal regulatory agencies regarding potentially contaminating activities within well capture zones and principal recharge zones.
WQ-5	Ongoing	Engage in planning processes to protect water quality	Agencies continued to review and comment (or capability to review and comment if needed) on proposed land developments, environmental documents and land use plans developed by local planning agencies.
WQ-6	Ongoing	Educate public on groundwater quality issues	Continued to support the Groundwater Guardian program, a community educational program developed by the non-profit Groundwater Foundation.

Project No.	Ongoing/Planned	Project/Program	Project/Program Description and Update for WY 2020-2021
WQ: Salt and Nutrient Management Planning			
WQ-7	Ongoing: completion in October 2026	Participate in Implementation of CV-SNMP Development Workplan	Request for Proposals from qualified technical and stakeholder engagement consultants was prepared in WY 2020- 2021 and released in January 2022.
WQ-8	Ongoing	Implement CV-SNMP Groundwater Monitoring Program Workplan	Implementation of the CV-SNMP Groundwater Monitoring Program Workplan began in 2021 with data collection tasks and siting study for new wells addressing data gaps. The first annual progress report will be submitted to the RWQCB in March 2022.
WQ-9	Ongoing	Install water quality monitoring wells	CVWD, on behalf of the Agencies, has submitted a general application to the CDWR Technical Support Services (TSS). After this general application is approved, CVWD will submit an individual application to the CDWR TSS to construct proposed water quality monitoring wells in the Mission Creek Subbasin.
SGMA Implementation (SGMA)			
SGMA-1	Ongoing	Continue existing subbasin management committee structure	The Agencies continued to maintain the existing Mission Creek Subbasin Management Committee structure.
SGMA-2	Ongoing	Conduct subsidence evaluation	The Agencies continue working with USGS on a multi-phase subsidence monitoring program. The Agencies provided USGS groundwater level data in WY 2020-2021.
SGMA-3	Ongoing	Maintain and manage water related data	The Agencies continued to maintain existing agency-specific data management systems to be combined annually to prepare SGMA Annual Reports.
SGMA-4	Ongoing	SGMA Annual Reports	The Agencies assembled, processed, and evaluated water data for the Mission Creek Subbasin Annual Report for SGMA compliance for WY 2020-2021.

Project No.	Ongoing/Planned	Project/Program	Project/Program Description and Update for WY 2020-2021
SGMA-5	Ongoing: due January 1, 2027	Five-Year Alternative Plan Updates	The Agencies prepared the first five-year Alternative Plan Update in WY 2020-2021. The next Alternative Plan Update is due to CDWR on January 1, 2027.
SGMA-6	Ongoing	Pursue funding opportunities	The Agencies continued to identify and will pursue funding opportunities for PMAs as applications become available.
Well Management (WELL)			
WELL-1	Ongoing	Well construction, abandonment, and destruction management	Agencies continued cooperative efforts with RCDEH regarding well management programs.
WELL-2	Ongoing	Subbasin Well Inventory	The Agencies continued to develop a well inventory system.
WELL-3	Ongoing	Expand Groundwater Production Reporting	The Agencies continued to consider expansion of requirements for reporting of groundwater extraction to any pumpers that extracts more than the de minimis user threshold of 2 AFY or less established by SGMA.

9.7 Summary of Progress

The Agencies continue to implement the goals and programs of the 2022 Alternative Plan Update and have made significant progress in maintaining the sustainability of groundwater supplies in the Mission Creek Subbasin. For WY 2020-2021, groundwater production was approximately 15 percent less than the historical highs in the mid-2000s. The results of the ongoing basin monitoring program demonstrate that long-term overdraft (i.e., the average overdraft over a generally 10-year period or more) in the Mission Creek Subbasin has been eliminated. Since 2009, the Mission Creek Subbasin has gained more than 12,000 AF of groundwater in storage.

Groundwater level monitoring demonstrates increasing groundwater levels since 2009 in most of the Mission Creek Subbasin. The rise in groundwater levels and resulting increase in groundwater storage is due to the continued implementation of the water management elements described above, including delivery of imported water for groundwater replenishment. All but one of the Key Wells were higher than the Measurable Objective (i.e., maintaining water levels at or above 2009 levels) for the water level sustainability criteria identified in the 2022 Alternative Plan Update, and consequently, substantially above the Minimum Thresholds. The well with a water level below the Measurable Objective was just slightly below the objective (0.6 feet below). Maintaining water levels above the sustainability criteria also resulted in maintaining groundwater storage above its Measurable Objective and Minimum Threshold. Monitoring of ground levels continued to confirm that subsidence is not occurring the Mission Creek Subbasin and a review of water quality data for the water year did not indicate any water quality exceedances above the Minimum Thresholds.

Continued implementation of the 2022 Alternative Plan Update is critical to meeting the goals of the Plan. The Agencies will also continue to evaluate the effectiveness of their groundwater monitoring program, and additional wells will be added to the program as the need and opportunity arise. The Agencies will continue to gather information on the potential for subsidence in the Mission Creek Subbasin and update the sustainability criteria for this Sustainability Indicator, if needed. In addition, the CV-SNMP development will include information gathering and analyses that will enhance the regional understanding of water quality in the Mission Creek Subbasin.

Section 10 – References

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Appendix A

Groundwater Elevation Data WY 2010-2011,

WY 2019-2020, and WY 2020-2021

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E21H001S	Other	DWA	10/22/2010	1449.84	360.89	1088.95	2011
02S04E21H001S	Other	DWA	11/23/2010	1449.84	347.42	1102.42	2011
02S04E21H001S	Other	DWA	12/22/2010	1449.84	333.95	1115.89	2011
02S04E21H001S	Other	DWA	1/7/2011	1449.84	320.5	1129.34	2011
02S04E21H001S	Other	DWA	2/22/2011	1449.84	329.58	1120.26	2011
02S04E21H001S	Other	DWA	3/31/2011	1449.84	333.4	1116.44	2011
02S04E21H001S	Other	DWA	4/25/2011	1449.84	325.91	1123.93	2011
02S04E21H001S	Other	DWA	5/31/2011	1449.84	306.75	1143.09	2011
02S04E21H001S	Other	DWA	6/30/2011	1449.84	290.75	1159.09	2011
02S04E21H001S	Other	DWA	7/25/2011	1449.84	284	1165.84	2011
02S04E21H001S	Other	DWA	8/18/2011	1449.84	276	1173.84	2011
02S04E21H001S	Other	DWA	8/23/2011	1449.84	278	1171.84	2011
02S04E21H001S	Other	DWA	9/22/2011	1449.84	279	1170.84	2011
02S04E21H001S	Other	DWA	10/22/2019	1449.84	474.5	975.34	2020
02S04E21H001S	Other	DWA	11/18/2019	1449.84	470	979.84	2020
02S04E21H001S	Other	DWA	1/9/2020	1449.84	472.3	977.54	2020
02S04E21H001S	Other	DWA	2/28/2020	1449.84	472.83	977.01	2020
02S04E21H001S	Other	DWA	3/30/2020	1449.84	478.44	971.4	2020
02S04E21H001S	Other	DWA	5/1/2020	1449.84	480	969.84	2020
02S04E21H001S	Other	DWA	5/27/2020	1449.84	477.3	972.54	2020
02S04E21H001S	Other	DWA	6/30/2020	1449.84	483.24	966.6	2020
02S04E21H001S	Other	DWA	7/20/2020	1449.84	484.75	965.09	2020
02S04E21H001S	Other	DWA	8/20/2020	1449.84	485.5	964.34	2020
02S04E21H001S	Other	DWA	9/15/2020	1449.84	482.8	967.04	2020
02S04E21H001S	Other	DWA	10/26/2020	1449.84	485.16	964.68	2021
02S04E21H001S	Other	DWA	11/17/2020	1449.84	483	966.84	2021
02S04E21H001S	Other	DWA	12/15/2020	1449.84	481.8	968.04	2021
02S04E21H001S	Other	DWA	1/25/2021	1449.84	480.4	969.44	2021
02S04E21H001S	Other	DWA	2/23/2021	1449.84	481.4	968.44	2021
02S04E21H001S	Other	DWA	3/29/2021	1449.84	482.3	967.54	2021
02S04E21H001S	Other	DWA	4/28/2021	1449.84	488.46	961.38	2021
02S04E21H001S	Other	DWA	5/25/2021	1449.84	485.3	964.54	2021
02S04E21H001S	Other	DWA	6/23/2021	1449.84	486.5	963.34	2021
02S04E21H001S	Other	DWA	7/27/2021	1449.84	487.4	962.44	2021
02S04E21H001S	Other	DWA	8/24/2021	1449.84	488.35	961.49	2021
02S04E21H001S	Other	DWA	9/27/2021	1449.84	489.16	960.68	2021
02S04E23N002S	Key Well	MSWD	10/6/2010	1284.55	565.97	718.58	2011
02S04E23N002S	Key Well	MSWD	11/4/2010	1284.55	564.91	719.64	2011
02S04E23N002S	Key Well	MSWD	12/1/2010	1284.55	562.41	722.14	2011
02S04E23N002S	Key Well	MSWD	1/6/2011	1284.55	559.66	724.89	2011
02S04E23N002S	Key Well	MSWD	2/2/2011	1284.55	557.38	727.17	2011
02S04E23N002S	Key Well	MSWD	3/1/2011	1284.55	554.81	729.74	2011
02S04E23N002S	Key Well	MSWD	4/4/2011	1284.55	551.86	732.69	2011
02S04E23N002S	Key Well	MSWD	5/3/2011	1284.55	551.05	733.5	2011
02S04E23N002S	Key Well	MSWD	6/6/2011	1284.55	549.15	735.4	2011
02S04E23N002S	Key Well	MSWD	6/28/2011	1284.55	547.86	736.69	2011
02S04E23N002S	Key Well	MSWD	8/10/2011	1284.55	545.53	739.02	2011
02S04E23N002S	Key Well	MSWD	9/6/2011	1284.55	543.47	741.08	2011

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021
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State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E23N002S	Key Well	MSWD	2/18/2020	1284.55	553.44	731.11	2020
02S04E23N002S	Key Well	MSWD	3/27/2020	1284.55	553.17	731.38	2020
02S04E23N002S	Key Well	MSWD	4/21/2020	1284.55	553.4	731.15	2020
02S04E23N002S	Key Well	MSWD	5/20/2020	1284.55	554.11	730.44	2020
02S04E23N002S	Key Well	MSWD	6/1/2020	1284.55	554.3	730.25	2020
02S04E23N002S	Key Well	MSWD	7/1/2020	1284.55	554.7	729.85	2020
02S04E23N002S	Key Well	MSWD	8/31/2020	1284.55	555.41	729.14	2020
02S04E23N002S	Key Well	MSWD	9/2/2020	1284.55	555.68	728.87	2020
02S04E23N002S	Key Well	MSWD	10/6/2020	1284.55	555.41	729.14	2021
02S04E23N002S	Key Well	MSWD	11/3/2020	1284.55	555.94	728.61	2021
02S04E23N002S	Key Well	MSWD	12/1/2020	1284.55	555.92	728.63	2021
02S04E23N002S	Key Well	MSWD	1/11/2021	1284.55	555.57	728.98	2021
02S04E23N002S	Key Well	MSWD	2/12/2021	1284.55	555.57	728.98	2021
02S04E23N002S	Key Well	MSWD	3/2/2021	1284.55	555.71	728.84	2021
02S04E23N002S	Key Well	MSWD	4/7/2021	1284.55	556.38	728.17	2021
02S04E23N002S	Key Well	MSWD	5/5/2021	1284.55	556.66	727.89	2021
02S04E23N002S	Key Well	MSWD	6/3/2021	1284.55	556.86	727.69	2021
02S04E23N002S	Key Well	MSWD	7/19/2021	1284.55	557.46	727.09	2021
02S04E23N002S	Key Well	MSWD	8/16/2021	1284.55	557.6	726.95	2021
02S04E23N002S	Key Well	MSWD	9/8/2021	1284.55	557.74	726.81	2021
02S04E26C001S	Other	MSWD	10/6/2010	1243.55	537.24	706.31	2011
02S04E26C001S	Other	MSWD	11/4/2010	1243.55	536.89	706.66	2011
02S04E26C001S	Other	MSWD	12/1/2010	1243.55	534.37	709.18	2011
02S04E26C001S	Other	MSWD	1/6/2011	1243.55	531.88	711.67	2011
02S04E26C001S	Other	MSWD	2/2/2011	1243.55	530.31	713.24	2011
02S04E26C001S	Other	MSWD	3/1/2011	1243.55	528.25	715.3	2011
02S04E26C001S	Other	MSWD	4/4/2011	1243.55	526.01	717.54	2011
02S04E26C001S	Other	MSWD	5/3/2011	1243.55	525.11	718.44	2011
02S04E26C001S	Other	MSWD	6/6/2011	1243.55	523.96	719.59	2011
02S04E26C001S	Other	MSWD	6/29/2011	1243.55	524.02	719.53	2011
02S04E26C001S	Other	MSWD	8/10/2011	1243.55	521.18	722.37	2011
02S04E26C001S	Other	MSWD	9/6/2011	1243.55	519.91	723.64	2011
02S04E26C001S	Other	MSWD	10/1/2019	1243.55	522.73	720.82	2020
02S04E26C001S	Other	MSWD	11/6/2019	1243.55	523.56	719.99	2020
02S04E26C001S	Other	MSWD	12/9/2019	1243.55	522.8	720.75	2020
02S04E26C001S	Other	MSWD	1/30/2020	1243.55	522.54	721.01	2020
02S04E26C001S	Other	MSWD	2/13/2020	1243.55	523.58	719.97	2020
02S04E26C001S	Other	MSWD	3/27/2020	1243.55	522.19	721.36	2020
02S04E26C001S	Other	MSWD	4/21/2020	1243.55	522.47	721.08	2020
02S04E26C001S	Other	MSWD	5/20/2020	1243.55	523.35	720.2	2020
02S04E26C001S	Other	MSWD	6/2/2020	1243.55	523.63	719.92	2020
02S04E26C001S	Other	MSWD	7/14/2020	1243.55	524.11	719.44	2020
02S04E26C001S	Other	MSWD	8/5/2020	1243.55	524.76	718.79	2020
02S04E26C001S	Other	MSWD	9/1/2020	1243.55	525.06	718.49	2020
02S04E26C001S	Other	MSWD	10/6/2020	1243.55	524.41	719.14	2021
02S04E26C001S	Other	MSWD	11/3/2020	1243.55	524.99	718.56	2021
02S04E26C001S	Other	MSWD	12/1/2020	1243.55	524.76	718.79	2021
02S04E26C001S	Other	MSWD	1/11/2021	1243.55	524.39	719.16	2021

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E26C001S	Other	MSWD	2/12/2021	1243.55	524.46	719.09	2021
02S04E26C001S	Other	MSWD	3/2/2021	1243.55	524.48	719.07	2021
02S04E26C001S	Other	MSWD	4/7/2021	1243.55	525.29	718.26	2021
02S04E26C001S	Other	MSWD	5/5/2021	1243.55	525.59	717.96	2021
02S04E26C001S	Other	MSWD	6/3/2021	1243.55	525.71	717.84	2021
02S04E26C001S	Other	MSWD	7/19/2021	1243.55	526.44	717.11	2021
02S04E26C001S	Other	MSWD	8/16/2021	1243.55	526.44	717.11	2021
02S04E26C001S	Other	MSWD	9/8/2021	1243.55	526.61	716.94	2021
02S04E28A001S	Other	MSWD	10/6/2010	1393.84	350.26	1043.58	2011
02S04E28A001S	Other	MSWD	11/4/2010	1393.84	340.47	1053.37	2011
02S04E28A001S	Other	MSWD	12/2/2010	1393.84	303.3	1090.54	2011
02S04E28A001S	Other	MSWD	1/6/2011	1393.84	291.3	1102.54	2011
02S04E28A001S	Other	MSWD	2/2/2011	1393.84	283.9	1109.94	2011
02S04E28A001S	Other	MSWD	3/1/2011	1393.84	287.5	1106.34	2011
02S04E28A001S	Other	MSWD	4/4/2011	1393.84	288.3	1105.54	2011
02S04E28A001S	Other	MSWD	5/3/2011	1393.84	282.6	1111.24	2011
02S04E28A001S	Other	MSWD	6/6/2011	1393.84	269.4	1124.44	2011
02S04E28A001S	Other	MSWD	6/28/2011	1393.84	261.4	1132.44	2011
02S04E28A001S	Other	MSWD	8/3/2011	1393.84	248.5	1145.34	2011
02S04E28A001S	Other	MSWD	9/7/2011	1393.84	244	1149.84	2011
02S04E28A001S	Other	MSWD	11/7/2019	1393.84	421.2	972.64	2020
02S04E28A001S	Other	MSWD	12/17/2019	1393.84	418.3	975.54	2020
02S04E28A001S	Other	MSWD	1/30/2020	1393.84	418.4	975.44	2020
02S04E28A001S	Other	MSWD	2/13/2020	1393.84	419.4	974.44	2020
02S04E28A001S	Other	MSWD	3/27/2020	1393.84	420.5	973.34	2020
02S04E28A001S	Other	MSWD	4/21/2020	1393.84	422.1	971.74	2020
02S04E28A001S	Other	MSWD	5/20/2020	1393.84	424.7	969.14	2020
02S04E28A001S	Other	MSWD	6/4/2020	1393.84	424.9	968.94	2020
02S04E28A001S	Other	MSWD	7/15/2020	1393.84	427.1	966.74	2020
02S04E28A001S	Other	MSWD	8/10/2020	1393.84	428.2	965.64	2020
02S04E28A001S	Other	MSWD	9/2/2020	1393.84	429.4	964.44	2020
02S04E28A001S	Other	MSWD	10/13/2020	1393.84	430.4	963.44	2021
02S04E28A001S	Other	MSWD	11/5/2020	1393.84	431.3	962.54	2021
02S04E28A001S	Other	MSWD	12/2/2020	1393.84	431.5	962.34	2021
02S04E28A001S	Other	MSWD	1/13/2021	1393.84	429.3	964.54	2021
02S04E28A001S	Other	MSWD	2/12/2021	1393.84	429.1	964.74	2021
02S04E28A001S	Other	MSWD	3/3/2021	1393.84	429	964.84	2021
02S04E28A001S	Other	MSWD	4/8/2021	1393.84	429.7	964.14	2021
02S04E28A001S	Other	MSWD	5/12/2021	1393.84	431.7	962.14	2021
02S04E28A001S	Other	MSWD	6/7/2021	1393.84	430.3	963.54	2021
02S04E28A001S	Other	MSWD	7/21/2021	1393.84	431.3	962.54	2021
02S04E28A001S	Other	MSWD	8/10/2021	1393.84	432	961.84	2021
02S04E28A001S	Other	MSWD	9/7/2021	1393.84	432.6	961.24	2021
02S04E28J001S	Key Well	MSWD	10/6/2010	1319.59	606.77	712.82	2011
02S04E28J001S	Key Well	MSWD	11/4/2010	1319.59	606.56	713.03	2011
02S04E28J001S	Key Well	MSWD	12/1/2010	1319.59	606.13	713.46	2011
02S04E28J001S	Key Well	MSWD	1/6/2011	1319.59	605.66	713.93	2011
02S04E28J001S	Key Well	MSWD	2/2/2011	1319.59	604.72	714.87	2011

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report

Water Year 2020-2021

Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E28J001S	Key Well	MSWD	3/1/2011	1319.59	604.09	715.5	2011
02S04E28J001S	Key Well	MSWD	4/4/2011	1319.59	603.47	716.12	2011
02S04E28J001S	Key Well	MSWD	5/3/2011	1319.59	602.36	717.23	2011
02S04E28J001S	Key Well	MSWD	6/7/2011	1319.59	601.64	717.95	2011
02S04E28J001S	Key Well	MSWD	6/28/2011	1319.59	600.63	718.96	2011
02S04E28J001S	Key Well	MSWD	8/3/2011	1319.59	601.67	717.92	2011
02S04E28J001S	Key Well	MSWD	9/7/2011	1319.59	598.39	721.2	2011
02S04E28J001S	Key Well	MSWD	10/7/2019	1319.59	591.18	728.41	2020
02S04E28J001S	Key Well	MSWD	11/7/2019	1319.59	591.27	728.32	2020
02S04E28J001S	Key Well	MSWD	12/17/2019	1319.59	591.57	728.02	2020
02S04E28J001S	Key Well	MSWD	1/30/2020	1319.59	591.94	727.65	2020
02S04E28J001S	Key Well	MSWD	2/12/2020	1319.59	591.8	727.79	2020
02S04E28J001S	Key Well	MSWD	3/27/2020	1319.59	591.91	727.68	2020
02S04E28J001S	Key Well	MSWD	4/21/2020	1319.59	592.15	727.44	2020
02S04E28J001S	Key Well	MSWD	5/8/2020	1319.59	592.17	727.42	2020
02S04E28J001S	Key Well	MSWD	6/2/2020	1319.59	592.4	727.19	2020
02S04E28J001S	Key Well	MSWD	7/14/2020	1319.59	593.3	726.29	2020
02S04E28J001S	Key Well	MSWD	8/10/2020	1319.59	592.63	726.96	2020
02S04E28J001S	Key Well	MSWD	9/1/2020	1319.59	592.84	726.75	2020
02S04E28J001S	Key Well	MSWD	10/6/2020	1319.59	593.12	726.47	2021
02S04E28J001S	Key Well	MSWD	11/2/2020	1319.59	593.21	726.38	2021
02S04E28J001S	Key Well	MSWD	12/1/2020	1319.59	593.37	726.22	2021
02S04E28J001S	Key Well	MSWD	1/11/2021	1319.59	593.62	725.97	2021
02S04E28J001S	Key Well	MSWD	2/10/2021	1319.59	593.72	725.87	2021
02S04E28J001S	Key Well	MSWD	3/1/2021	1319.59	594.13	725.46	2021
02S04E28J001S	Key Well	MSWD	4/8/2021	1319.59	594.39	725.2	2021
02S04E28J001S	Key Well	MSWD	5/11/2021	1319.59	594.25	725.34	2021
02S04E28J001S	Key Well	MSWD	6/7/2021	1319.59	594.36	725.23	2021
02S04E28J001S	Key Well	MSWD	7/19/2021	1319.59	595.03	724.56	2021
02S04E28J001S	Key Well	MSWD	8/10/2021	1319.59	595.03	724.56	2021
02S04E28J001S	Key Well	MSWD	9/7/2021	1319.59	595.03	724.56	2021
02S04E36D001S	Key Well	MSWD	11/4/2010	1108.53	404	704.52	2011
02S04E36D001S	Key Well	MSWD	12/1/2010	1108.53	403	705.52	2011
02S04E36D001S	Key Well	MSWD	1/6/2011	1108.53	402.2	706.32	2011
02S04E36D001S	Key Well	MSWD	2/2/2011	1108.53	401.7	706.82	2011
02S04E36D001S	Key Well	MSWD	9/6/2011	1108.53	404.8	703.72	2011
02S04E36D001S	Key Well	MSWD	10/3/2019	1108.53	385.81	722.72	2020
02S04E36D001S	Key Well	MSWD	11/5/2019	1108.53	383.87	724.66	2020
02S04E36D001S	Key Well	MSWD	12/17/2019	1108.53	383.5	725.02	2020
02S04E36D001S	Key Well	MSWD	1/27/2020	1108.53	383.71	724.82	2020
02S04E36D001S	Key Well	MSWD	2/13/2020	1108.53	383.34	725.18	2020
02S04E36D001S	Key Well	MSWD	3/27/2020	1108.53	383.57	724.96	2020
02S04E36D001S	Key Well	MSWD	4/21/2020	1108.53	383.18	725.34	2020
02S04E36D001S	Key Well	MSWD	5/29/2020	1108.53	386.37	722.16	2020
02S04E36D001S	Key Well	MSWD	6/2/2020	1108.53	386.62	721.9	2020
02S04E36D001S	Key Well	MSWD	7/29/2020	1108.53	387.08	721.44	2020
02S04E36D001S	Key Well	MSWD	8/10/2020	1108.53	386.34	722.18	2020
02S04E36D001S	Key Well	MSWD	9/2/2020	1108.53	386.34	722.18	2020

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report

Water Year 2020-2021

Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E36D001S	Key Well	MSWD	10/6/2020	1108.53	386.8	721.72	2021
02S04E36D001S	Key Well	MSWD	11/4/2020	1108.53	386	722.52	2021
02S04E36D001S	Key Well	MSWD	12/3/2020	1108.53	386.6	721.92	2021
02S04E36D001S	Key Well	MSWD	1/13/2021	1108.53	386.2	722.32	2021
02S04E36D001S	Key Well	MSWD	2/22/2021	1108.53	386.2	722.32	2021
02S04E36D001S	Key Well	MSWD	3/3/2021	1108.53	386.1	722.42	2021
02S04E36D001S	Key Well	MSWD	4/7/2021	1108.53	386.2	722.32	2021
02S04E36D001S	Key Well	MSWD	5/6/2021	1108.53	386.4	722.12	2021
02S04E36D001S	Key Well	MSWD	6/3/2021	1108.53	387.2	721.32	2021
02S04E36D001S	Key Well	MSWD	7/27/2021	1108.53	388.3	720.22	2021
02S04E36D001S	Key Well	MSWD	8/16/2021	1108.53	388.5	720.02	2021
02S04E36D001S	Key Well	MSWD	9/8/2021	1108.53	388.8	719.72	2021
02S04E36K001S	Key Well	MSWD	10/6/2010	1016.5	325.37	691.13	2011
02S04E36K001S	Key Well	MSWD	11/4/2010	1016.5	326.01	690.49	2011
02S04E36K001S	Key Well	MSWD	12/1/2010	1016.5	325.62	690.88	2011
02S04E36K001S	Key Well	MSWD	1/6/2011	1016.5	325.41	691.09	2011
02S04E36K001S	Key Well	MSWD	4/4/2011	1016.5	324.74	691.76	2011
02S04E36K001S	Key Well	MSWD	5/3/2011	1016.5	324.1	692.4	2011
02S04E36K001S	Key Well	MSWD	6/6/2011	1016.5	322.39	694.11	2011
02S04E36K001S	Key Well	MSWD	6/27/2011	1016.5	322.32	694.18	2011
02S04E36K001S	Key Well	MSWD	8/3/2011	1016.5	322.5	694	2011
02S04E36K001S	Key Well	MSWD	9/7/2011	1016.5	321.95	694.55	2011
02S04E36K001S	Key Well	MSWD	10/2/2019	1016.5	306.81	709.69	2020
02S04E36K001S	Key Well	MSWD	11/5/2019	1016.5	306.91	709.59	2020
02S04E36K001S	Key Well	MSWD	12/30/2019	1016.5	306.61	709.89	2020
02S04E36K001S	Key Well	MSWD	1/27/2020	1016.5	306.26	710.24	2020
02S04E36K001S	Key Well	MSWD	2/25/2020	1016.5	306.26	710.24	2020
02S04E36K001S	Key Well	MSWD	3/27/2020	1016.5	306.49	710.01	2020
02S04E36K001S	Key Well	MSWD	4/21/2020	1016.5	306.51	709.99	2020
02S04E36K001S	Key Well	MSWD	5/29/2020	1016.5	306.7	709.8	2020
02S04E36K001S	Key Well	MSWD	6/2/2020	1016.5	306.7	709.8	2020
02S04E36K001S	Key Well	MSWD	7/22/2020	1016.5	307.51	708.99	2020
02S04E36K001S	Key Well	MSWD	8/5/2020	1016.5	307.74	708.76	2020
02S04E36K001S	Key Well	MSWD	9/14/2020	1016.5	308.04	708.46	2020
02S04E36K001S	Key Well	MSWD	10/6/2020	1016.5	308.13	708.37	2021
02S04E36K001S	Key Well	MSWD	11/4/2020	1016.5	308.22	708.28	2021
02S04E36K001S	Key Well	MSWD	12/8/2020	1016.5	308.08	708.42	2021
02S04E36K001S	Key Well	MSWD	1/11/2021	1016.5	307.58	708.92	2021
02S04E36K001S	Key Well	MSWD	2/22/2021	1016.5	307.55	708.95	2021
02S04E36K001S	Key Well	MSWD	3/2/2021	1016.5	307.39	709.11	2021
02S04E36K001S	Key Well	MSWD	4/7/2021	1016.5	307.97	708.53	2021
02S04E36K001S	Key Well	MSWD	5/12/2021	1016.5	308.29	708.21	2021
02S04E36K001S	Key Well	MSWD	6/10/2021	1016.5	308.61	707.89	2021
02S04E36K001S	Key Well	MSWD	7/20/2021	1016.5	308.92	707.58	2021
02S04E36K001S	Key Well	MSWD	8/16/2021	1016.5	309.22	707.28	2021
02S04E36K001S	Key Well	MSWD	9/20/2021	1016.5	309.47	707.03	2021
02S04E36P001S	Other	MSWD	10/6/2010	1012	313.01	698.99	2011
02S04E36P001S	Other	MSWD	11/4/2010	1012	312.84	699.16	2011

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report

Water Year 2020-2021

Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
02S04E36P001S	Other	MSWD	12/1/2010	1012	312.36	699.64	2011
02S04E36P001S	Other	MSWD	1/6/2011	1012	311.78	700.22	2011
02S04E36P001S	Other	MSWD	4/4/2011	1012	315.31	696.69	2011
02S04E36P001S	Other	MSWD	5/3/2011	1012	315.01	696.99	2011
02S04E36P001S	Other	MSWD	6/6/2011	1012	314.9	697.1	2011
02S04E36P001S	Other	MSWD	6/27/2011	1012	314.96	697.04	2011
02S04E36P001S	Other	MSWD	9/7/2011	1012	314.8	697.2	2011
02S04E36P001S	Other	MSWD	10/7/2019	1012	301.17	710.83	2020
02S04E36P001S	Other	MSWD	11/5/2019	1012	301.4	710.6	2020
02S04E36P001S	Other	MSWD	12/30/2019	1012	301.17	710.83	2020
02S04E36P001S	Other	MSWD	1/28/2020	1012	300.8	711.2	2020
02S04E36P001S	Other	MSWD	2/25/2020	1012	300.8	711.2	2020
02S04E36P001S	Other	MSWD	3/27/2020	1012	300.73	711.27	2020
02S04E36P001S	Other	MSWD	4/21/2020	1012	300.24	711.76	2020
02S04E36P001S	Other	MSWD	5/29/2020	1012	301.1	710.9	2020
02S04E36P001S	Other	MSWD	6/2/2020	1012	301.01	710.99	2020
02S04E36P001S	Other	MSWD	7/22/2020	1012	301.84	710.16	2020
02S04E36P001S	Other	MSWD	8/5/2020	1012	301.98	710.02	2020
02S04E36P001S	Other	MSWD	9/14/2020	1012	302.46	709.54	2020
02S04E36P001S	Other	MSWD	10/8/2020	1012	302.46	709.54	2021
02S04E36P001S	Other	MSWD	11/4/2020	1012	302.79	709.21	2021
02S04E36P001S	Other	MSWD	12/4/2020	1012	302.58	709.42	2021
02S04E36P001S	Other	MSWD	1/11/2021	1012	302.14	709.86	2021
02S04E36P001S	Other	MSWD	2/22/2021	1012	302.07	709.93	2021
02S04E36P001S	Other	MSWD	3/2/2021	1012	302.05	709.95	2021
02S04E36P001S	Other	MSWD	4/7/2021	1012	302.35	709.65	2021
02S04E36P001S	Other	MSWD	5/12/2021	1012	302.83	709.17	2021
02S04E36P001S	Other	MSWD	6/8/2021	1012	303.11	708.89	2021
02S04E36P001S	Other	MSWD	7/20/2021	1012	303.41	708.59	2021
02S04E36P001S	Other	MSWD	8/16/2021	1012	303.66	708.34	2021
02S04E36P001S	Other	MSWD	9/20/2021	1012	303.94	708.06	2021
03S04E01J001S	Other	MSWD	10/4/2019	934.97	219	715.97	2020
03S04E01J001S	Other	MSWD	11/1/2019	934.97	219.2	715.77	2020
03S04E01J001S	Other	MSWD	12/17/2019	934.97	219.1	715.87	2020
03S04E01J001S	Other	MSWD	1/28/2020	934.97	218.6	716.37	2020
03S04E01J001S	Other	MSWD	2/12/2020	934.97	218.7	716.27	2020
03S04E01J001S	Other	MSWD	3/27/2020	934.97	218.6	716.37	2020
03S04E01J001S	Other	MSWD	4/21/2020	934.97	218.6	716.37	2020
03S04E01J001S	Other	MSWD	5/5/2020	934.97	218.8	716.17	2020
03S04E01J001S	Other	MSWD	6/1/2020	934.97	219.1	715.87	2020
03S04E01J001S	Other	MSWD	7/13/2020	934.97	219.4	715.57	2020
03S04E01J001S	Other	MSWD	8/4/2020	934.97	219.8	715.17	2020
03S04E01J001S	Other	MSWD	9/1/2020	934.97	220.3	714.67	2020
03S04E01J001S	Other	MSWD	10/5/2020	934.97	220.6	714.37	2021
03S04E01J001S	Other	MSWD	11/2/2020	934.97	220.9	714.07	2021
03S04E01J001S	Other	MSWD	12/1/2020	934.97	220.8	714.17	2021
03S04E01J001S	Other	MSWD	1/12/2021	934.97	220.8	714.17	2021
03S04E01J001S	Other	MSWD	2/12/2021	934.97	220.5	714.47	2021

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
03S04E01J001S	Other	MSWD	3/1/2021	934.97	220.6	714.37	2021
03S04E01J001S	Other	MSWD	4/7/2021	934.97	220.7	714.27	2021
03S04E01J001S	Other	MSWD	5/12/2021	934.97	221.1	713.87	2021
03S04E01J001S	Other	MSWD	6/8/2021	934.97	221.2	713.77	2021
03S04E01J001S	Other	MSWD	7/14/2021	934.97	221.5	713.47	2021
03S04E01J001S	Other	MSWD	8/11/2021	934.97	222	712.97	2021
03S04E01J001S	Other	MSWD	9/9/2021	934.97	221.9	713.07	2021
03S04E04P001S	Key Well	DWA	10/23/2019	1075	343.9	731.1	2020
03S04E04P001S	Key Well	DWA	11/18/2019	1075	343.91	731.09	2020
03S04E04P001S	Key Well	DWA	1/9/2020	1075	343.41	731.59	2020
03S04E04P001S	Key Well	DWA	2/27/2020	1075	344.75	730.25	2020
03S04E04P001S	Key Well	DWA	3/30/2020	1075	344	731	2020
03S04E04P001S	Key Well	DWA	5/1/2020	1075	345.2	729.8	2020
03S04E04P001S	Key Well	DWA	5/27/2020	1075	345.5	729.5	2020
03S04E04P001S	Key Well	DWA	6/29/2020	1075	345.25	729.75	2020
03S04E04P001S	Key Well	DWA	7/21/2020	1075	345.3	729.7	2020
03S04E04P001S	Key Well	DWA	8/20/2020	1075	345.1	729.9	2020
03S04E04P001S	Key Well	DWA	10/26/2020	1075	345.75	729.25	2021
03S04E04P001S	Key Well	DWA	11/16/2020	1075	345.83	729.17	2021
03S04E04P001S	Key Well	DWA	12/16/2020	1075	345.91	729.09	2021
03S04E04P001S	Key Well	DWA	1/25/2021	1075	345.75	729.25	2021
03S04E04P001S	Key Well	DWA	2/23/2021	1075	346.25	728.75	2021
03S04E04P001S	Key Well	DWA	3/29/2021	1075	347	728	2021
03S04E04P001S	Key Well	DWA	4/30/2021	1075	346.67	728.33	2021
03S04E04P001S	Key Well	DWA	5/24/2021	1075	347.59	727.41	2021
03S04E04P001S	Key Well	DWA	6/23/2021	1075	347.5	727.5	2021
03S04E04P001S	Key Well	DWA	7/27/2021	1075	348.16	726.84	2021
03S04E04P001S	Key Well	DWA	8/23/2021	1075	348.17	726.83	2021
03S04E04P001S	Key Well	DWA	9/28/2021	1075	348.09	726.91	2021
03S04E11A002S	Other	MSWD	10/6/2010	905	212.78	692.22	2011
03S04E11A002S	Other	MSWD	11/4/2010	905	212.6	692.4	2011
03S04E11A002S	Other	MSWD	12/1/2010	905	211.97	693.03	2011
03S04E11A002S	Other	MSWD	1/6/2011	905	211.46	693.54	2011
03S04E11A002S	Other	MSWD	2/2/2011	905	211.14	693.86	2011
03S04E11A002S	Other	MSWD	3/1/2011	905	210.09	694.91	2011
03S04E11A002S	Other	MSWD	4/4/2011	905	210.73	694.27	2011
03S04E11A002S	Other	MSWD	5/3/2011	905	210.47	694.53	2011
03S04E11A002S	Other	MSWD	6/6/2011	905	210.68	694.32	2011
03S04E11A002S	Other	MSWD	6/27/2011	905	210.96	694.04	2011
03S04E11A002S	Other	MSWD	8/3/2011	905	210.75	694.25	2011
03S04E11A002S	Other	MSWD	9/7/2011	905	210.63	694.37	2011
03S04E11A002S	Other	MSWD	10/4/2019	905	189.42	715.58	2020
03S04E11A002S	Other	MSWD	11/14/2019	905	189.75	715.25	2020
03S04E11A002S	Other	MSWD	12/30/2019	905	188.8	716.2	2020
03S04E11A002S	Other	MSWD	1/30/2020	905	189.03	715.97	2020
03S04E11A002S	Other	MSWD	2/13/2020	905	188.92	716.08	2020
03S04E11A002S	Other	MSWD	3/27/2020	905	189.17	715.83	2020
03S04E11A002S	Other	MSWD	4/21/2020	905	188.39	716.61	2020

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report

Water Year 2020-2021

Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
03S04E11A002S	Other	MSWD	5/20/2020	905	189.08	715.92	2020
03S04E11A002S	Other	MSWD	6/9/2020	905	189.45	715.55	2020
03S04E11A002S	Other	MSWD	7/22/2020	905	190.12	714.88	2020
03S04E11A002S	Other	MSWD	8/10/2020	905	190.21	714.79	2020
03S04E11A002S	Other	MSWD	9/3/2020	905	190.86	714.14	2020
03S04E11A002S	Other	MSWD	10/7/2020	905	191.3	713.7	2021
03S04E11A002S	Other	MSWD	11/3/2020	905	191.41	713.59	2021
03S04E11A002S	Other	MSWD	12/3/2020	905	190.9	714.1	2021
03S04E11A002S	Other	MSWD	1/13/2021	905	191.16	713.84	2021
03S04E11A002S	Other	MSWD	2/23/2021	905	190.6	714.4	2021
03S04E11A002S	Other	MSWD	3/2/2021	905	190.63	714.37	2021
03S04E11A002S	Other	MSWD	4/14/2021	905	190.97	714.03	2021
03S04E11A002S	Other	MSWD	5/13/2021	905	191.69	713.31	2021
03S04E11A002S	Other	MSWD	6/8/2021	905	192.29	712.71	2021
03S04E11A002S	Other	MSWD	7/20/2021	905	192.2	712.8	2021
03S04E11A002S	Other	MSWD	8/11/2021	905	192.77	712.23	2021
03S04E11A002S	Other	MSWD	9/22/2021	905	193.24	711.76	2021
03S04E11L004S	Key Well	MSWD	10/6/2010	879.48	174.53	704.95	2011
03S04E11L004S	Key Well	MSWD	11/4/2010	879.48	174.09	705.39	2011
03S04E11L004S	Key Well	MSWD	12/1/2010	879.48	173.58	705.9	2011
03S04E11L004S	Key Well	MSWD	1/6/2011	879.48	172.93	706.55	2011
03S04E11L004S	Key Well	MSWD	2/2/2011	879.48	172.77	706.71	2011
03S04E11L004S	Key Well	MSWD	3/1/2011	879.48	172.45	707.03	2011
03S04E11L004S	Key Well	MSWD	4/4/2011	879.48	172.47	707.01	2011
03S04E11L004S	Key Well	MSWD	5/3/2011	879.48	172.1	707.38	2011
03S04E11L004S	Key Well	MSWD	6/6/2011	879.48	172.45	707.03	2011
03S04E11L004S	Key Well	MSWD	6/27/2011	879.48	171.85	707.63	2011
03S04E11L004S	Key Well	MSWD	8/3/2011	879.48	171.25	708.23	2011
03S04E11L004S	Key Well	MSWD	9/7/2011	879.48	171.18	708.3	2011
03S04E11L004S	Key Well	MSWD	10/7/2019	879.48	156.3	723.18	2020
03S04E11L004S	Key Well	MSWD	11/14/2019	879.48	156.2	723.28	2020
03S04E11L004S	Key Well	MSWD	12/30/2019	879.48	156.46	723.02	2020
03S04E11L004S	Key Well	MSWD	1/30/2020	879.48	156.11	723.37	2020
03S04E11L004S	Key Well	MSWD	2/13/2020	879.48	155.51	723.97	2020
03S04E11L004S	Key Well	MSWD	3/27/2020	879.48	155.79	723.69	2020
03S04E11L004S	Key Well	MSWD	4/21/2020	879.48	154.96	724.52	2020
03S04E11L004S	Key Well	MSWD	5/20/2020	879.48	155.6	723.88	2020
03S04E11L004S	Key Well	MSWD	6/17/2020	879.48	155.83	723.65	2020
03S04E11L004S	Key Well	MSWD	7/23/2020	879.48	156.06	723.42	2020
03S04E11L004S	Key Well	MSWD	8/6/2020	879.48	157.68	721.8	2020
03S04E11L004S	Key Well	MSWD	9/3/2020	879.48	157.13	722.35	2020
03S04E11L004S	Key Well	MSWD	10/7/2020	879.48	158.21	721.27	2021
03S04E11L004S	Key Well	MSWD	11/18/2020	879.48	158.56	720.92	2021
03S04E11L004S	Key Well	MSWD	12/4/2020	879.48	158.7	720.78	2021
03S04E11L004S	Key Well	MSWD	1/13/2021	879.48	157.84	721.64	2021
03S04E11L004S	Key Well	MSWD	2/10/2021	879.48	157.8	721.68	2021
03S04E11L004S	Key Well	MSWD	3/2/2021	879.48	157.59	721.89	2021
03S04E11L004S	Key Well	MSWD	4/14/2021	879.48	158.74	720.74	2021

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
03S04E11L004S	Key Well	MSWD	5/12/2021	879.48	158.98	720.5	2021
03S04E11L004S	Key Well	MSWD	6/7/2021	879.48	158.77	720.71	2021
03S04E11L004S	Key Well	MSWD	7/20/2021	879.48	160.34	719.14	2021
03S04E11L004S	Key Well	MSWD	8/17/2021	879.48	161.22	718.26	2021
03S04E11L004S	Key Well	MSWD	9/21/2021	879.48	161.19	718.29	2021
03S04E12B002S	Other	CVWD	11/18/2010	884.57	195.4	689.17	2011
03S04E12B002S	Other	CVWD	3/10/2011	884.57	192.2	692.37	2011
03S04E12B002S	Other	CVWD	6/28/2011	884.57	194.3	690.27	2011
03S04E12B002S	Other	CVWD	10/8/2019	884.57	183.2	701.37	2020
03S04E12B002S	Other	CVWD	2/21/2020	884.57	175.4	709.17	2020
03S04E12B002S	Other	CVWD	6/5/2020	884.57	176.8	707.77	2020
03S04E12B002S	Other	CVWD	10/1/2020	884.57	177.8	706.77	2021
03S04E12B002S	Other	CVWD	4/26/2021	884.57	178.2	706.37	2021
03S04E12B002S	Other	CVWD	6/2/2021	884.57	177.8	706.77	2021
03S04E12C001S	Key Well	CVWD	11/18/2010	890.27	198	692.27	2011
03S04E12C001S	Key Well	CVWD	1/10/2011	890.27	197.7	692.57	2011
03S04E12C001S	Key Well	CVWD	6/9/2011	890.27	196.6	693.67	2011
03S04E12C001S	Key Well	CVWD	10/8/2019	890.27	180.5	709.77	2020
03S04E12C001S	Key Well	CVWD	2/21/2020	890.27	179.7	710.57	2020
03S04E12C001S	Key Well	CVWD	6/5/2020	890.27	180.4	709.87	2020
03S04E12C001S	Key Well	CVWD	10/1/2020	890.27	182.4	707.87	2021
03S04E12C001S	Key Well	CVWD	4/26/2021	890.27	182.8	707.47	2021
03S04E12C001S	Key Well	CVWD	6/2/2021	890.27	183.4	706.87	2021
03S04E12F001S	Other	CVWD	11/18/2010	859.67	167.9	691.77	2011
03S04E12F001S	Other	CVWD	3/10/2011	859.67	166.1	693.57	2011
03S04E12F001S	Other	CVWD	6/28/2011	859.67	165.9	693.77	2011
03S04E12F001S	Other	CVWD	10/8/2019	859.67	160	699.67	2020
03S04E12F001S	Other	CVWD	2/21/2020	859.67	150.5	709.17	2020
03S04E12F001S	Other	CVWD	6/9/2020	859.67	150.5	709.17	2020
03S04E12F001S	Other	CVWD	10/1/2020	859.67	152.8	706.87	2021
03S04E12F001S	Other	CVWD	4/26/2021	859.67	152	707.67	2021
03S04E12F001S	Other	CVWD	6/2/2021	859.67	154.5	705.17	2021
03S04E12H003S	Other	CVWD	10/8/2019	847.66	140.6	707.06	2020
03S04E12H003S	Other	CVWD	2/21/2020	847.66	139.9	707.76	2020
03S04E12H003S	Other	CVWD	6/5/2020	847.66	139.7	707.96	2020
03S04E12H003S	Other	CVWD	10/7/2020	847.66	143.1	704.56	2021
03S04E12H003S	Other	CVWD	4/26/2021	847.66	142	705.66	2021
03S04E12H003S	Other	CVWD	6/2/2021	847.66	142.6	705.06	2021
03S05E15R001S	Key Well	CVWD	1/14/2020	927.46	219.4	708.06	2020
03S05E15R001S	Key Well	CVWD	5/8/2020	927.46	219.1	708.36	2020
03S05E15R001S	Key Well	CVWD	8/19/2020	927.46	219.5	707.96	2020
03S05E15R001S	Key Well	CVWD	1/28/2021	927.46	219.6	707.86	2021
03S05E15R001S	Key Well	CVWD	5/18/2021	927.46	219.4	708.06	2021
03S05E15R001S	Key Well	CVWD	9/23/2021	927.46	220.2	707.26	2021
03S05E17J001S	Key Well	CVWD	11/18/2010	790.23	98.3	691.93	2011
03S05E17J001S	Key Well	CVWD	1/10/2011	790.23	97.2	693.03	2011
03S05E17J001S	Key Well	CVWD	6/8/2011	790.23	97	693.23	2011
03S05E17J001S	Key Well	CVWD	10/8/2019	790.23	86.5	703.73	2020

Table A-1

Groundwater Elevation Data WY 2010-2011, WY 2019-2020, and WY 2020-2021

Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

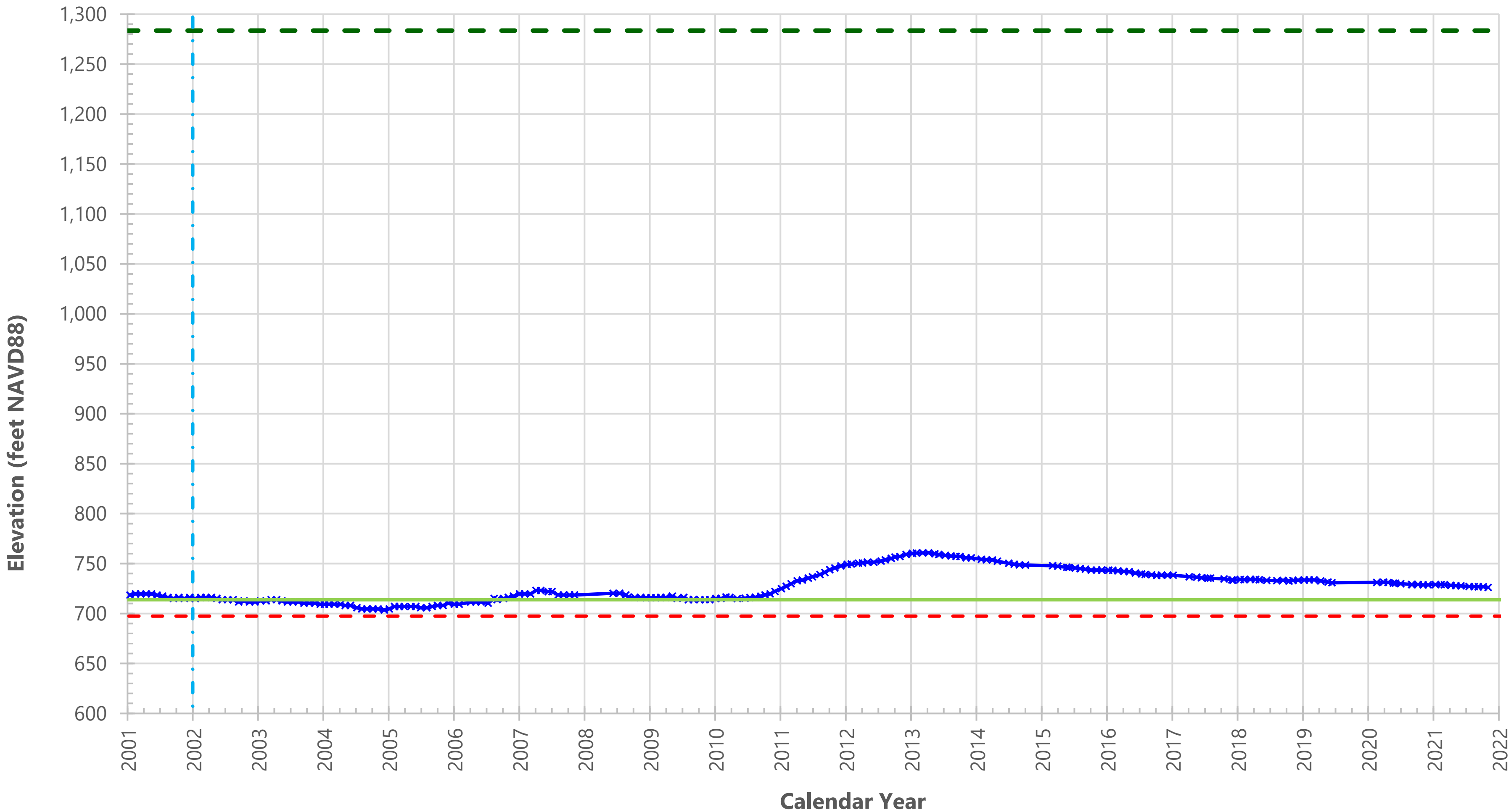
State Well Number	Monitoring Well Type	Monitoring Agency	Groundwater Level Measurement Date	Measuring Point Elevation (feet NAVD88)[1]	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Water Year[2]
03S05E17J001S	Key Well	CVWD	2/24/2020	790.23	84.5	705.73	2020
03S05E17J001S	Key Well	CVWD	6/22/2020	790.23	86.3	703.93	2020
03S05E17J001S	Key Well	CVWD	10/7/2020	790.23	89.9	700.33	2021
03S05E17J001S	Key Well	CVWD	4/27/2021	790.23	86.3	703.93	2021
03S05E17J001S	Key Well	CVWD	6/2/2021	790.23	86.3	703.93	2021
03S05E19B001S	Other	CVWD	11/18/2010	709.02	6.4	702.62	2011
03S05E19B001S	Other	CVWD	3/10/2011	709.02	5.9	703.12	2011
03S05E19B001S	Other	CVWD	10/8/2019	709.02	4.7	704.32	2020
03S05E19B001S	Other	CVWD	2/24/2020	709.02	3.8	705.22	2020
03S05E19B001S	Other	CVWD	8/19/2020	709.02	4.8	704.22	2020
03S05E19B001S	Other	CVWD	10/7/2020	709.02	4.2	704.82	2021
03S05E19B001S	Other	CVWD	4/27/2021	709.02	4.3	704.72	2021
03S05E19B001S	Other	CVWD	8/12/2021	709.02	4.9	704.12	2021

Notes
1. Measuring point for CVWD wells converted to ground surface by CVWD.
2. Water Year from October 1 through September 30, identified by the ending year of the period.

Abbreviations
bmp = feet below measuring point
CVWD = Coachella Valley Water District
DWA = Desert Water Agency
MSWD = Mission Springs Water District
NAVD88 = North American Vertical Datum of 1988
-- = Not available

Appendix B

Representative Groundwater Elevation Hydrographs



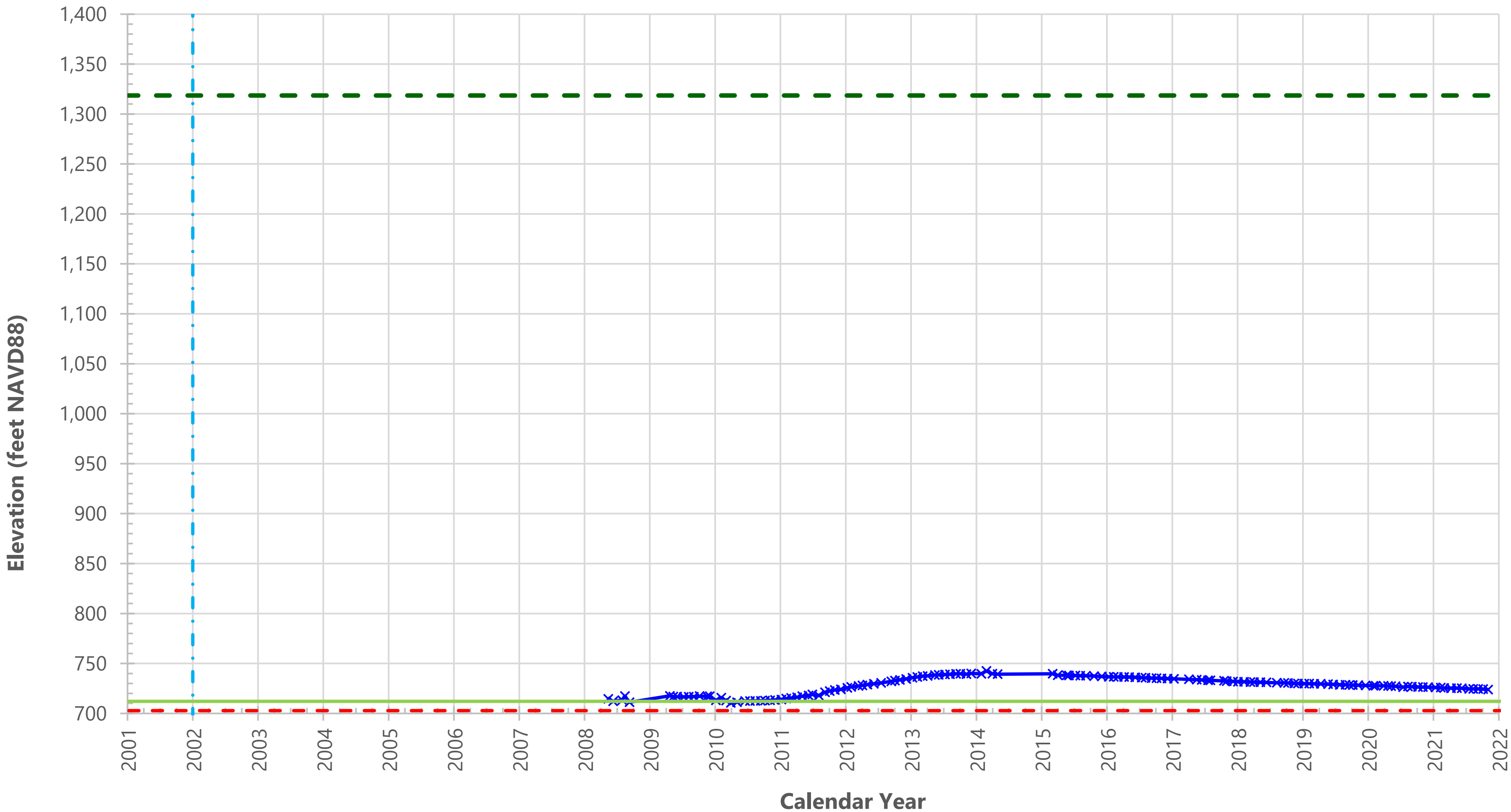
Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 02S04E23N002S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/9/2021	Project No. CM19167353
wood.		Figure **B-1**



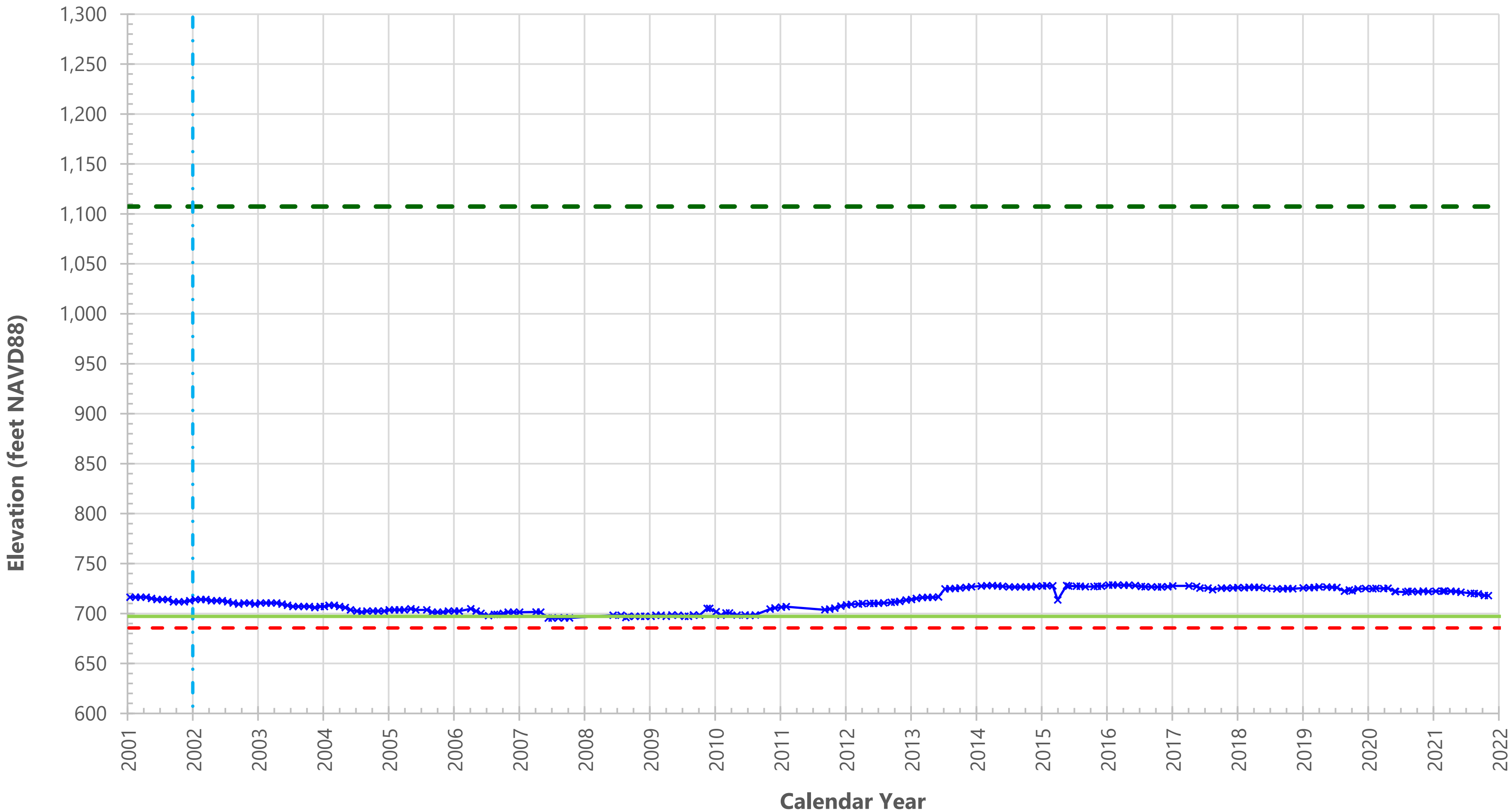
Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 02S04E28J001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.		Figure **B-2**



Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:

GRF = Mission Creek Groundwater Replenishment Facility

NAVD88 = North American Datum of 1988

Hydrograph for

Well 02S04E36D001S

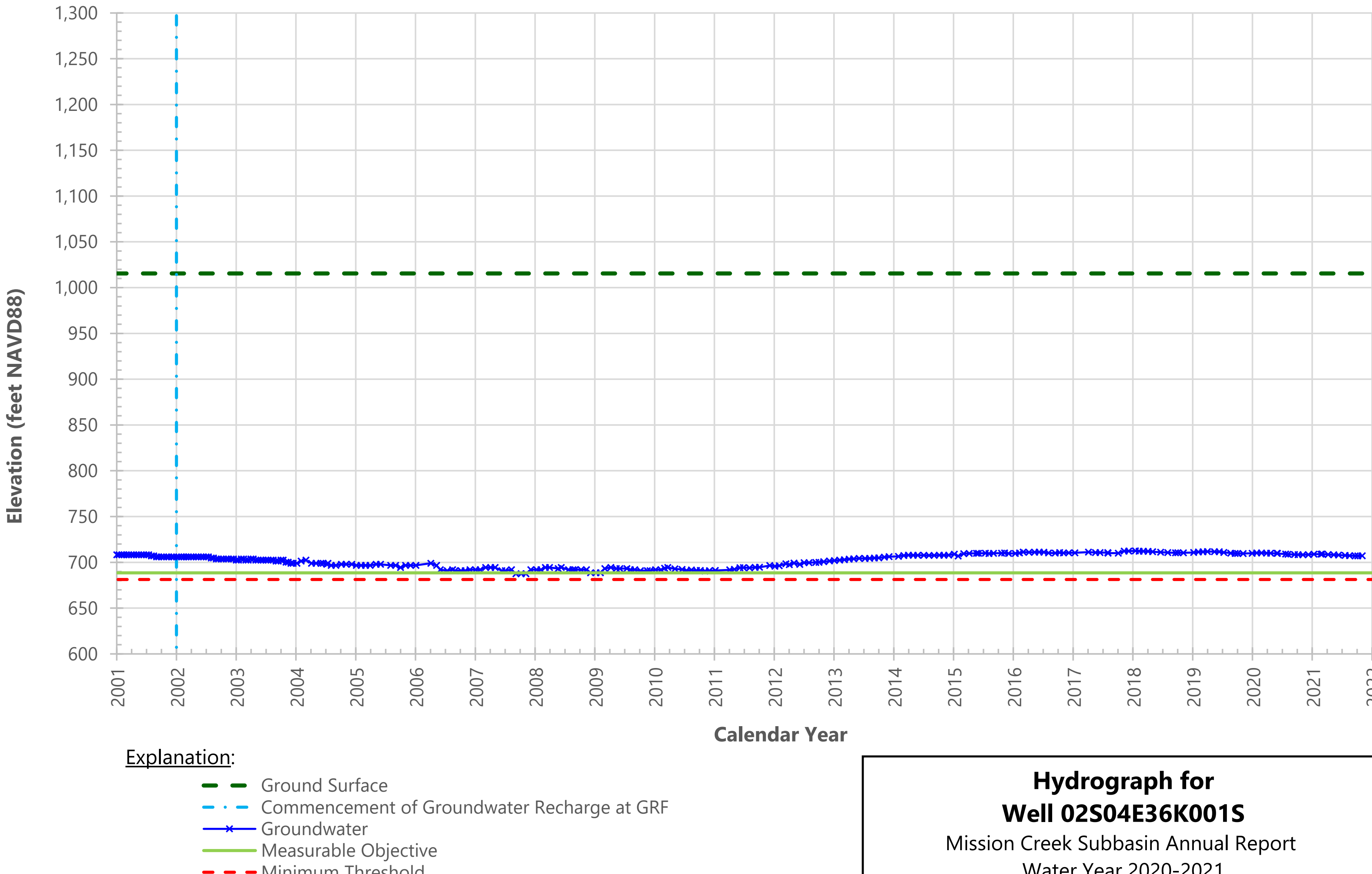
Mission Creek Subbasin Annual Report

Water Year 2020-2021

Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.		Figure **B-3**

P:\167353\03 DocCtrl\Mission Creek Subbasin Annual Report for WY 2020-2021\Appendix B\AppxB_hydrographs_12-20-2021



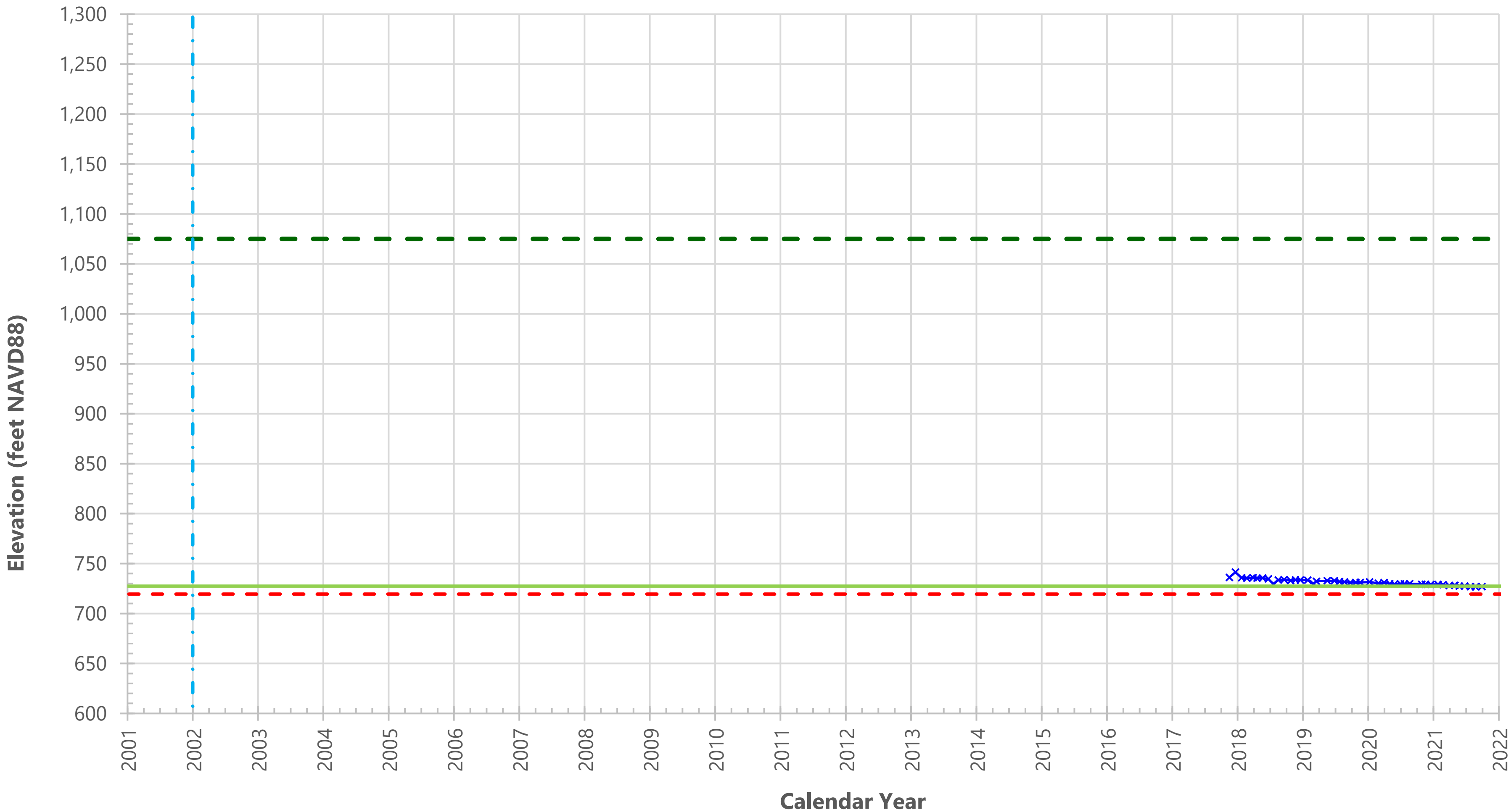
Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 02S04E36K001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR | Date: 12/09/2021 | Project No. CM19167353

wood.

Figure **B-4**

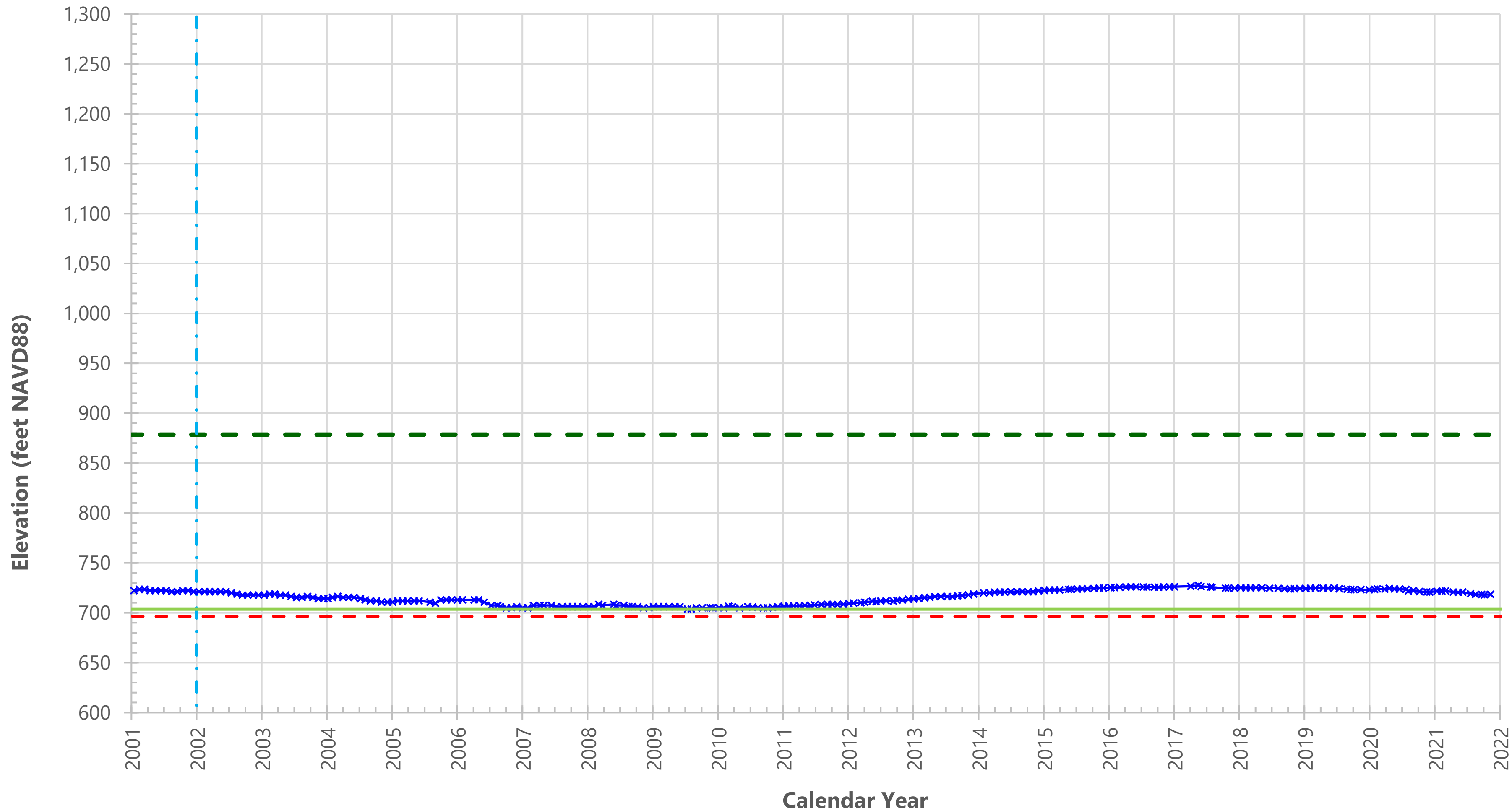


Explanation:
- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 03S04E04P001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.	Figure **B-5**	



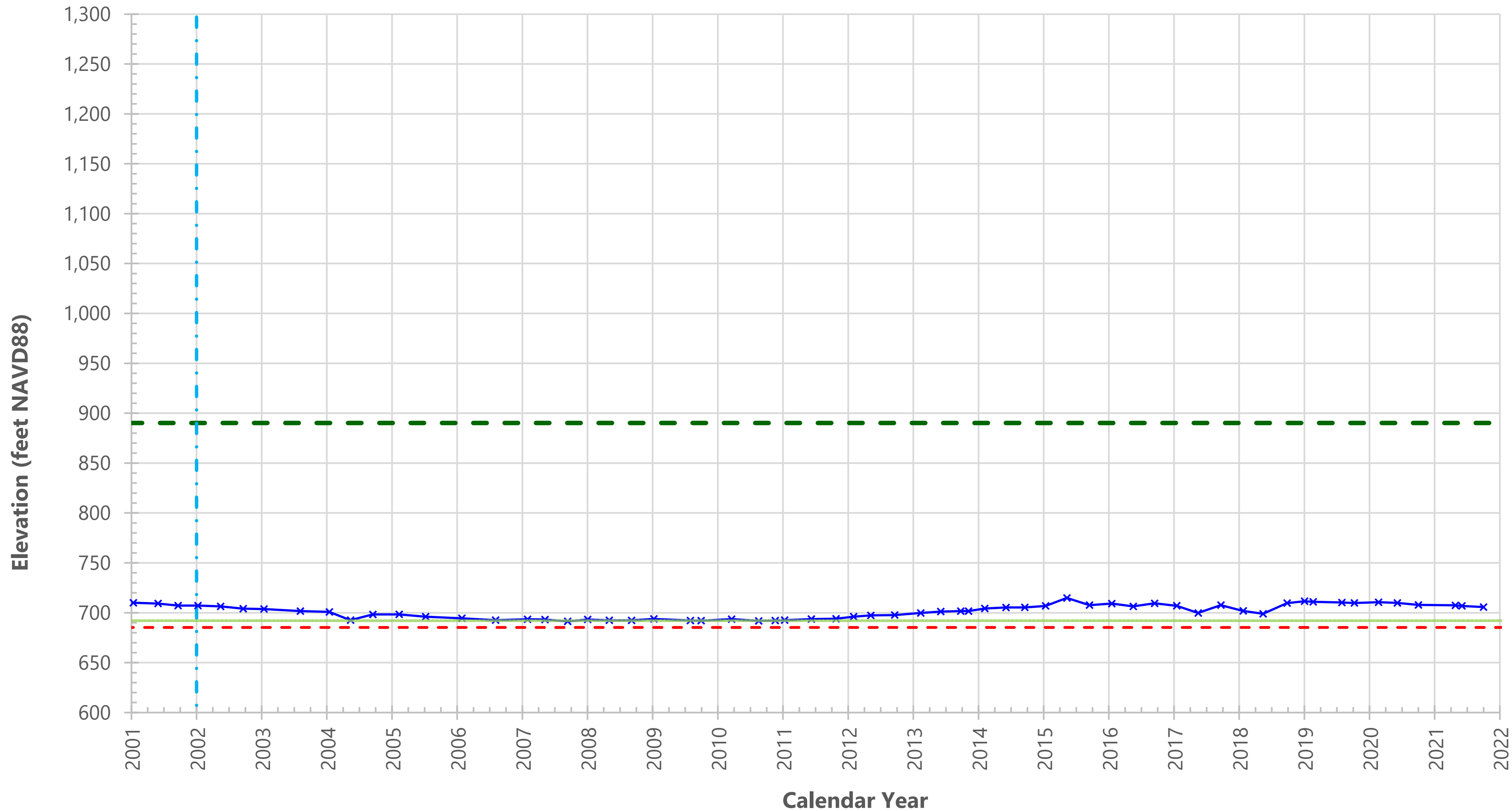
Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 03S04E11L004S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.	Figure **B-6**	



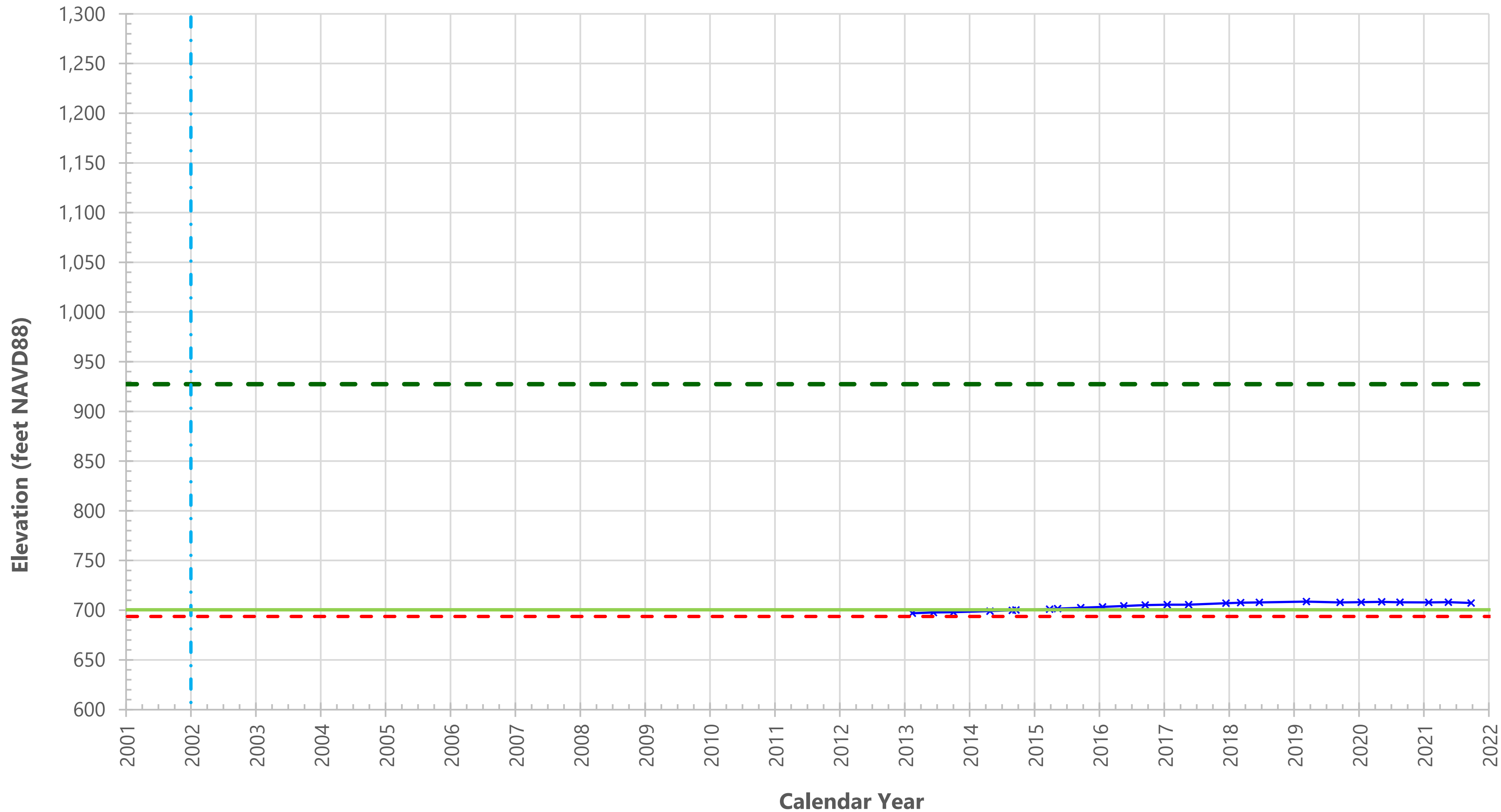
Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 03S04E12C001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.		Figure **B-7**



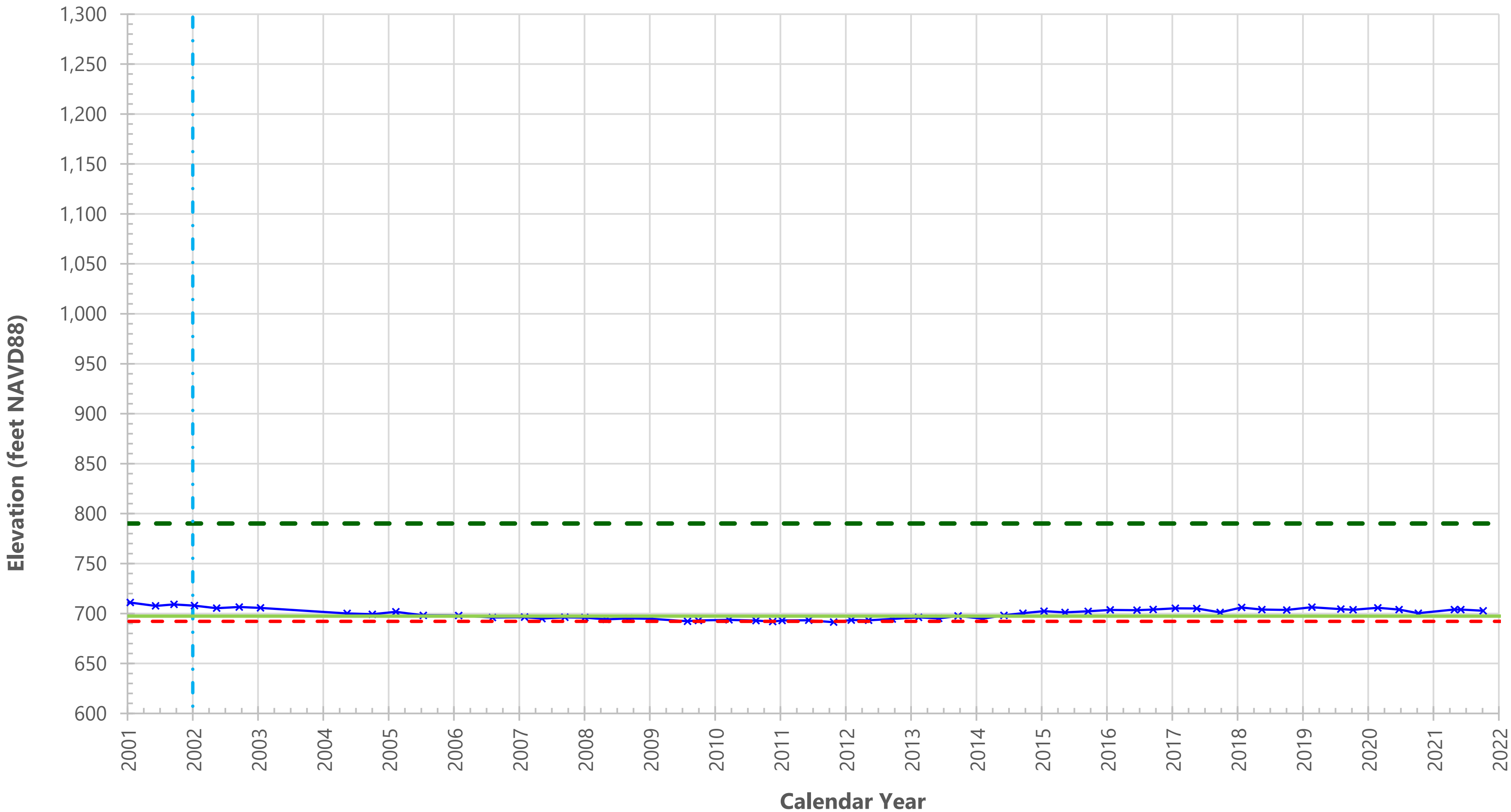
Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 03S05E15R001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.		Figure **B-8**



Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater
- Measurable Objective
- Minimum Threshold

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 03S05E17J001S
Mission Creek Subbasin Annual Report
Water Year 2020-2021
Coachella Valley, California

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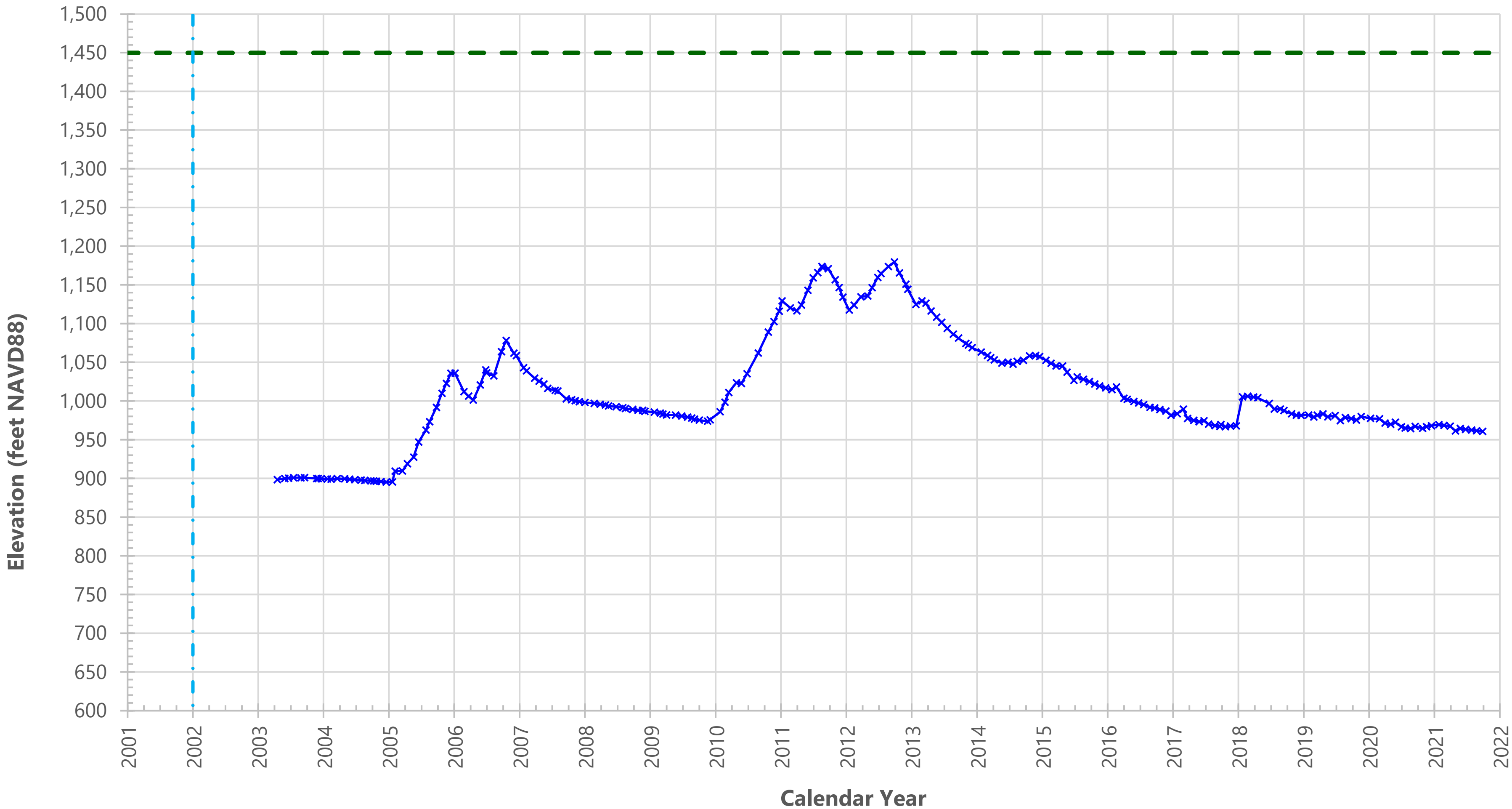
wood.		Figure **B-9**



Explanation:

- Ground Surface
- Commencement of Groundwater Recharge at GRF
- Groundwater

Note:
GRF = Mission Creek Groundwater Replenishment Facility
NAVD88 = North American Datum of 1988

Hydrograph for
Well 02S04E21H001S
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Water Year 2020-2021
Coachella Valley, California

By: GRR	Date: 12/09/2021	Project No. CM19167353
wood.		Figure **B-10**

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