MISSION CREEK SUBBASIN SGMA

RINCON CONSULTANTS wsp



# 2027 Mission Creek Subbasin Alternative Plan Update

## In Compliance with the Sustainable Groundwater Management Act

**Volume 1 - October 2026**

**Prepared For:**

Coachella Valley Water District

Desert Water Agency

Mission Springs Water District

Public Review Draft

# Mission Creek Subbasin Alternative Plan Update

## In Compliance with the Sustainable Groundwater Management Act

## PUBLIC REVIEW DRAFT

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## Appendices

Appendix A: Groundwater Flow Model Calibration Report

Appendix B: Groundwater Flow Model Update Forecasts

Appendix C: Outreach and Engagement Plan

Appendix D: Comments and Responses

Appendix E: Agency Board Resolutions

# Abbreviations and Glossary

| Acronym | Definition |
|---|---|
| °F | Degrees Fahrenheit |
| AD | Assessment District |
| AF | Acre-Feet |
| AFY | Acre-Feet per Year |
| AFY/Ac | Acre-Feet per Year per Acre |
| Agencies | Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) |
| AMI | Advanced Metering Infrastructure |
| AOB | Area of Benefit |
| BCM | Basin Characterization Model |
| bgs | below ground surface |
| CDWR | California Department of Water Resources |
| CII | Commercial, Industrial, and Institutional |
| CM5 RCP 4.5 | CNRM-CERFACS coupled global climate model with the Representative Concentration Pathway 4.5 (Cool-Wet) scenario |
| COCs | Constituents of concern |
| CRA | Colorado River Aqueduct |
| CVMSHCP | Coachella Valley Multi-Species Habitat Conservation Plan |
| CV-SNMP | Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin |
| CVRWMG | Coachella Valley Regional Water Management Group |
| CVWD | Coachella Valley Water District |
| CWA | Coachella Water Authority |
| DAC | Disadvantaged Community |
| DCF | Delta Conveyance Facility |
| DDW | Division of Drinking Water |
| DEH | Department of Environmental Health |
| Delta | Sacramento-San Joaquin River Delta |
| DHSSB | Desert Hot Springs Subbasin |

| Acronym | Definition |
|---|---|
| DHS | Desert Hot Springs |
| DOE | United States Department of Energy |
| DOF | California Department of Finance |
| DWA | Desert Water Agency |
| EDD | California Employment Development Department |
| EPA | Environmental Protection Agency |
| EQ | Equation |
| GAMA | Groundwater Ambient Monitoring and Assessment Program |
| GHB | General Head Boundaries |
| GHSA | Garnet Hill Subarea |
| GIS | Geographic Information System |
| GPCD | Gallons per capita per day |
| GPHUD | Gallons per housing unit per day |
| GRF | Groundwater Replenishment Facility |
| GRP | Groundwater Replenishment Program |
| GSA | Groundwater Sustainability Agency |
| GSP | Groundwater Sustainability Plan |
| GUI | Graphic User Interface |
| GWMP | Groundwater Management Planning Act |
| GWV | GWVistas™ Version 9 |
| HFB | Horizontal Flow Barrier |
| ID-8 | Improvement District-8 (in CVWD's service area) |
| InSAR | Interferometric Synthetic Aperture Radar |
| IRWM | Integrated Regional Water Management |
| IWA | Indio Water Authority |
| IWFM | Integrated Water Flow Model |
| JAWRA | Journal of the American Water Resources Association |
| Kh | Hydraulic conductivity |
| Kv | Vertical hydraulic conductivity |
| Kennedy Jenks | Kennedy/Jenks Consultants, Inc. |
| LADWP | Los Angeles Department of Water and Power |
| LDX | Local Data Exchange |

| Acronym | Definition |
|---|---|
| MC/GH WMP | Mission Creek/Garnet Hill Water Management Plan |
| MC-GRF | Mission Creek Groundwater Replenishment Facility |
| MCL | Maximum Contaminant Level |
| MCSB | Mission Creek Subbasin |
| MDMWC | Myoma Dunes Mutual Water Company |
| MFR | Mountain Front Recharge |
| MGD | Million Gallons per Day |
| µg/L | Micrograms per Liter |
| mg/L | Milligrams per liter |
| MIROC5 RCP 8.5 | MIROC5 global climate model with the Representative Concentration Pathway 8.5 (Hot-Dry) scenario |
| 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) |
| MWELO | Model Water Efficiency Landscape Ordinance |
| N | Nitrogen |
| NAICS | North American Industry Classification System |
| Nancy Wright RWRF | Nancy Wright Regional Water Reclamation Facility |
| NL | Notification Level |
| NRMS | Normalized root mean square |
| NRW | Non-revenue Water |
| N/TDS | Nitrates/Total Dissolved Solids |
| PEST | Parameter Estimation |
| pCi/L | Picocuries per liter |
| Program | Colorado River Basin Salinity Control Program |
| PWS | Public Water System |
| QSA | Quantification Settlement Agreement |
| RAC | Replenishment Assessment Charge |
| RCDEH | Riverside County Department of Environmental Health |

| Acronym | Definition |
|---|---|
| RCFCWCD | Riverside County Flood Control and Water Conservation District |
| RCP | Representative Concentration Pathway |
| RUWMP | Regional Urban Water Management Plan |
| RWQCB | Colorado River Basin Regional Water Quality Control Board |
| ROA | Result-Oriented Activities |
| SCAG | Southern California Association of Governments |
| SB | Senate Bill |
| SGMA | Sustainable Groundwater Management Act |
| SLA | Special Landscape Area |
| SMCLs | Secondary Maximum Contaminant Levels |
| 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 |
| Sy | Specific yield |
| TAZ | Transportation Analysis Zones |
| TDS | Total Dissolved Solids |
| UCR-CCB | University of California Riverside-Center for Conservation Biology |
| USBR | United States Bureau of Reclamation |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| UWMP | Urban Water Management Plan |
| VSD | Valley Sanitary District |
| WMP | Water Management Plan |
| Wood | Wood Environment & Infrastructure Solutions, Inc. |
| WUE | Water Use Efficiency |
| WWR-GRF | West Whitewater Groundwater Replenishment Facility |
| WWTP | Wastewater Treatment Plant |
| WY | Water Year |
| Yuba Accord | Yuba River Accord Dry Year Water Purchase Program |

# Executive Summary

## ES.1 Introduction

The Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD), collectively the Agencies, manage groundwater resources in the Mission Creek Subbasin (MCSB) as the Management Committee. The Agencies have prepared this 2027 Mission Creek Subbasin Alternative Plan Update (2027 MCSB Update) to evaluate groundwater management since the preceding update and to guide continued sustainable management. The 2027 MCSB Update brings together current groundwater information, revised demand projections, updated groundwater modeling, sustainable management criteria (SMCs), and projects and management actions (PMAs). It supports implementation of the Sustainable Groundwater Management Act (SGMA) and includes the five-year Periodic Evaluation of the MCSB Alternative to a Groundwater Sustainability Plan (GSP) (Alternative Plan) that will also be submitted to the California Department of Water Resources (DWR) under separate cover by January 1, 2027.

The foundation of the MCSB Alternative Plan is the 2013 Mission Creek/Garnet Hill Water Management Plan and the 2016 Bridge Document. DWR approved these documents as an Alternative Plan for the MCSB in July 2019. The Agencies submitted the first five-year update in December 2021, referred to as the 2022 Mission Creek Subbasin Alternative Plan Update (2022 MCSB Update). DWR approved that update through its June 2024 periodic review and identified three Recommended Corrective Actions concerning salt and nutrient management, inter-subbasin coordination, and consistency between the monitoring network in the report and DWR's SGMA Portal.

The 2027 MCSB Update retains the sustainability goal established through the prior planning process:

**Sustainability goal**

Maintain sustainable water resources to reliably meet demands for existing and future beneficial use in the Mission Creek Subbasin by managing the water resources cost effectively to avoid undesirable results.

The principal groundwater-condition dataset covers water year (WY) 2019–2020 through WY 2023–2024. Later information is included where identified, including WY 2024–2025 annual-report information, updated well surveys, and subsequent PMA updates supporting groundwater-level forecast modeling. The principal management-planning period is 2025 through 2050. Longer model simulations inform risks though 2075; the planning focus does not establish an end date for sustainable groundwater management.

The 2027 MCSB Update supports continuation of the Alternative Plan's goal and adaptive-management approach, with targeted changes to its technical basis, criteria, and PMAs. Sections 1 through 8 contain the supporting technical information. Section 9 and Table 9-1 constitute the Periodic Evaluation, summarized in ES.9 below. The separate Elements Guide provides navigation and cross-references to SGMA requirements and the contents of the update.

## ES.2 Planning Area

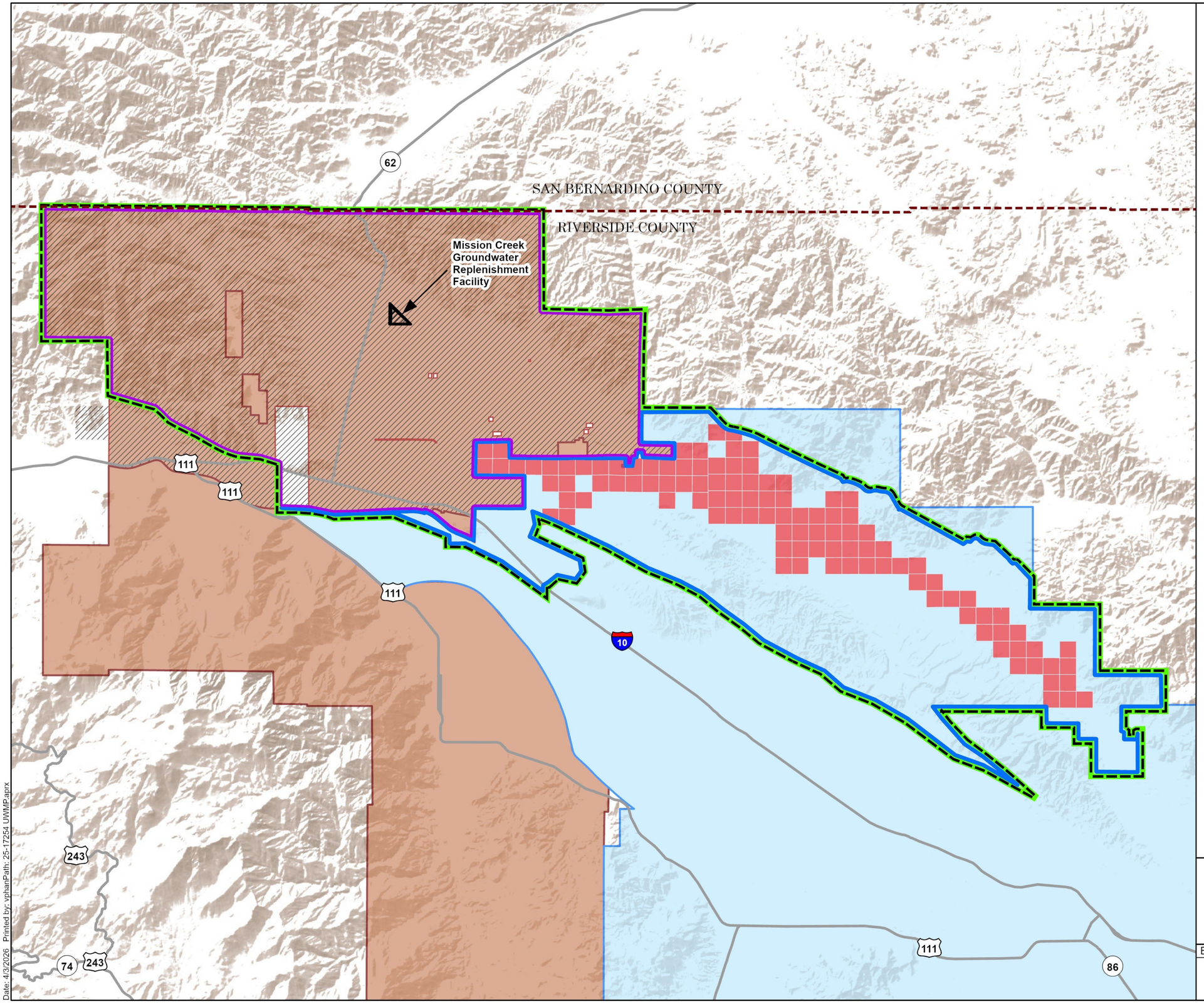
The MCSB (DWR Subbasin No. 7-021.02) occupies part of the northwestern Coachella Valley Groundwater Basin. The broader Planning Area includes the MCSB, the Garnet Hill Subarea (GHSA) of the Indio Subbasin, and adjoining areas served by groundwater produced from these areas. It also includes the Desert Hot Springs Subbasin (DHSSB) and portions of neighboring cities and unincorporated Riverside County. **Figure ES-1** shows the Planning Area and water-agency areas used for water-demand planning.

The Agencies coordinate management through the Management Committee. CVWD and DWA are groundwater sustainability agencies (GSAs) in the MCSB; MSWD participates as a managing partner and municipal water supplier. Both CVWD and MSWD provide retail water service within the Planning Area. DWA's role in the Planning Area is groundwater management and replenishment rather than retail water delivery. Agency service areas, GSA areas, and groundwater-subbasin boundaries serve different purposes and are not interchangeable.

The MCSB aquifer consists predominantly of heterogeneous alluvial deposits under unconfined conditions. Regional groundwater movement is generally from northwest to southeast. Faults form partial barriers to groundwater flow. The Mission Creek Fault separates the MCSB from the DHSSB, the Banning Fault separates the MCSB from the GHSA, and the Garnet Hill Fault separates the GHSA from the main Indio Subbasin. These barriers restrict, but do not eliminate, groundwater exchange between adjacent areas.

For the purpose of the SGMA evaluation, this 2027 MCSB Update addresses the MCSB. The GHSA is evaluated as part of the Indio Subbasin Alternative Plan, although its water use, groundwater conditions, and boundary flows are included in coordinated planning and modeling. The DHSSB is included in the hydrogeologic analysis because it contributes groundwater underflow toward the MCSB.

Beneficial uses considered in the 2027 MCSB Update include municipal supply, private domestic and small water systems, agricultural and industrial uses, and recreation. Section 2.6 describes the Willow Hole mesquite hummocks and local fault-controlled shallow-groundwater conditions as basin-setting information. This information is provided for context and is not part of the MCSB Alternative Plan monitoring program.




AGENCY BOUNDARIES AND PLANNING AREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: Rincon Consultants | Date: 4/3/2026 | Project No.: 1944537*00 |
|---|---|---|

Figure ES-1

Date: 4/3/2026 Printed by: vphanPath: 25-17254 UWMP.aprx

# ES.3 Demand Projections

Section 3 updates water-demand projections in five-year increments from 2025 through 2050. The analysis uses the Southern California Association of Governments' Connect SoCal 2024 housing and employment forecasts, agency water-use records, housing types, seasonal occupancy, conservation, and water-loss assumptions. Municipal demand is evaluated separately from metered and unmetered private groundwater production and then combined to estimate total Planning Area demand.

The Planning Area population estimate, including permanent and seasonal residents, increases from 63,554 in 2025 to 124,832 in 2050 (Table 3-2). This population measure includes seasonal residents rather than representing a full-year resident population alone. The demand method also accounts for year-round water uses associated with seasonally occupied properties, particularly landscape irrigation. Housing mix, indoor efficiency, and outdoor conservation influence how demographic growth translates into water demand.

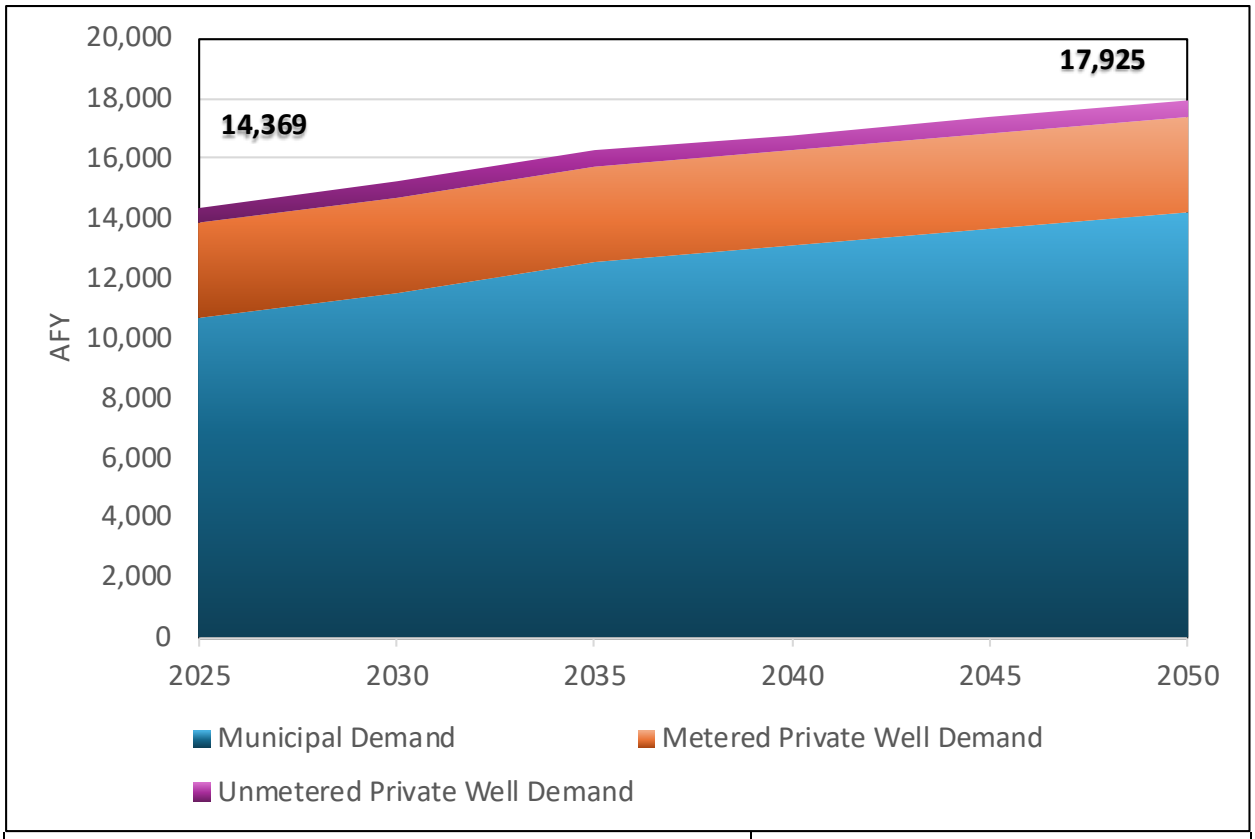
Total projected demand increases from 14,369 acre-feet per year (AFY) in 2025 to 17,925 AFY in 2050, an increase of approximately 3,556 AFY, or 25 percent. Municipal demand increases from 10,644 AFY to 14,200 AFY, approximately 33 percent. Metered private demand is assumed to remain constant at 3,185 AFY, and estimated unmetered private demand is assumed to remain constant at 540 AFY. **Table ES-1** reproduces the values in Table 3-17; **Figure ES-2** shows their composition.

**Table ES-1: Demand Projections for the Planning Area**

| Year | Municipal (AFY) | Unmetered private (AFY) | Metered private (AFY) | Total (AFY) |
|---|---|---|---|---|
| 2025 | 10,644 | 540 | 3,185 | 14,369 |
| 2030 | 11,514 | 540 | 3,185 | 15,239 |
| 2035 | 12,539 | 540 | 3,185 | 16,264 |
| 2040 | 13,070 | 540 | 3,185 | 16,795 |
| 2045 | 13,635 | 540 | 3,185 | 17,360 |
| 2050 | 14,200 | 540 | 3,185 | 17,925 |

Source: Section 3, Table 3-17. AFY = acre-feet per year. Values describe demand in the broader Planning Area, not groundwater extraction from the MCSB alone.

**Figure ES-2: Total Demand Projections for the Planning Area**




**Total Demand Projections for the Planning Area**

DRAFT

Source: Section 3, Figure 3-10. Projected demand includes municipal, metered private, and estimated unmetered private demand. Final figure to be inserted.

Conservation is incorporated into the projection rather than treated as an additional supply. The analysis considers replacement of less-efficient indoor fixtures, changes in housing and water-use patterns, and reductions in outdoor irrigation demand. Actual growth, development timing, water use, and program performance will continue to be evaluated through agency planning and annual reporting. The 2026 regional private-well inventory provides additional information for refining estimates of groundwater use by domestic and small-system users; it does not eliminate all uncertainty in unmetered pumping.

# ES.4 Overview of Water Resources

## Groundwater use and replenishment

Groundwater remains the current direct source of municipal and private water supply in the Planning Area. Imported water supports that supply by replenishing the aquifer. Natural recharge, return flow from water use, and groundwater exchange across subbasin boundaries also contribute to the groundwater system. The water budget accounts for these recharge sources and groundwater extraction together.

Average groundwater extraction from the MCSB was 14,086 AFY during WY 2019–2020 through WY 2023–2024, including the 500 AFY estimate used for unreported minimal-pumper production in historical reporting. Approximately 93 percent of metered extraction was for urban uses, including municipal supply and recreational uses such as golf-course irrigation. Agricultural and industrial pumping accounted for the remainder of metered production. These historical MCSB quantities have a different geographic and accounting basis from the Planning Area demand projections in **Table ES-1**.

CVWD and DWA obtain imported water through their State Water Project (SWP) contracts and exchange arrangements with the Metropolitan Water District of Southern California. Colorado River Aqueduct water is delivered in exchange for SWP supplies and recharged at the Mission Creek Groundwater Replenishment Facility (MC-GRF). Replenishment began in 2002 and has countered historical groundwater-level declines. The volume delivered varies substantially with water availability and the operation of the replenishment program.

Recent groundwater replenishment activity illustrates the variability in water available for replenishment. No recharge was reported at the MC-GRF in WY 2021–2022, followed by 5,275 acre-feet (AF) in WY 2022–2023, and 5,432 AF in WY 2023–2024. In WY 2024–2025 (one year beyond the current Periodic Review period), 10,204 AF was delivered to the MC-GRF. Regional groundwater levels have generally recovered or remained above conditions observed around 2009 across much of the MCSB, but responses vary with location, recharge timing, and pumping. **Figure ES-3** illustrates the historical regional water-level response to groundwater replenishment through WY 2023-2024.

## Supply reliability and recycled water

Future supply reliability remains sensitive to drought, climate conditions, imported-water availability, regulatory constraints, and project implementation. SWP contractual amounts do not represent guaranteed deliveries to the MCSB. The Agencies continue to evaluate imported-water reliability projects and purchases while maintaining the existing replenishment program. The amount, timing, and allocation of future supplies are therefore important assumptions in the forecast scenarios, rather than fixed outcomes (forecast scenarios are more fully described in Section 7).

The Nancy Wright Regional Water Reclamation Facility (Nancy Wright RWRF) was constructed in 2024 and began operating in early 2025. It provides advanced secondary treatment and supports continued septic-to-sewer conversions by providing additional wastewater treatment capacity for the region. The facility and its evaporation/percolation ponds are in the GHSA. Its current discharge therefore returns treated water to the GHSA, not directly to the MCSB.

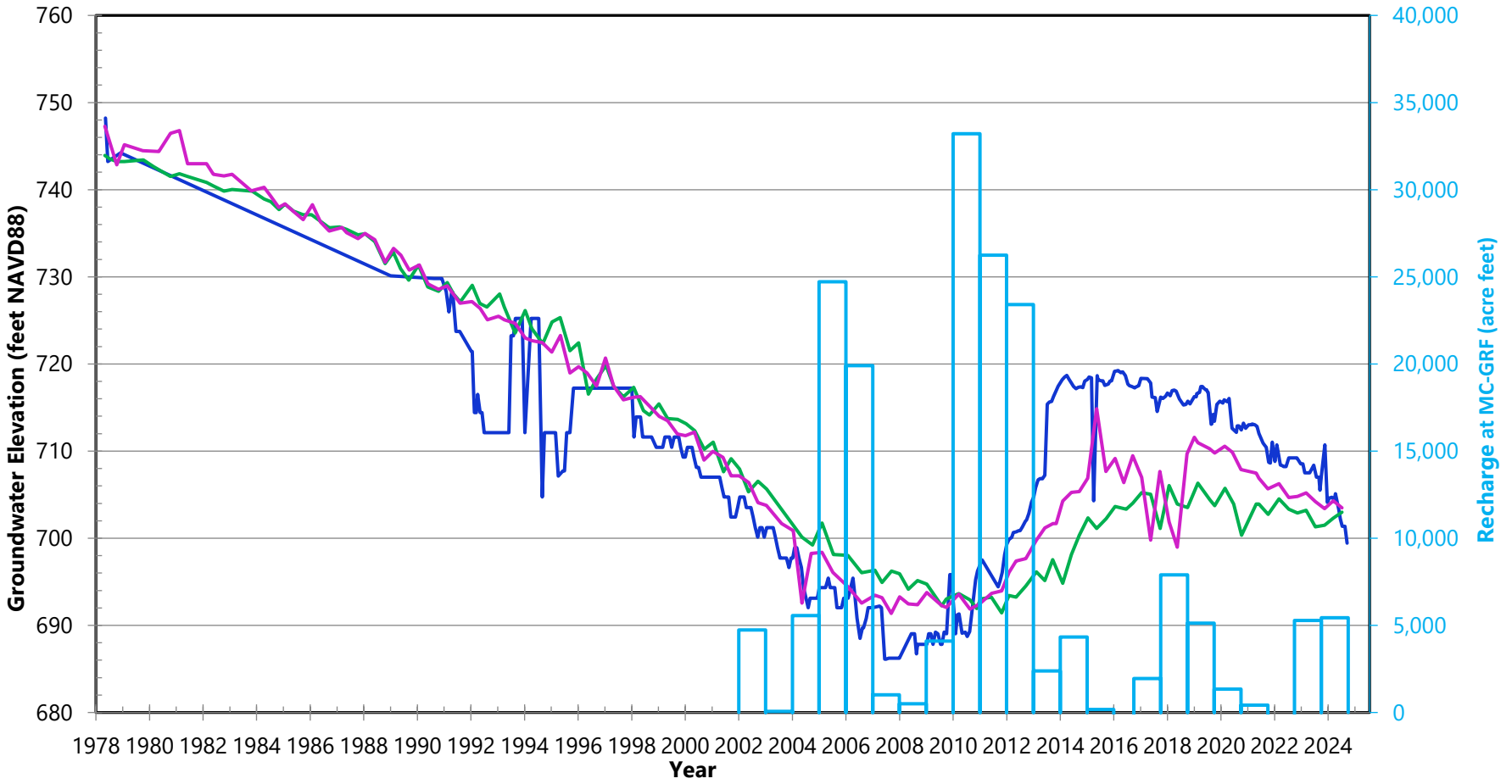
MSWD is planning a Groundwater Replenishment and Reuse Program to further treat and convey water from the Nancy Wright RWRF back to the MCSB for recharge. Additional treatment, conveyance, recharge facilities, monitoring, and approvals would be needed to realize those benefits. Planned tertiary-treatment and distribution improvements at the Horton Wastewater Treatment Plant (WWTP) would support non-potable recycled-water use and reduce groundwater demand.

## Groundwater quality

Groundwater quality is evaluated using agency and other available monitoring information, with attention to historical naturally occurring constituents and possible effects of groundwater management. In the selected WY 2019–2020 through WY 2023–2024 dataset, no results are above California drinking-water maximum contaminant levels (MCLs) for nitrate or uranium. Seven of the 11 wells sampled for hexavalent chromium, Cr(VI), had at least one result above the 10 micrograms per liter (µg/L) drinking-water MCL adopted in 2024.

Cr(VI) concentrations above the newly promulgated MCL occurred historically, including before SGMA implementation. The new drinking-water benchmark therefore does not, by itself, establish that groundwater management has degraded water quality. Municipal purveyors address drinking-water compliance through applicable monitoring, treatment, and source-management programs. The MCSB Alternative Plan separately evaluates whether groundwater extraction, recharge, or other management activities are causing significant and unreasonable groundwater-quality degradation.

Total dissolved solids (TDS) management, salt-loading evaluation, and associated monitoring are being addressed together through the separate Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) effort. Workplans and technical memoranda document progress on this effort. Completion of the CV-SNMP is anticipated in 2027. Associated monitoring results are not evaluated in this 2027 MCSB Update; relevant findings will be considered in a future MCSB Alternative Plan update when available.




**Notes:**

Replenishment by calendar year through 2015 and water year thereafter

No recharge occurred from January 2016 to October 2016 nor during water year 2021-2022

MC-GRF = Mission Creek Groundwater Replenishment Facility

NGVD88 = National Geodetic Vertical Datum 1988

HYDROGRAPHS OF WELLS WITH
GROUNDWATER REPLENISHMENT AT THE MC-GRF
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 04/13/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure ES-3 |

## ES.5 Groundwater Modeling

The 2027 MCSB Model, implemented using MODFLOW2005-NWT, provides a common framework for evaluating groundwater levels, water budgets, inter-subbasin exchange, and the effects of alternative management actions. It represents the MCSB, GHSA, and DHSSB, including restricted groundwater flow across the principal faults. The 2027 MCSB Model domain, grid, layering, and hydraulic parameters remain as established for the 2022 MCSB Model. The 2027 MCSB Model update incorporates additional agency observations, pumping and recharge information, updated mountain-front recharge estimates, and coordinated boundary-flow information with the consultants modeling the Indio Subbasin.

The historical simulation has been extended through 2024. The calibration dataset now includes 8,554 groundwater-elevation observations from 64 wells, compared with 7,128 observations from 58 wells in the preceding 2022 MCSB Model update. Parameter estimation was not rerun for this 2027 MCSB Model update. The principal changes include updated recharge inputs and adjustment or incorporation of boundary flows, rather than wholesale re-estimation of the aquifer hydraulic parameters.

Coordination with the Indio Subbasin Model is particularly important in the area where both model domains overlap in the GHSA. The 2027 MCSB Model update incorporates shared information on hydraulic properties, Whitewater River recharge, and groundwater exchange across the Garnet Hill Fault. Boundary fluxes for 1997 through 2024 were retained from the updated Indio Subbasin Model, with adjustments to earlier-period fluxes. This coordination improves consistency between neighboring subbasin analyses without treating the two planning areas as hydrologically independent.

DWR airborne electromagnetic data provide additional information on subsurface heterogeneity and are consistent with the retained conceptual model of laterally variable coarse-grained deposits within an alluvial system containing discontinuous finer-grained materials. The geophysical information supplements, rather than replaces, well information, measured groundwater levels, and the existing hydrogeologic interpretation.

The updated historical simulation indicates that, although groundwater storage recently declined, it is roughly in balance over the long-term, defined here as periods of 20 years or more. The Periodic Evaluation finds that the MCSB is not in overdraft. Modeled water budgets, annual-report budgets, and the Key Well storage proxy have different spatial and accounting bases; annual-report water budgets use long-term average mountain-front recharge rather than a model simulation for each year. Sustainability is evaluated using the applicable SMCs, water budget, and PMA implementation together.

## ES.6 Sustainable Management Criteria

The 2027 MCSB Update retains the existing nine groundwater-level Representative Monitoring Sites, referred to as Key Wells, and retains 2009 as the reference year for groundwater-level management. **Figure ES-4** shows the Key Well locations. The measurable objectives (MOs)

describe the groundwater conditions the Agencies seek to maintain, while minimum thresholds (MTs) define the limits used in the undesirable-results criteria. The 2027 MCSB Update refines their technical basis without substituting a new reference year.

## Groundwater levels and storage

For the seven Key Wells with 2009 measurements, the MOs continue to use the lowest measured groundwater elevation in that calendar year. At well 03S04E04P001S (4P01) and well 03S05E15R001S (15R01), which lack 2009 measurements, the MOs remain provisional and are revised using a contour-based interpretation of 2009 low groundwater elevations instead of the previous modeled estimates. Updated surveys improve the accuracy of the survey to the common datum of the North American Vertical Datum of 1988 (NAVD88). MTs are recalculated from the available groundwater-level variability over WY 2001–2002 through WY 2023–2024. With the additional data derived from extending the period, well 4P01 now uses its own variability record.

On the common NAVD88 comparison basis in Table 6-2, the well 4P01 MO changes from 732.3 to 708.0 feet above mean sea level (msl) and its MT changed from 724.4 to 703.4 feet above msl. At well 15R01, the MO changes from 698.7 to 690.1 feet above msl and its MT from 692.0 to 686.6 feet above msl. Changes to the other MTs are 1.5 feet or less. These revisions reflect improved historical groundwater-level estimates and the extension of the variability record. The groundwater-storage and interim land subsidence proxy criteria are also revised to reflect the changes to the groundwater-level criteria.

A groundwater-level undesirable result occurs when the annual-average groundwater elevation at the same four or more of the nine Key Wells is below the applicable MT in each of three consecutive water years. Groundwater storage uses a separate basin-wide proxy: the arithmetic mean of the nine Key Well annual-average elevations is compared with the mean of their MTs. A groundwater storage undesirable result occurs when that mean groundwater elevation is below the mean MT in each of three consecutive water years.

The criteria were also evaluated against available well-construction and pump-setting information in relation to beneficial uses, other sustainability indicators, and adjacent subbasins. No dry or failed wells were identified. One municipal supply well was identified as a potential pump-setting limitation, for which lowering the pump is identified as mitigation.

San Bernardino County

Riverside County

Mission Creek

Mission Creek Groundwater Replenishment Facility

San Bernardino Mountains

Little San Bernardino Mountains

Whitewater River

Bonnie Bell

23N02

28J01

36D01

36K01

04P01

12C01

11L04

17J01

15R01

Whitewater River Groundwater Replenishment Facility

| 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 3505 | 200 - 480 |
| 15R01 | 03S05E15R001S | 15R01 | 200 - 400 |
| 17J01 | 03S05E17J001S | 17J01 | 182 - 405 |

N

0 4,000 8,000

Feet

## Explanation

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

## Notes

1. bgs = below ground surface.
2. SWN=State Well Number

Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018.

KEY WELLS FOR GROUNDWATER LEVELS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

Figure ES-4

Date: 9/15/2026 Printed by: USMW719917
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### Groundwater quality and land subsidence

The groundwater-quality framework retains the nitrate and uranium criteria established in the preceding 2022 MCSB Update. Their MTs and MOs are based on the applicable California primary drinking-water MCLs: 10 milligrams per liter (mg/L) for nitrogen as nitrate and 20 picocuries per liter (pCi/L) for uranium. No separate numeric Cr(VI) MT, MO, or undesirable-result criterion is added because Cr(VI) occurs naturally above its MCL in the MCSB. The Agencies will evaluate material changes in Cr(VI) conditions and investigate a possible relationship to groundwater management. Consideration of potential TDS criteria and management measures is part of the separate CV-SNMP effort.

Available information, including the 2015–2024 DWR interferometric synthetic aperture radar (InSAR) record, has not identified groundwater-extraction-related land subsidence in the MCSB. Groundwater-level criteria continue to serve as an interim proxy for land subsidence potential, supported by InSAR review and available benchmark information. The U.S. Geological Survey (USGS) land subsidence evaluation, anticipated in 2027, will inform assessment of land subsidence potential and the interim proxy.

**Table ES-2: Sustainable Management Criteria Overview**

| Indicator | Criteria and evaluation approach |
|---|---|
| Groundwater levels | Nine Key Wells; 2009 reference retained. A groundwater-level undesirable result requires annual-average elevations below the respective MTs at the same four or more Key Wells in each of three consecutive water years. |
| Groundwater storage | Mean of the nine Key Well annual-average elevations serves as the monitoring proxy. An undesirable result requires that mean to be below the mean MT in each of three consecutive water years. Modeled storage changes are evaluated separately. |
| Land subsidence | Groundwater-level MTs and the groundwater-level undesirable-result criterion serve as interim proxies, supported by InSAR and available benchmark data. The USGS land subsidence evaluation is anticipated in 2027. |
| Groundwater quality | Nitrate and uranium retain MCL-based MTs and MOs; an undesirable result occurs when concentrations in municipal supply wells exceed their respective MTs. Cr(VI) is evaluated for historical occurrence and potential management-related degradation without separate numeric SMCs. Potential TDS criteria are considered through the separate CV-SNMP effort. |

Note. This overview does not replace the complete indicator-specific definitions in Section 6.

Consistent with previous findings, seawater intrusion and depletion of interconnected surface waters remain excluded as applicable indicators. The 2027 MCSB Update does not establish SGMA Management Areas or interim milestones.

## ES.7 Water Management Forecasting

Section 7 evaluates three management packages—Baseline, Near-Term Projects, and Future Projects—under two climate assumptions: CNRM-CM5 RCP 4.5 (a relatively mild climate change scenario) and MIROC5 RCP 8.5 (a more severe climate change scenario). This creates six forecast scenarios. The two climate cases provide different estimates of future recharge and

supply conditions. The principal management comparison extends through WY 2049-2050, while the extended model simulation provides additional information through WY 2074-2075.

The Baseline scenarios provide comparison cases for evaluating the incremental effects of additional PMAs. They include the demand forecast and ongoing management assumptions, including the Nancy Wright RWRF's discharge to the GHSA, but are not the Agencies' selected implementation strategy. Near-Term Projects add planned recycled water return to the MCSB. Future Projects build on that package with imported water reliability components associated with the Sites Reservoir and the Delta Conveyance Project.

**Table ES-3: Forecast Scenario Framework**

| Management package | Principal management comparison | Climate cases |
|---|---|---|
| Baseline | Ongoing management and demand assumptions; Nancy Wright RWRF return flow remains in the GHSA. Comparison case without the additional project package. | CNRM-CM5 RCP 4.5; MIROC5 RCP 8.5 |
| Near-Term Projects | Baseline plus planned conveyance of recycled water back to the MCSB for recharge/replenishment. | CNRM-CM5 RCP 4.5; MIROC5 RCP 8.5 |
| Future Projects | Near-Term package plus planned imported water reliability components, including Sites Reservoir and Delta Conveyance. | CNRM-CM5 RCP 4.5; MIROC5 RCP 8.5 |

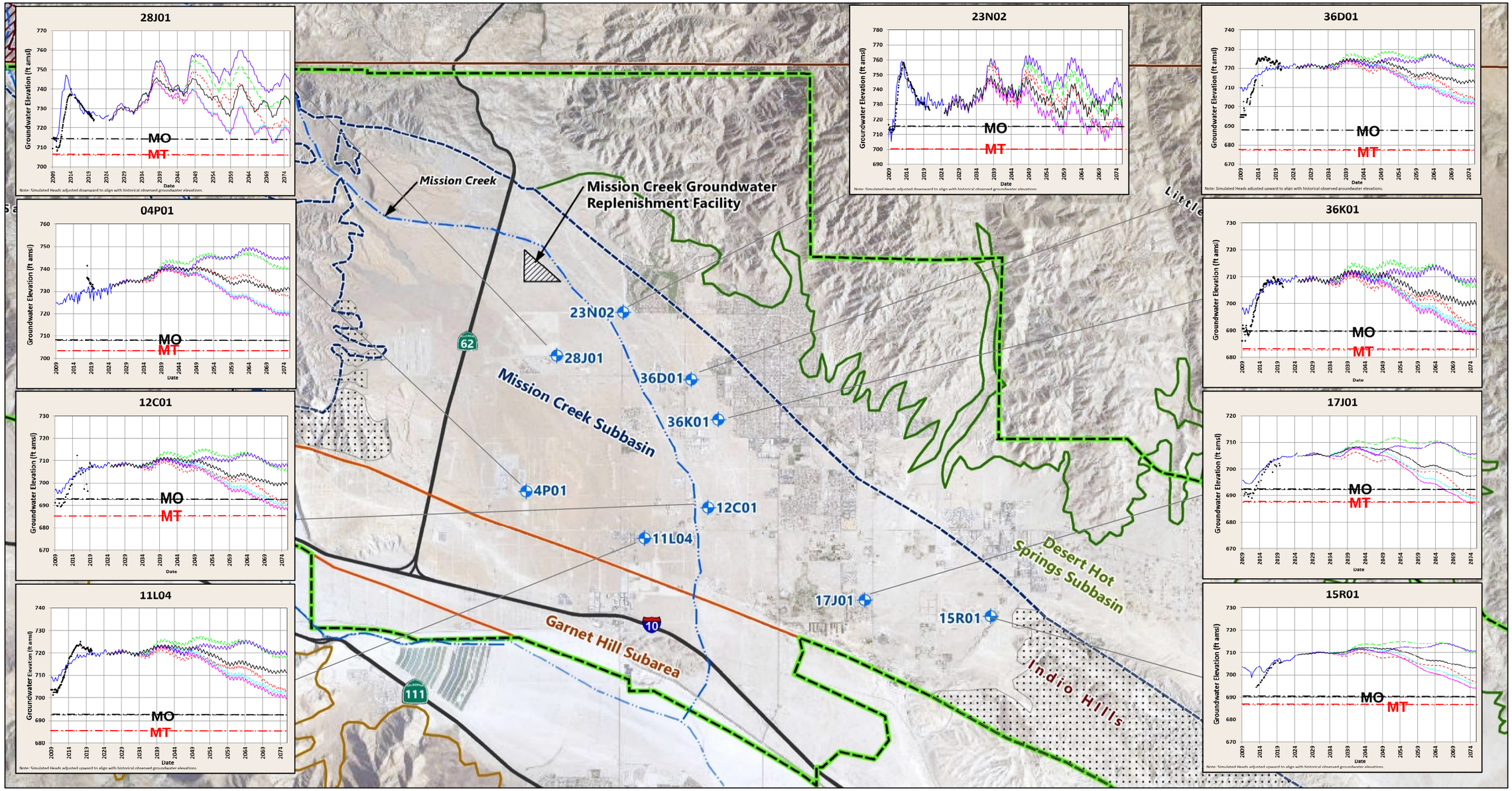
Sources: Sections 7.2 and 8.5. Project timing, supply assumptions, and scenario outputs are described in Section 7 and Appendix B; the evaluation findings are summarized in Section 9 and Table 9-1.

Forecast evaluation compares groundwater elevations at the nine Key Wells with the revised MOs and MTs and considers cumulative change in storage and inter-subbasin groundwater exchange. A simulated elevation below an MO does not, by itself, establish an undesirable result. Modeled cumulative storage change relative to 2009 is evaluated separately from the annual-average Key Well proxy used for the groundwater-storage SMC.

**Forecast findings through 2050**

As shown in ES-5, under both CNRM-CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions, the Near-Term Projects and Future Projects forecasts indicate that planned PMAs can maintain groundwater levels above MOs and MTs at all nine Key Wells through 2050. Cumulative modeled storage change relative to 2009 is positive under both climate change assumptions. However, a negative trend in both storage and water levels in Key Wells begins prior to 2050 under the MIROC5 RCP8.5 future scenarios.

These findings support continued implementation of the MCSB Alternative Plan through 2050 under the evaluated project, demand, and climate assumptions. Negative cumulative modeled storage change under MIROC5 RCP 8.5 and groundwater-level declines beyond 2050 (**Figure ES-5, ES-6,** and **ES-7**) reinforce the importance of continued replenishment, conservation, planned recycled-water and imported water reliability projects, monitoring, and adaptive management. Project timing, supply availability, and actual demands will be evaluated through the adaptive-management process.




Monitoring well (Key Well)
Groundwater Replenishment Facility
Planning Area
Streams
Highway/road
Mission Creek Subbasin

Garnet Hill Subarea of Indio Subbasin
Lower permeability/non-water bearing sediments/bedrock
Desert Hot Springs Subbasin
Indio Subbasin
Mission Creek Subbasin

Observed
Baseline CM5-4.5
NearTerm CM5-4.5
Future CM5-4.5
MO

Calibration v06r14
Baseline Miroc-8.5
NearTerm Miroc-8.5
Future Miroc5-8.5
MT

Note:

1. Ground surface elevation in feet above mean sea level.
2. See Appendix B for individual Key Well Hydrographs

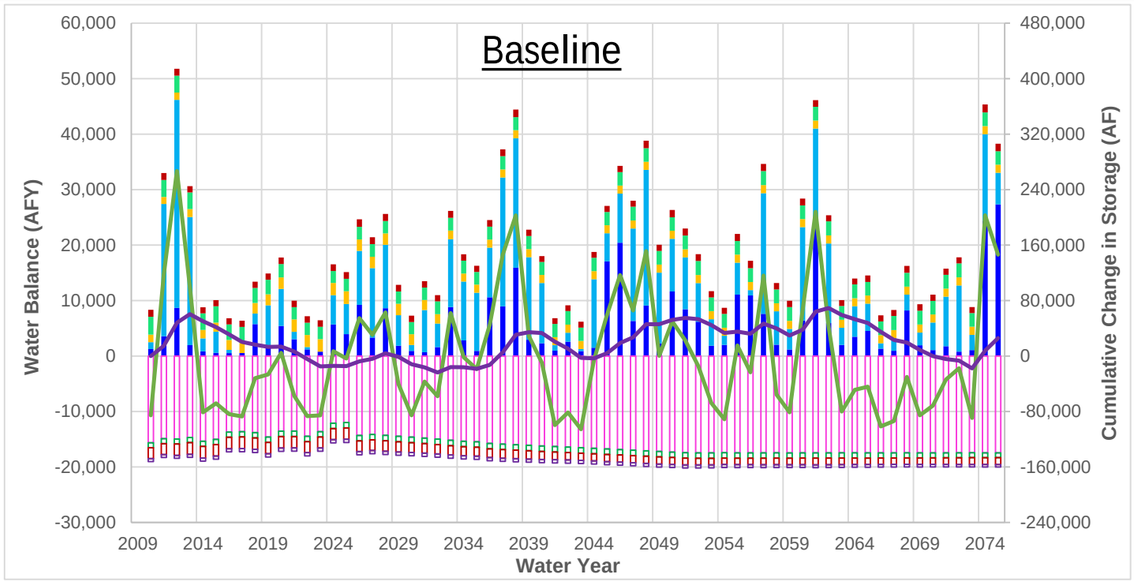
Abbreviations:

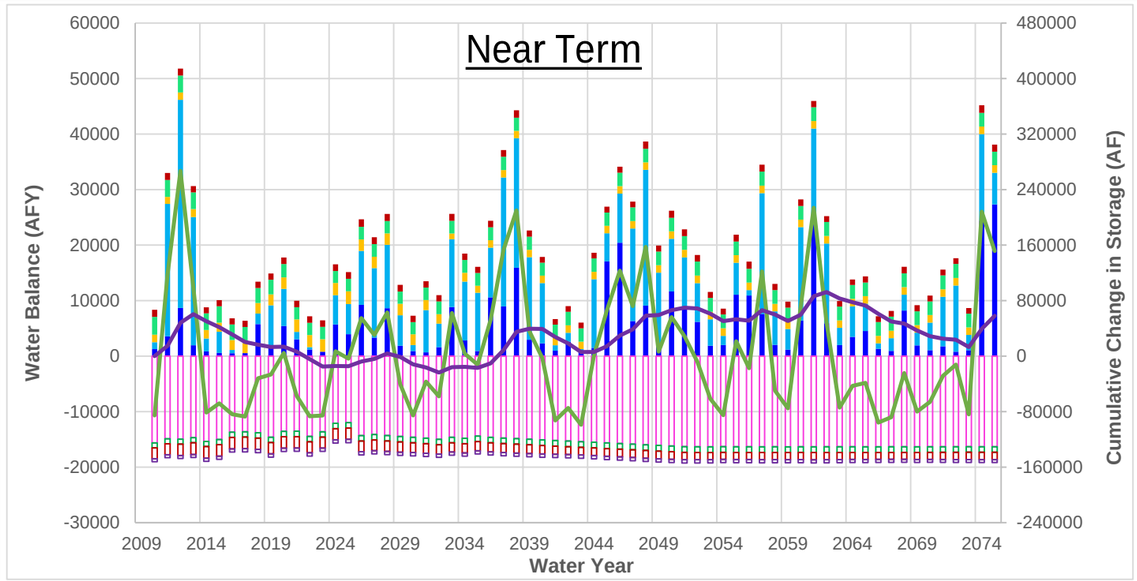
MO = Measurable Objective

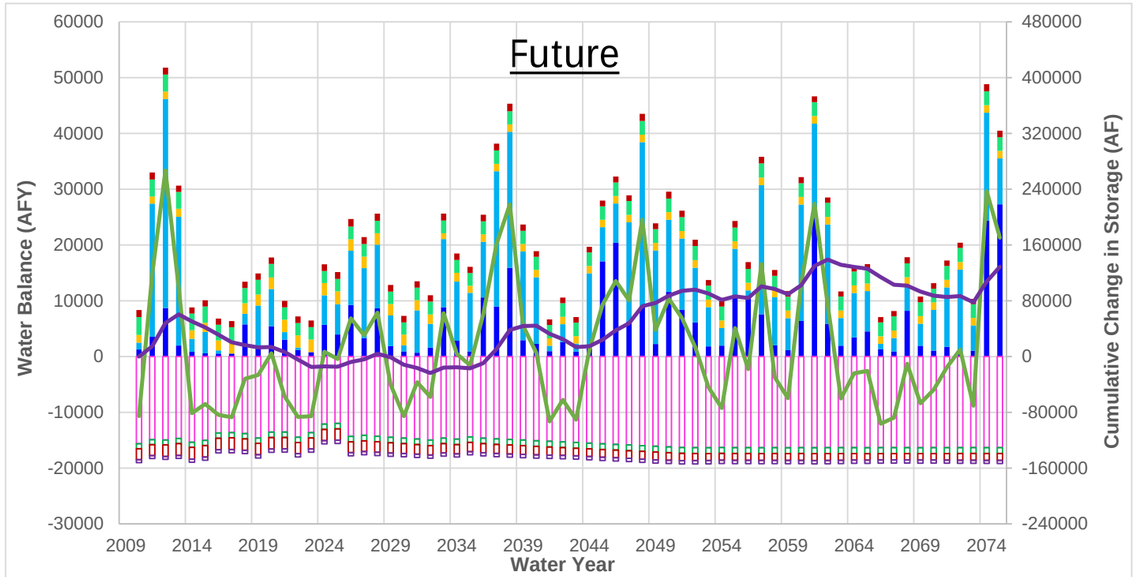
# Forecast Simulation Results For Key Wells with Measurable Objectives and Minimum Thresholds

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/08/2026 | Project No.: US0043968.2616 |
|---|---|---|
| | | Figure ES-5 |



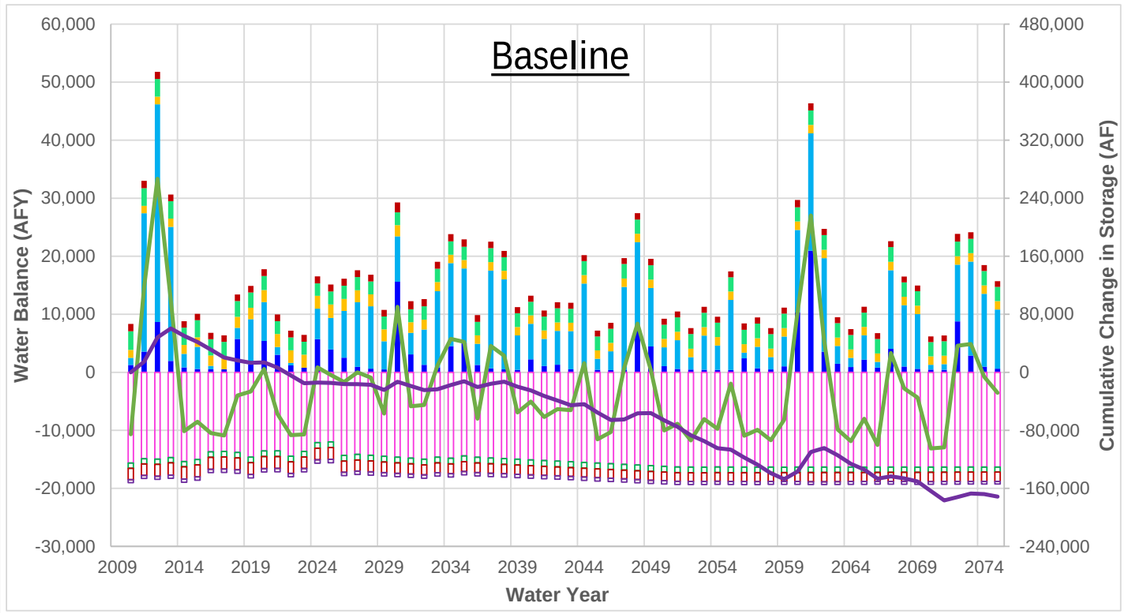

Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin

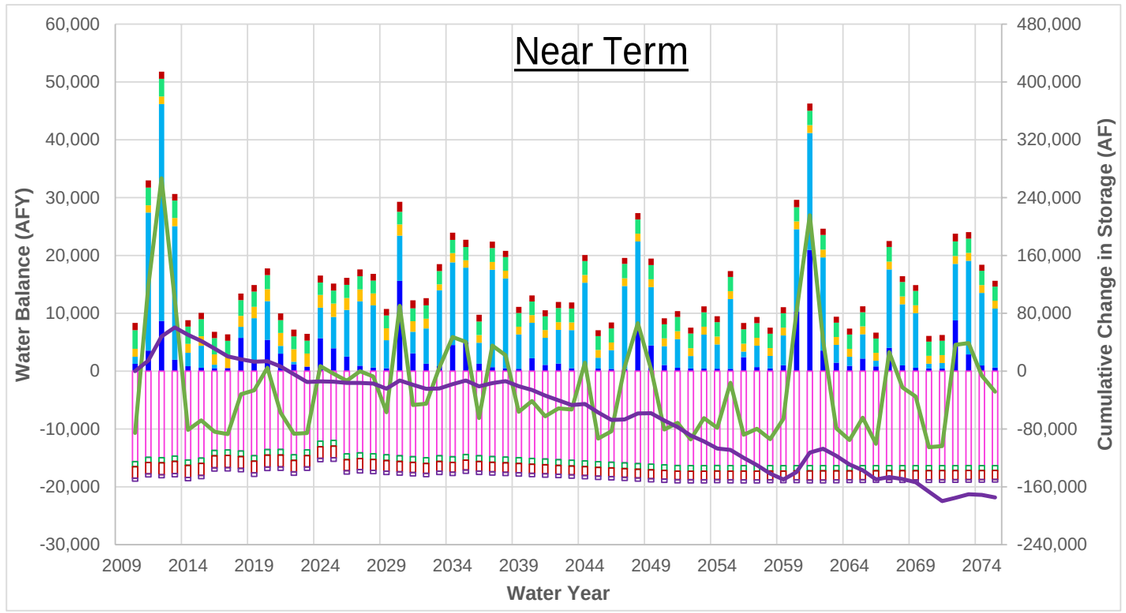
+ Natural Recharge
+ GW Replenishment
+ Wastewater Return
+ Other Return Flows
+ Underflow from DHSSB
- Pumping
- Evapo-transpiration
- Underflow to GHSA
- Underflow to Indio Hills
Change in Storage
Cumulative Change in Storage

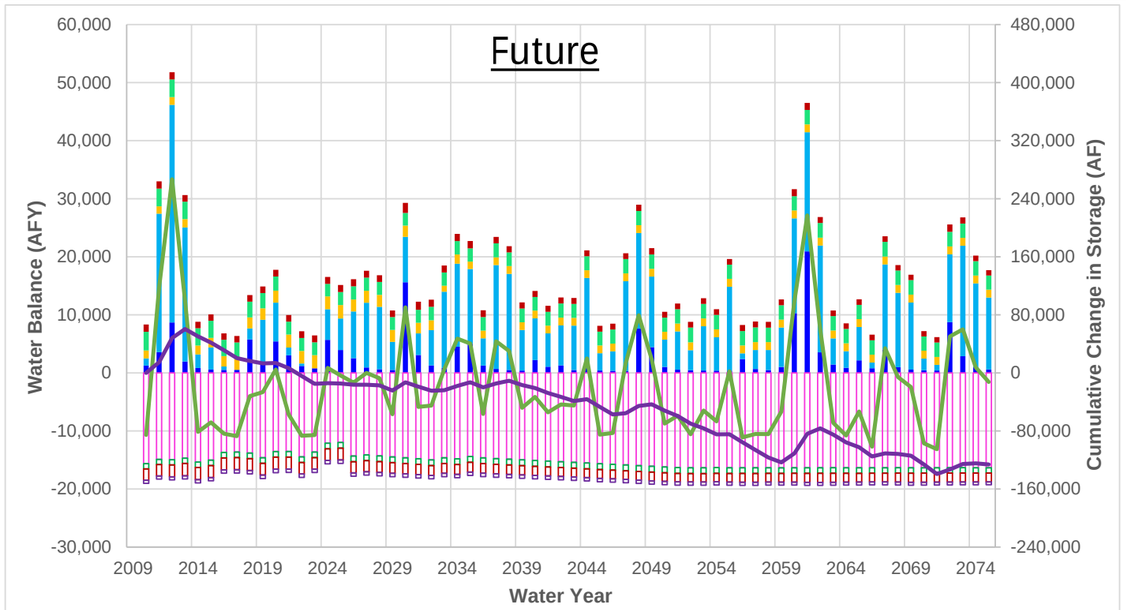
2009 - 2074 Simulated
Water Balances for MCSB
Forecast Scenarios CM5 RCP 4.5
Mission Creek Subbasin Alternative Update
Coachella Valley, California

By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616

Figure ES-6




Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin
GW = Groundwater

+ Natural Recharge
+ GW Replenishment
+ Wastewater Return
+ Other Return Flows
+ Underflow from DHSSB
- Pumping
- Evapo-transpiration
- Underflow to GHSA
- Underflow to Indio Hills
Change in Storage
Cumulative Change in Storage

2009 - 2074 Simulated
Water Balances for MCSB
Forecast Scenarios MIROC5 RCP 8.5
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure ES-7 |

# ES.8 Projects and Management Actions

The PMAs in Section 8 carry forward the management approach that has supported groundwater-level recovery while responding to new information and changing water-supply conditions. The 2027 MCSB Update distinguishes ongoing programs, planned facilities, completed work, and removed projects. Benefits already realized are separated from benefits that depend on future design, funding, construction, treatment, conveyance, or regulatory approvals.

Water conservation remains an ongoing demand-management activity. The Agencies continue urban conservation and education, turf-irrigation reduction, and implementation of Water Shortage Contingency Plans (WSCPs). The Regional Water Conservation Study completed in October 2024 provides information on conservation effectiveness and cost-effectiveness to help target future programs. Temporary shortage responses were implemented during the 2021–2022 statewide drought and subsequently lifted as conditions improved.

The existing imported water replenishment program remains the principal ongoing supply-management program directly supporting the MCSB. Planning continues for the Nancy Wright RWRF Groundwater Replenishment and Reuse Program and the Horton WWTP recycled-water system. CVWD and DWA continue participation in the Delta Conveyance and Sites Reservoir projects to improve imported water reliability. The Lake Perris Dam Seepage Recovery Project has been removed following feasibility reassessment and discontinuation of participation; it is not an active supply component.

Water-quality protection includes septic-to-sewer conversions, tracking regulatory actions, well-source assessment and protection, coordination with land-use planning, and public education. CV-SNMP development, salt-loading evaluation, and associated monitoring are being addressed together as a separate effort. Two supporting water-quality monitoring wells, TSS_MC-2 and TSS_MC-5, were completed in the Planning Area in 2025. Their monitoring results are not evaluated in this 2027 MCSB Update; relevant CV-SNMP findings will be considered in a future MCSB Alternative Plan update when available. A study of uranium occurrence and migration risk remains a planned action.

SGMA implementation includes continued Management Committee coordination, the USGS land subsidence evaluation, maintenance of water-related data, annual reporting, five-year MCSB Alternative Plan updates, and pursuit of funding. Well-management actions include coordination on well construction and destruction, and consideration of expanded groundwater-production reporting. Completion of the regional Domestic and Small Water System Well Inventory and Vulnerability Assessment in 2026 improves knowledge of private wells and supports refinement of extraction estimates and vulnerability assessments.

**Table ES-4: Principal Project and Program Status**

| Project or program | Status and role in the 2027 update |
|---|---|
| Imported water replenishment<br>WS-1 | Ongoing. Continue recharge at MC-GRF as supplies become available and evaluate actual groundwater response. |
| Nancy Wright RWRF and MCSB replenishment<br>WS-2 | Nancy Wright RWRF construction completed in 2024; operations began in early 2025, with discharge in the GHSA. Planning for additional treatment and conveyance to replenish the MCSB continues; those facilities are planned. |
| Horton WWTP recycled-water system<br>WS-3 | Planning and funding efforts continue. Tertiary treatment and distribution facilities for non-potable reuse remain planned. |
| Delta Conveyance and Sites Reservoir<br>WS-4 and WS-5 | Participation and planning continue. Future reliability benefits depend on implementation and are not existing MCSB supplies. |
| CV-SNMP and associated monitoring<br>WQ-6 through WQ-8 | Separate ongoing effort addressing TDS, salt loading, and associated monitoring. Completion is anticipated in 2027; findings will be considered in a future MCSB Alternative Plan update when available. Monitoring results are not evaluated in this 2027 MCSB Update. |
| Completed technical studies | Regional Conservation Study completed in October 2024; regional domestic and small-system well inventory and vulnerability assessment completed in 2026. |
| Lake Perris Dam Seepage Recovery | Removed from the active portfolio following feasibility reassessment and discontinuation of participation. |

Note. This table highlights major activities; the complete PMA descriptions remain in Section 8.

The Agencies will continue to use the monitoring–reporting–evaluation–adjustment–implementation cycle described in Section 8.2. Conditions approaching an MT will prompt evaluation of potential causes and appropriate management responses, rather than waiting for the full duration of an undesirable-result criterion. Changes may include accelerating, refining, adding, or deferring PMAs due to updated technical evaluations, new implementation opportunities, evolving agency priorities, and changing subbasin conditions. Financing will continue to be evaluated through agency revenues, replenishment assessments, grants, loans, and other project-specific mechanisms described in Section 8. Listing a funding source does not imply an award or commitment.

# ES.9 Periodic Evaluation

Section 9 and Table 9-1 provide the Agencies' evaluation of MCSB Alternative Plan implementation, including groundwater conditions, performance relative to the SMCs, significant new information, MCSB Alternative Plan revisions, PMA implementation and effects, monitoring-network adequacy, and inter-subbasin coordination. The evaluation supports retention of the sustainability goal and management approach, with the targeted revisions summarized above. The evaluation topics in Sections 356.4 and 354.38 of Title 23 of the California Code of Regulations are used as an organizing framework for the MCSB Alternative Plan evaluation.

## Observed conditions and evaluation findings

For the WY 2019–2020 through WY 2023–2024 review period, the Periodic Evaluation reports groundwater elevations above the then-applicable MTs at all nine Key Wells. In WY 2023–2024, well 4P01 was 0.3 foot above its provisional MT and the other eight Key Wells were above their MOs. The groundwater-level proxy for storage remained above its MO throughout the review period.

The 2027 MCSB Update retains the nine Key Wells and the 2009 reference year while improving survey accuracy, estimates of 2009 low groundwater levels at wells 4P01 and 15R01, and the groundwater-level variability used to calculate their MTs. These revisions also update the groundwater storage and interim land subsidence proxy criteria. The revised MOs at wells 4P01 and 15R01 remain provisional because groundwater-level measurements are unavailable for those wells in 2009.

Under both climate assumptions, the Near-Term Projects and Future Projects forecasts indicate that planned PMAs can maintain groundwater levels above MTs at all nine Key Wells through 2050. Cumulative modeled storage change relative to 2009 is positive under CNRM-CM5 RCP 4.5 and negative under MIROC5 RCP 8.5 at 2050. Under MIROC5 RCP 8.5, Future Projects reduce cumulative storage loss but do not eliminate it by 2050. These forecast findings support continued project implementation and adaptive management.

The selected groundwater-quality dataset contains no results above the retained nitrate and uranium criteria. Cr(VI) is evaluated against historical conditions and for potential management-related degradation, without a separate numeric Cr(VI) SMC in this 2027 MCSB Update. Available information has not identified groundwater-extraction-related land subsidence. Continued InSAR review and the USGS land subsidence evaluation support assessment of the interim groundwater-level proxy.

## Response to DWR's Recommended Corrective Actions

The 2027 MCSB Update documents work responsive to the three Recommended Corrective Actions identified in DWR's June 2024 review. **Table ES-5** summarizes the work incorporated into this 2027 MCSB Update and the continuing actions.

**Table ES-5: Status of DWR Recommended Corrective Actions**

| Recommended Corrective Action | Response and continuing work |
|---|---|
| 1. Salt and nutrient management | CV-SNMP development, salt-loading evaluation, and associated monitoring are being addressed together as a separate effort, with completion anticipated in 2027. Monitoring results are not evaluated in this 2027 MCSB Update. Relevant findings will be considered in a future MCSB Alternative Plan update when available; the recommendation remains in progress. |
| 2. Inter-subbasin coordination | The 2027 MCSB Update documents coordinated hydrogeologic information, model boundary flows, and evaluation of effects on adjacent areas, particularly the GHSA/Indio Subbasin model interface. Coordination of criteria, monitoring, and technical information continues. |
| 3. Report/Portal monitoring consistency | Following adoption of the 2027 MCSB Update by the Agency Boards, the Agencies will complete a comprehensive review and update of the SGMA Portal Monitoring Network Module. The review will verify Key Well survey elevations, align SMC entries with adopted values, and confirm inclusion of the water-quality monitoring sites identified in the adopted MCSB Alternative Plan, including those that are not Key Wells. |

## Monitoring and implementation priorities

The retained nine Key Wells network, other Agency groundwater-level and production records, water-quality monitoring, and InSAR and benchmark information support the overall sustainability assessment. The monitoring network and frequency of monitoring are considered sufficient for that assessment, and no new monitoring is proposed under the MCSB Alternative Plan in this update. Remaining information needs to concern the separate CV-SNMP effort, including associated monitoring and consideration of potential TDS criteria, and the USGS land subsidence evaluation. Completion of both efforts is anticipated in 2027.

The Agencies will continue to compile and evaluate groundwater levels, extraction, replenishment, water quality, and available land subsidence information through existing data-management and annual-reporting programs. Relevant CV-SNMP findings will be considered in a future MCSB Alternative Plan update when available. Following adoption of the 2027 MCSB Update by the Agency Boards, the SGMA Portal Monitoring Network Module will be reviewed and updated to reflect the adopted 2027 MCSB Update.

Maintaining sustainable groundwater management requires continued replenishment and conservation, advancement of appropriate recycled water and imported water reliability components, protection of groundwater quality, and response to actual monitoring results. The adaptive-management process provides the means to modify implementation when demands, project timing, supplies, or groundwater conditions depart from the planning assumptions. The Agencies' commitment to sustainable management continues beyond the 2050 planning focus.

# 1. Introduction

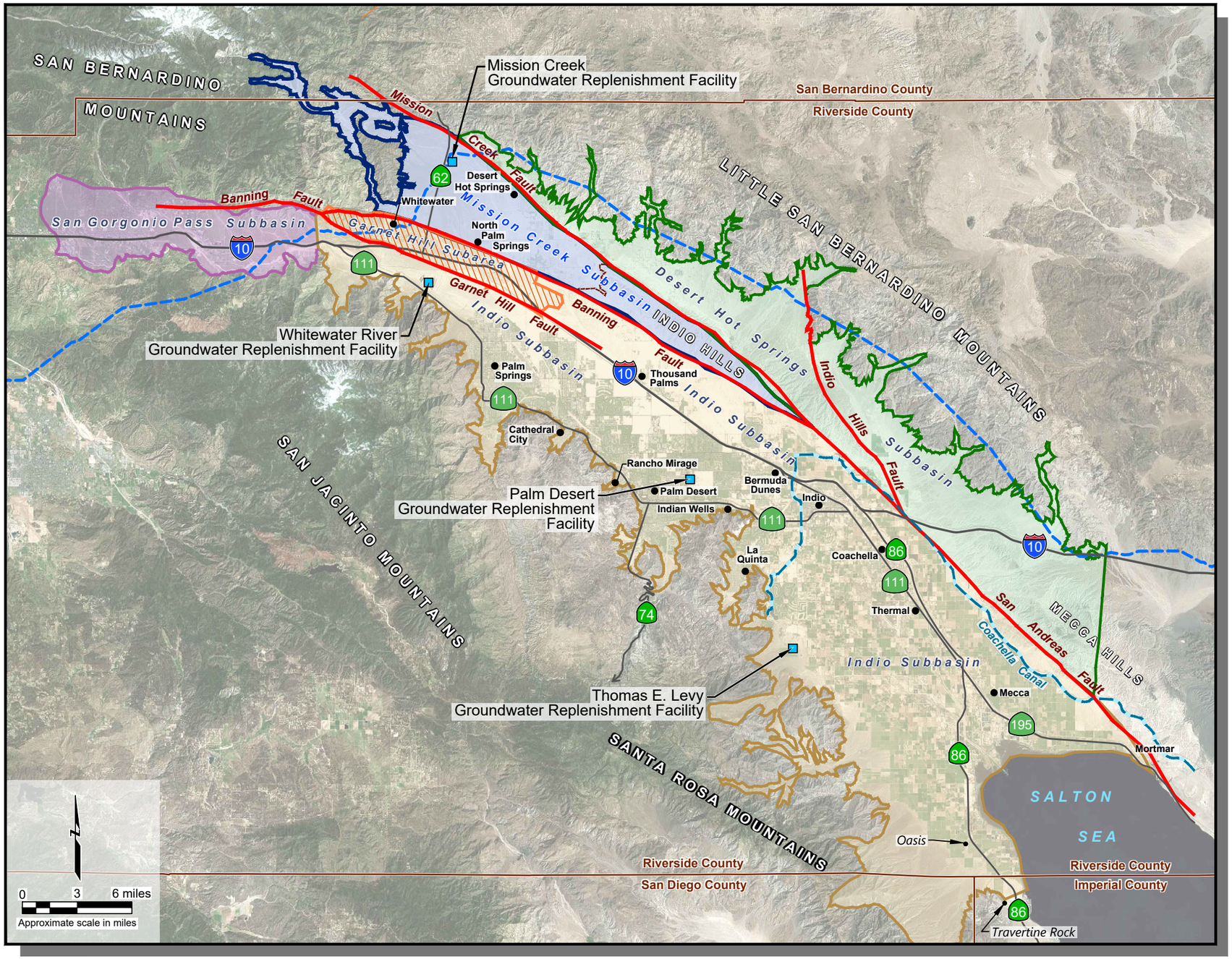
Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD), collectively referred to as the Agencies, serve as the Management Committee for the Mission Creek Subbasin (MCSB) and the adjacent Garnet Hill Subarea (GHSA) of the Indio Subbasin in the northern Coachella Valley. Together, the Agencies are complying with the 2014 Sustainable Groundwater Management Act (SGMA) through the development, periodic update, and implementation of this MCSB Alternative to a Groundwater Sustainability Plan (GSP) [Alternative Plan].

The broader Coachella Valley Groundwater Basin consists of four principal subbasins: the Indio Subbasin, the MCSB, the Desert Hot Springs Subbasin (DHSSB) and San Gorgonio Pass Subbasin (**Figure 1-1**). For purposes of this document, subareas of the Indio Subbasin outside the GHSA (e.g., Palm Springs Subarea) are grouped as the main Indio Subbasin. The basin boundaries for the MCSB, GHSA, DHSSB, and Indio Subbasin are shown on **Figure 1-2,** while **Figure 1-3** illustrates the individual service-area boundaries of the Agencies.

The Agencies recognize the vital role of the MCSB and GHSA as groundwater resource areas to the local communities and are committed to reliably meeting local demands and protecting water quality in a sustainable and cost-effective manner. The Agencies also recognize the value of SGMA for providing guidance and establishing metrics for documenting groundwater sustainability. The Agencies have retained WSP USA Inc. (WSP) and Rincon Consultants, Inc. (Rincon) to prepare this 2027 Mission Creek Subbasin Alternative Plan Update (2027 MCSB Update) to satisfy SGMA requirements for the MCSB and to guide future water management actions for both the MCSB and the GHSA.

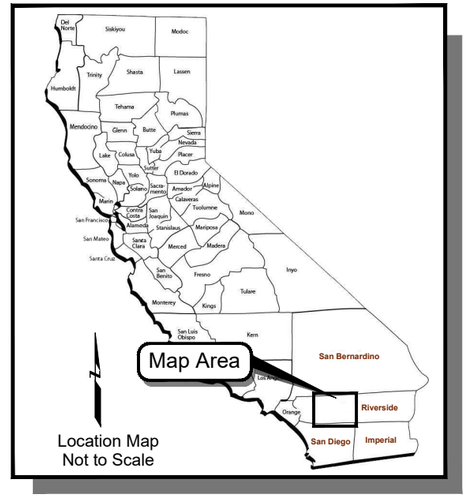
Although the GHSA is included with the MCSB for water management planning, SGMA requirements for the GHSA are addressed separately in the 2027 Indio Subbasin Water Management Plan Update prepared separately by Todd Groundwater (Todd) and Rincon (Todd/Rincon, 2026). Consequently, the GHSA is not included in the Periodic Evaluation portion of this 2027 MCSB Update outside of the discussion of coordination with and assessment for impacts to adjacent subbasins.

This section states the objectives of the 2027 MCSB Update and provides background for development of the initial MCSB Alternative Plan development and the 2022 MCSB Alternative Plan Update (2022 MCSB Update). In addition, it also provides an overview of the 2027 MCSB Update organization, development process, relationships to other planning efforts, and description of stakeholder involvement.




## 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
- Colorado River Aqueduct




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.

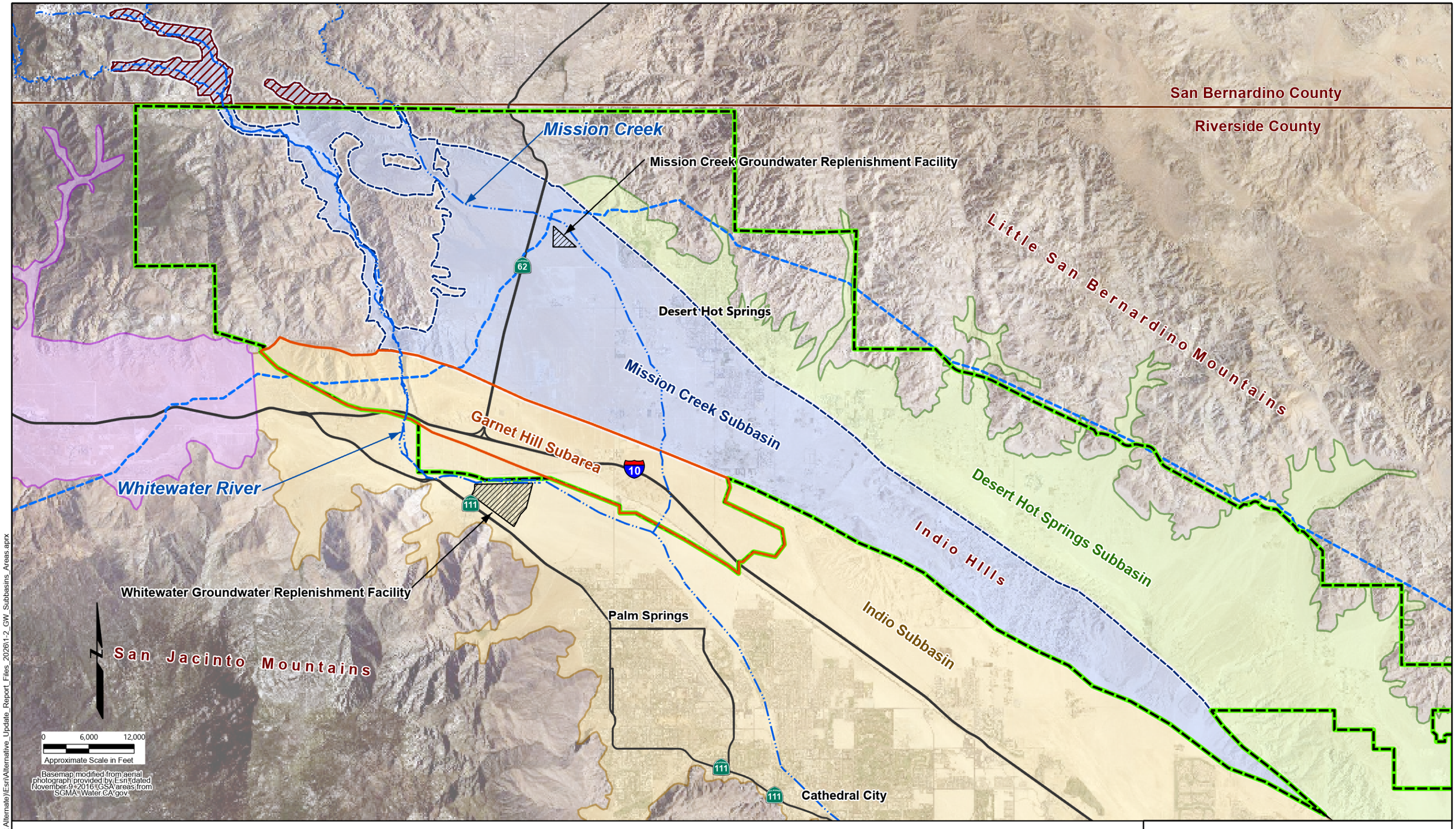
## Note:

All locations are approximate.

COACHELLA VALLEY GROUNDWATER BASIN
SUBBASIN and GARNET HILL SUBAREA
Mission Creek Alternaive Update
Coachella Valley, California

| By: jrw | Date: 03/31/2026 | Project No. 2024US352616 |
|---|---|---|
| wsp | | Figure **1-1** |

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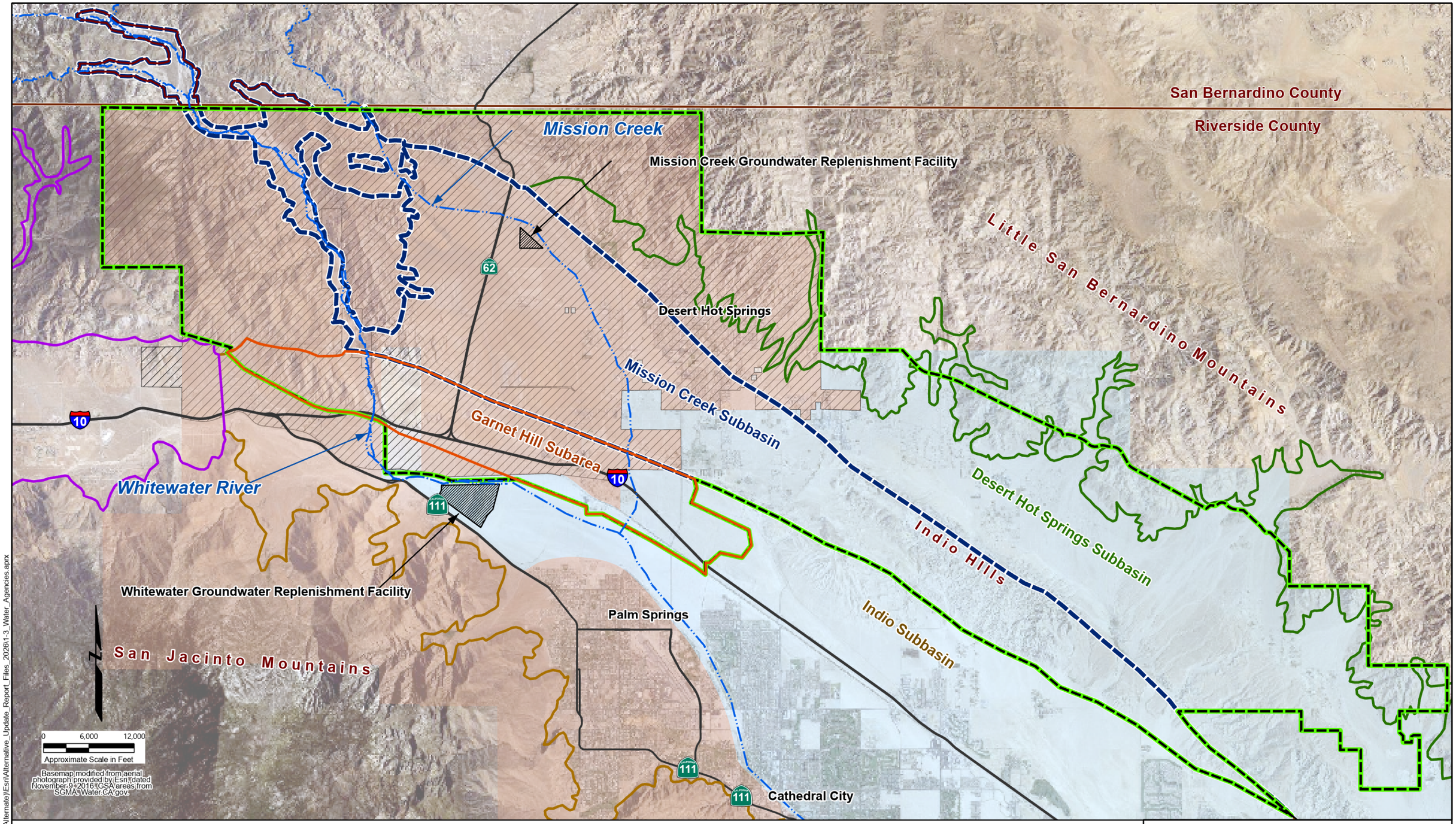

Explanation

- Streams
- Colorado River Aqueduct
- Facility
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Planning Area
- Highway/road
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

GROUNDWATER SUBBASINS AND SUBAREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 1-2 |

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Explanation

- Facility
- Planning Area
- Streams
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin
- Coachella Valley Water District (CVWD)
- Desert Water Agency (DWA)
- Mission Springs Water District (MSWD)

Note:

Individual water agencies outside the Mission Creek Subbasin and Garnet Hill Subarea are not shown except where the water agencies extend out of these two areas.

WATER AGENCIES
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/17/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 1-3 |

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## 1.1 2027 MCSB Alternative Plan Update Objectives

The 2027 MCSB Update fulfills three objectives:

1. Provides a written assessment, for the California Department of Water Resources (DWR) review, of whether the MCSB Alternative Plan is meeting the MCSB's sustainability goal and continues to meet the requirements of SGMA (Periodic Evaluation),
2. Responds to the DWR's review and recommendations for the 2022 MCSB Update, and
3. Provides future water management planning for both the MCSB and the GHSA that will support long-term water-supply reliability, with the objective of ensuring that management actions remain cost-effective while meeting local demand, protecting water quality, and avoiding undesirable results into the future.

## 1.2 MCSB Alternative Plan Foundation and Update

SGMA requires Groundwater Sustainability Agencies (GSAs) in medium- and high-priority basins to develop and implement approved GSPs or Alternative Plans to avoid undesirable results (e.g., wells becoming dry, land subsidence, etc.) and mitigate groundwater pumping above sustainable pumping. The MCSB (DWR Subbasin 7-021.02) retains its medium-priority designation and is one of only nine subbasins statewide with an approved Alternative Plan as of the most recent DWR determination. The MCSB Alternative Plan is jointly managed by CVWD and DWA as GSAs with the participation of MSWD as a member of the Management Committee.

The remainder of this section describes the development process, organization, relationship to parallel planning efforts in the Indio Subbasin, and ongoing stakeholder involvement that informs adaptive management of the MCSB.

### 1.2.1 SGMA Alternative Plan Foundation

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 Plan. California Water Code (CWC) §10733.6 describes three voluntary alternative paths to preparing and submitting a SGMA-compliant Alternative Plan as defined in the California Code of Regulations (CCR, 2016; CWC, 2016):

> *(a) If a local agency believes that an alternative described in subdivision (b) satisfies the objectives of this part, the local agency may submit the alternative to the department for evaluation and assessment of whether the alternative satisfies the objectives of this part for the basin.*

*(b) An alternative is any of the following:*

*(1) A plan developed pursuant to Part 2.75 (commencing with Section 10750) or other law authorizing groundwater management.*

*(2) Management pursuant to an adjudication action.*

*(3) An analysis of basin conditions that demonstrates that the basin has operated within its sustainable yield over a period of at least 10 years. The submission of an alternative described by this paragraph shall include a report prepared by a registered professional engineer or geologist who is licensed by the state and submitted under that engineer's or geologist's seal.*

*(c) A local agency shall submit an alternative pursuant to this section no later than January 1, 2017, and every five years thereafter.*

*(d) The assessment required by subdivision (a) shall include an assessment of whether the alternative is within a basin that is in compliance with Part 2.11 (commencing with Section 10920). If the alternative is within a basin that is not in compliance with Part 2.11 (commencing with Section 10920), the department shall find the alternative does not satisfy the objectives of this part.*

The foundation for this 2027 MCSB Update is the 2013 Mission Creek/Garnet Hill Water Management Plan (MWH, 2013 [2013 MC/GH WMP]) and Bridge Document (Stantec, 2016 [2016 Bridge Document]). Together, those documents described how the 2013 MC/GH WMP and supporting documents met the requirements of SGMA and thus are considered an Alternative Plan under the SGMA. These documents identified the following:

- For SGMA reporting, the GHSA of the Indio Subbasin is addressed in the Indio Subbasin Alternative Plan and annual reports submitted by the Indio Subbasin GSAs (see https://sgma.water.ca.gov/portal/alternative/annualreport/submitted).
- Hydrologically, the MCSB and GHSA are linked because the bounding fault is only a partial barrier and steep hydraulic gradients drive subsurface outflow from the MCSB to the GHSA.
- Institutionally, overlapping agency boundaries and the 2004 Settlement Agreement require CVWD, DWA, and MSWD to manage the MCSB and GHSA cooperatively as the MCSB Management Committee.

On July 17, 2019, the DWR approved the MCSB Alternative Plan, finding it functionally equivalent to a GSP (DWR, 2019a,b). The approval also stipulated that the first five-year evaluation of the MCSB Alternative Plan be submitted to DWR by January 1, 2022 (DWR, 2019b).

### 1.2.2 2022 MCSB Alternative Plan Update

The 2022 MCSB Update was prepared for the Management Committee by Wood Environment & Infrastructure Solutions, Inc. and Kennedy/Jenks Consultants, Inc. (Wood and Kennedy Jenks, 2021) to meet specific requirements of the SGMA as it applies to the MCSB and to support water management planning for a Planning Area that includes the MCSB, the DHSSB, and the Garnet Hill Subarea of the Indio Subbasin. SGMA requirements for the GHSA of the Indio Subbasin are addressed in the 2022 Indio Subbasin Alternative Plan Update prepared by Todd Groundwater and Woodard & Curran (Todd and Woodard & Curran, 2021). The DHSSB does not have SGMA reporting requirements because it is classified as a very low-priority basin.

The 2022 MCSB Update was prepared to:

- Ensure that the region's most current projections for population growth, land use, imported water supply, and other future conditions are incorporated into water management planning.
- 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 DWR's 2019 SGMA Alternative Assessment Staff Report and Statement of Findings (DWR, 2019a; DWR, 2019b; and DWR, 2019c).

The 2022 MCSB Update findings indicated that the MCSB is being sustainably managed and projected to remain sustainable under the scenarios evaluated. However, based on predicted future water demands, the 2022 MCSB Update identified that additional groundwater production may be needed through the planning period of 2045. To address this projected demand, the Agencies identified options for obtaining additional imported water supplies and increasing water supply reliability through 2045. The additional imported water supplies are intended to help 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 MCSB was updated and used to assess a range of water management and hydrologic scenarios. The results of these forecast scenarios were compared with the Sustainable Management Criteria (SMCs) developed in the 2022 MCSB Update. The water management forecast modelling showed that the Agencies

could maintain sustainable groundwater levels in the MCSB under assumed drier climate change conditions through the planning period by continuing Projects and Management Actions (PMAs) already in progress and implementing additional planned PMAs.

In June 2024, the DWR approved the 2022 MCSB Update as part of their "Periodic Review of the Mission Creek Subbasin Alternative Groundwater Sustainability Plan" (DWR, 2024). DWR's report of findings documents the MCSB Alternative Plan (including the 2022 MCSB Update) as:

- Complete and including the applicable information required by SGMA for the type of alternative submitted,
- Consistent with SGMA and implemented in a manner that will likely achieve the sustainability goal for the basin, and
- Sufficient in demonstrating its ability to achieve the objectives of SGMA.

Based on these findings, DWR proposed recommended corrective actions to enhance the MCSB Alternative Plan and facilitate future evaluation by DWR. The corrective actions included:

1. Incorporation of an approved salt and nutrient management plan (SNMP) into future iterations of the MCSB Alternative Plan and to continue current efforts to study the rate and level of increased salt contents in groundwater due to importation of Colorado River water.
2. Clarification of how inter-basin items, such as thresholds across basin boundaries, monitoring networks, hydrogeologic conceptual models (e.g. principal aquifer designations and water budgets) along basin boundaries have been coordinated.
3. Verification that the monitoring network details included in the MCSB Alternative Plan are consistent with the information contained in the DWR's SGMA Portal Monitoring Network Module (MNM).

DWR approval also specified completion of a 5-year Periodic Assessment with a deadline for submittal of January 1, 2027.

### 1.2.3 Purpose of the 2027 MCSB Alternative Plan Update

The 2027 MCSB Update builds upon a sequence of prior documents with new information to achieve the MCSB Alternative Plan objectives described in Section 1.1. Since the 2022 MCSB Update, the Agencies have incorporated several significant data sets and analyses that inform the 2027 MCSB Update:

- **Five Years of Groundwater Monitoring Network Data:** Data were accumulated, analyzed, and presented for each water year (WY) beginning in WY 2019-2020 through WY 2023-2024. Data included groundwater production, groundwater-level measurements, water quality, groundwater replenishment, water use, return flow, and water balance estimates.

- **Statewide Airborne Electromagnetic (AEM) Survey:** DWR's 2023 AEM data were reviewed to evaluate the hydrogeologic conceptual model and to potentially realign the boundary conditions used for groundwater-flow modelling. The results support the existing conceptual model, as described in Section 5.
- **Updated Water Demand Forecast:** Rincon revised municipal and private-sector demand projections using the Southern California Association of Governments (SCAG) Connect SoCal growth forecast (SCAG 2024) and worked with Maddaus Water Management to develop region-specific conservation assumptions, replacing the WaterSMART default factors used previously.
- **Climate Change Hydrology:** Future recharge and demand scenarios are no longer estimated by analog-year repetition, and now rely on the United States Geological Survey (USGS) Basin Characterization Model (BCM) mid-range climate projections (CNRM-CM5_RCP4.5 and MIROC5_RCP8.5), that represent the approximately 75 percentile likelihood envelope of future climate (Flint et. al., 2012). The use of global climate change forecasts is consistent with recent DWR guidance.
- **Updated Supply Forecast:** Used the updated climate change hydrology to forecast delivery of State Water Project (SWP) exchange supplies to the MCSB for replenishment, considering reduction in reliability outlined in DWR's 2025 SWP Delivery Capability Report (DWR, 2025).
- **Water Quality Focus:** Uranium and nitrate continue to be constituents with Minimum Thresholds (MTs), consistent with the 2022 MCSB Update. Hexavalent chromium (Cr(VI)) is evaluated through existing drinking-water compliance programs and review of potential groundwater-management-related changes, without establishing a separate numeric Cr(VI) MT. The Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) continues to be a work in progress to address total dissolved solids (TDS).

Consistent with the overall MCSB Alternative Plan objectives described in Section 1.1, the Management Committee prepared this update to:

- Integrate datasets collected since the 2022 MCSB Update, including AEM geophysics, data compiled and presented in annual reports from WY 2019-2020 through and including WY 2023-2024 (groundwater production, water level, water quality, groundwater replenishment, water use return flow, and ground-level measurements), and updates of BCM estimates of quarterly recharge and runoff for WY 2019-2020 through WY 2023-2024.
- Refine future water demand projections using SCAG's growth forecast and updated conservation assumptions that reflect current regional demand reduction programs and statewide conservation mandates.
- Update and recalibrate the integrated groundwater-flow model to the end of WY 2023-2024, adding new observation targets for head.

- Reevaluate sustainable management criteria (SMC) for chronic lowering of water levels, reduction of storage, degradation of water quality, and land subsidence.
- Address each recommendation in DWR's 2024 Periodic Review.
- Review historical information along with current and projected future environmental and demographic conditions to evaluate undesirable results and if necessary, revise objectives and thresholds to maintain groundwater sustainability.
- Provide an update of future projected supplies for groundwater replenishment from SWP water, exchanged for Colorado River water, to use in forecasting future groundwater production and supplies.
- Develop scenarios for forecasting groundwater levels based on future demands and supplies assuming future hydrologic conditions under two climate change scenarios (CNRM-CM5_RCP4.5 [warm-wet] and MIROC5_RCP8.5 [hot-dry]) and compare these forecasted water level conditions to groundwater sustainability criteria.
- Provide an assessment of the MCSB Alternative Plan implementation (i.e., Periodic Evaluation) that documents that the MCSB Alternative Plan as documented in this 2027 MCSB Update is meeting the MCSB's sustainability goal and continues to meet the requirements of SGMA.

Together, these actions ensure that groundwater in the MCSB and GHSA continues to be managed sustainably in alignment with SGMA requirements into the future.

## 1.3 Plan Organization

The following lists each section in the 2027 MCSB Update, along with a summary of the section's topic:

- **Section 1 – Introduction** provides a brief background of the need for and objectives of the 2027 MCSB Update, the background for the foundation of the initial MCSB Alternative Plan and the 2022 MCSB Update, a description of the general report organization, the relation to other planning efforts, and the general background and prior planning efforts.
- **Section 2 – Plan Setting** describes the Planning Area (including all groundwater basins and subbasins within the area), the land uses and demographics within the Planning Area, and the water infrastructure within the area.
- **Section 3 – Demand Projections** provides historical and future water demands for the Planning Area.
- **Section 4 – Water Resources** describes each water supply type within the Planning Area, including local surface water, imported water, wastewater/recycled water, and local groundwater conditions including groundwater use.

- **Section 5 – Groundwater Model Update** presents a discussion about the groundwater model and calibration update, summarizing the characteristics for the MCSB, GHSA, and DHSSB, as well as coordination efforts with the Indio Subbasin and associated groundwater model.
- **Section 6 – Sustainable Management Criteria** provides the SGMA Objective and description of SMCs for the MCSB.
- **Section 7 – Water Management Forecasting** presents and discusses the findings of the model forecast for the MCSB for projected changes in water demand due to population increases. Forecasts include a baseline scenario of no projects referred to as the Baseline Scenario, a scenario with near-term projects (capital projects anticipated in less than five years) referred to as the Near-Term Projects scenario, and a scenario of future projects (those anticipated within the 25-year planning horizon) referred to as the Future Protects scenario. The Baseline Scenario reflects conditions of long-term historical hydrology, while the Near-Term Projects and Future Projects scenario reflects future climate change conditions. The MCSB is the focus of groundwater model forecasting and results of the forecasting are compared with the SMCs for the MCSB developed in Section 6.
- **Section 8 – Projects and Management Actions** describes PMAs that are ongoing and planned in the MCSB. This section also includes a discussion on the implementation of the PMAs, how this implementation has successfully maintained groundwater sustainability over the last decade, and how the future PMAs are expected to support groundwater sustainability through the end of the planning horizon (2050).
- **Section 9 – Periodic Evaluation** evaluates the MCSB Alternative Plan implementation, groundwater conditions, significant new information, and the basis for retaining or revising MCSB Alternative Plan provisions. The section includes an introductory evaluation narrative followed by Table 9-1, Periodic Evaluation.

The appendices of the 2027 MCSB Update provide more detailed information supporting the report sections:

- **Appendix A – Groundwater Flow Model Calibration Report** provides a detailed description of the groundwater model assumptions and model update process.
- **Appendix B – Water Management Forecasting Supplementary Tables** includes 2027 MCSB Update forecast model tables and Key Well hydrographs.
- **Appendix C – Communications and Engagement Plan** describes the communication and engagement process as well as the stakeholders involved in the planning effort.
- **Appendix D – Comments and Responses** presents feedback from stakeholders throughout the 2027 MCSB Update review process.
- **Appendix E – Agency Board Resolutions** compiles the resolutions documenting the 2027 MCSB Update adoption by all three Agencies.

## 1.4 Background

The background for water management planning in the Coachella Valley, MCSB, and the planning area overview are provided in the subsections below.

### 1.4.1 MCSB Management Committee Formation

Concerns about the lowering of groundwater levels in Coachella Valley Groundwater Basin date back to 1913 when the CVWD was formed to secure water supplies. CVWD took steps to secure water supplies from the Colorado River that led to the completion of the Coachella Branch of the All-American Canal in 1948 to deliver imported water to the southeastern Coachella Valley. CVWD and DWA contracted with the State of California for water from the SWP in the early 1960s. Because the Coachella Valley has no physical connection to the SWP infrastructure, CVWD and DWA entered into an exchange agreement with Metropolitan Water District of Southern California (MWD) for delivery of Colorado River supplies from MWD's Colorado River Aqueduct (CRA) in exchange for their SWP supplies. The first deliveries of imported water to the northwestern part of the Coachella Valley occurred in 1973 through the CRA and allowed for recharge of this imported water at the Whitewater River Groundwater Replenishment Facility (WWR-GRF) in the Indio Subbasin. There were no imported water deliveries to the MCSB, and declining water levels triggered discussions between the Agencies as early as 1984 regarding the need to recharge imported water to replenish groundwater in the MCSB.

To control water level declines, CVWD and DWA, with a resolution of support from MSWD's Board of Directors, embarked on a MCSB groundwater replenishment program in 2002 and constructed the Mission Creek Groundwater Replenishment Facility (MC-GRF). The MC-GRF received its first delivery of replenishment water in late 2002. Cooperative management of groundwater replenishment in the MCSB was initiated on April 8, 2003, when CVWD and DWA entered into the Mission Creek Groundwater Replenishment Agreement for the cooperative management and recharge of imported water and allocating recharge facility costs between the two agencies. This original agreement has since been updated and replaced by the 2014 Mission Creek Water Management Agreement.

In October 2003, MSWD filed action in the Superior Court of the State of California against CVWD and DWA seeking a writ of mandate, declaratory relief for prescriptive and appropriative water rights, and declaratory and injunctive relief for a physical solution of a groundwater basin. MSWD sought adjudication of the MCSB, challenged the validity of the replenishment assessments in the Indio Subbasin[1] and MCSB, and questioned the impact that the quality of the imported CRA water would have on MCSB groundwater. Both CVWD and DWA filed responses challenging the complaint.

[1] The Indio Subbasin is also identified as the Whitewater River Subbasin by the United States Geological Survey (USGS, 1980).

In December 2004, MSWD, DWA, and CVWD reached an agreement to settle outstanding litigation. The agreement included provisions regarding payment of outstanding replenishment assessments, establishment of a three-party management committee consisting of CVWD, DWA, and MSWD, shared costs for basin studies, and development of a water management plan for the MCSB and the GHSA. An addendum to the 2004 Settlement Agreement specifies that water supplies available through CVWD's and DWA's SWP contracts will be allocated and delivered to the West Whitewater River Management Area of the Indio Subbasin (also known as Whitewater River Subbasin) and the Management Area of the MCSB, based on the percentage of total annual groundwater and surface water production in the Management Areas.

The MCSB Management Committee was formed as a result of the 2004 Settlement Agreement. The stated purpose of the Management Committee is to "exchange information, express ideas and otherwise discuss in a free, comprehensive, and frank manner any and all aspects regarding the management of resources within the Mission Creek Subbasin." The Management Committee is composed of at least one member or representative of each of the Agencies.

A Memorandum of Understanding (MOU) among CVWD, DWA, and MSWD was executed on July 27, 2009, to prepare the 2013 MC/GH WMP and develop a groundwater model of the MCSB and GHSA. The 2013 MC/GH WMP was prepared for the MCSB and GHSA as required by the 2004 Settlement Agreement to address the water management needs of these areas. The MCSB Management Committee developed the following Mission Statement for the 2013 MC/GH WMP:

> *"The purpose of the Mission Creek and Garnet Hill Water Management Plan is to manage the water resources to meet demands reliably and protect water quality in a sustainable and cost-effective manner."*

As described above, the 2013 MC/GH WMP was submitted to DWR along with a Bridging Document as an Alternative to a GSP under SGMA. Following approval by DWR, the 2022 MCSB Update was prepared and adopted. This 2027 MCSB Update is the next subsequent five-year periodic update of the MCSB Alternative Plan.

## 1.4.2 Planning Area Overview

The Management Committee defined a water management planning area (Planning Area) that includes the MCSB and GHSA, as well as the portion of the DHSSB east of the MCSB and a small portion of the main Indio Subbasin south of the GHSA (**Figure 1-2**). The groundwater subbasins and the subarea in the MCSB Alternative Plan include:

- **MCSB** – the Planning Area includes the entirety of the alluvial MCSB, except for a fringe portion of the MCSB located in San Bernardino County that is largely wilderness area and outside the Agencies' boundaries.

- **GHSA** – for the purposes of SGMA, the GHSA is contained within the Indio Subbasin and is included in the Indio Subbasin Alternative Plan Update. An MOU regarding the governance of the Indio Subbasin under SGMA has been entered into by the Indio Subbasin GSAs, which are the City of Coachella (a municipal corporation acting through, and on behalf of, the Coachella Water Authority [CWA]), CVWD, DWA, and the City of Indio (a municipal corporation acting through, and on behalf of, the Indio Water Authority [IWA]). Through this MOU, these agencies have agreed to coordinate and cooperate regarding implementation of SGMA within their respective jurisdictions to ensure that the sustainability goals of SGMA are met within the Indio Subbasin, including the GHSA.
- **DHSSB** – potable water pumped from the MCSB is utilized within the area overlying this subbasin and is an important groundwater demand component of the MCSB. DHSSB has been designated as a very low-priority basin by DWR and does not have a GSP or Alternative Plan.

The Planning Area for this 2027 MCSB Update is shown with the agency areas on **Figure 1-4**. A more detailed description of the plan setting is provided in Section 2. The Planning Area is the same as the 2013 MC/GH WMP Planning Area with the following exceptions:

- This Planning Area includes the Indio Hills to address a DWR recommendation to include current and future water use in the Indio Hills (DWR, 2019c); and
- This Planning Area includes all the MSWD boundary to the northwest of the MCSB and GHSA and north of the MCSB, including portions of the DHSSB.

### 1.4.3 Mission Creek Subbasin GSAs

CVWD, MSWD, and DWA have legal authorities established in the California Water Code. Under SGMA, each agency has filed separate Notices of Election with DWR to become GSAs to manage the MCSB within the areas shown on **Figure 1-4**:

- **CVWD** – submitted its notice of election for the portion of the MCSB within its boundaries (CVWD, 2015) and was approved by DWR as an exclusive GSA to manage the MCSB within that area.
- **DWA** – submitted its notice of election for a large portion of the MCSB, which includes an area also located within the boundaries of MSWD. DWR designated DWA as an exclusive GSA for all portions of the MCSB located within DWA's boundaries, including those portions that overlie MSWD boundaries.
- **MSWD** – submitted a notice of election for the portion of the MCSB located within its boundaries, and this notice of election was rejected by the DWR 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). DWR designated the three-square mile area as DWA and

MSWD "overlap" (see **Figure 1-4** for the location of this GSA notice overlap area). The overlap status of the DWA and MSWD 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. The trial court ruled in favor of DWA on the writ of mandate, and MSWD filed its Notice of Appeal on June 24, 2022, in the Fourth District, Division 2 of the Court of Appeal, App. Case No. E079256. The California Court of Appeal ruled in favor of DWA in late 2023. The California Supreme Court on July 10, 2024, declined to review the appeal submitted by MSWD.

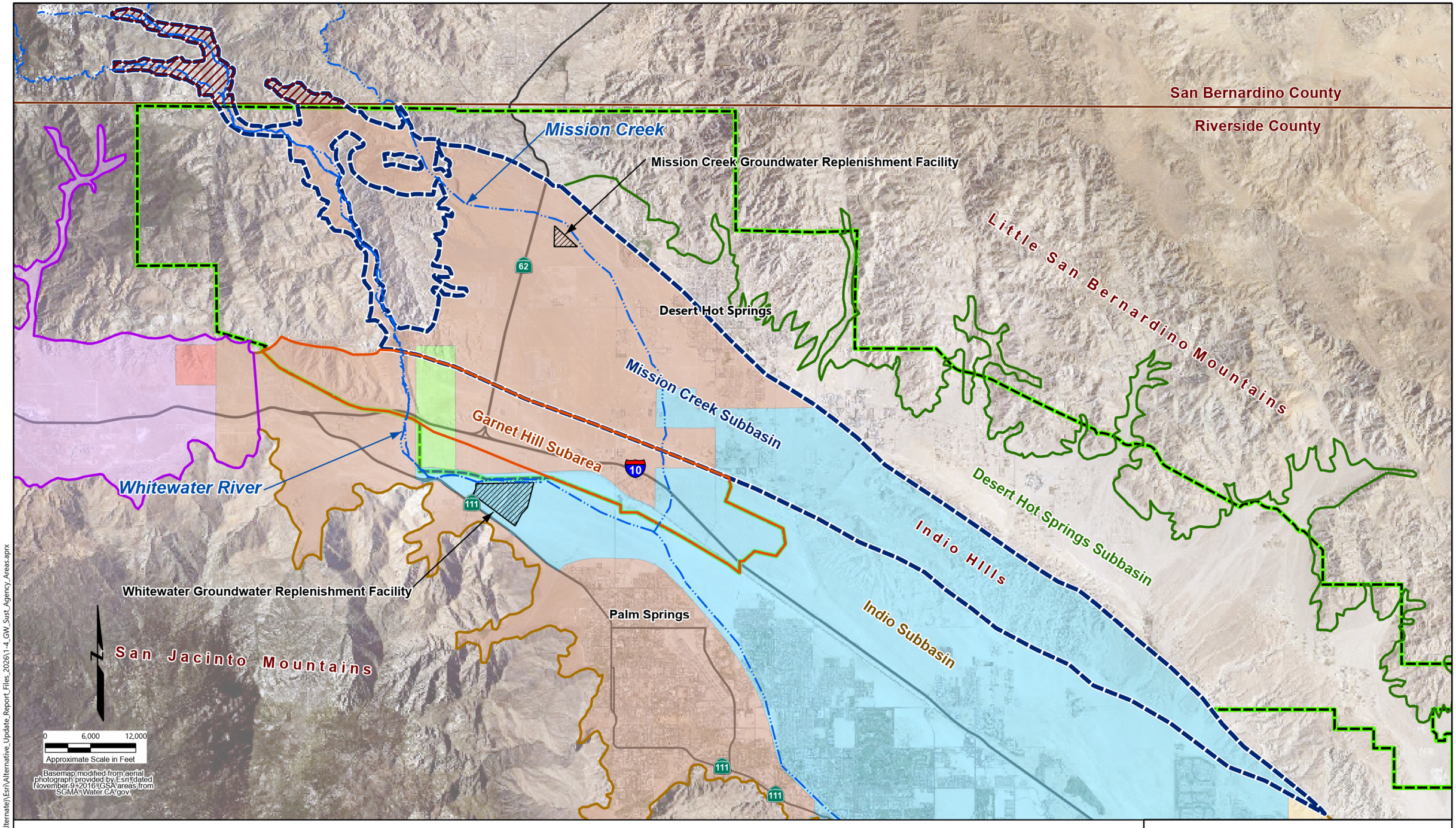
## 1.5 Relationship to Other Planning Efforts

The following planning efforts have a nexus with this 2027 MCSB Update because of geographic proximity, overlapping planning areas, evaluation of similar projects, and inter-related aspects of long-range water resources planning for the region.

### 1.5.1 SGMA in Adjacent Subbasins

SG MA requirements apply to basins and subbasins designated by DWR as medium- or high-priority to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Therefore, the adjacent DHSSB, which is designated as a very-low priority subbasin by DWR is not subject to SGMA requirements.

Two adjacent/near adjacent subbasins in the area are designated as medium priority: (1) the adjacent Indio Subbasin and (2) the near adjacent San Gorgonio Pass Subbasin. As noted earlier, the 2022 Indio Subbasin Alternative Plan Update is also being updated and is anticipated to be submitted by January 1, 2027. The San Gorgonio Pass Subbasin GSP (Provost & Pritchard Consulting Group and INTERA Geoscience & Engineering Solutions, 2021) was prepared cooperatively with the San Gorgonio Pass GSA, the Verbenia GSA, and the Desert Water Agency GSA. An updated San Gorgonio Pass Subbasin GSP is anticipated to be submitted by the January 1, 2027, deadline. As such, the 2027 MCSB Update is being coordinated with the planning and reporting efforts for these adjacent/near adjacent subbasins.




Explanation

- Facility — Facility
- Planning_Area_v4 — Planning Area
- streams — Streams
- highways — Highway/road
- Subbasin_Fringe_Area — Mission Creek Subbasin fringe area
- Garnet subarea — Garnet HIll Subarea of Indio Subbasin
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin
- Coachella Valley Water District (GSA Exclusive Area)
- Desert Water Agency (GSA Exclusive Area)
- Indio Water Authority (GSA Exclusive Area)
- Overlap Area of GSA Notices by Desert Water Agency and Mission Springs Water District
- San Gorgonio Pass GSA (Exclusive Area)
- Verbenia GSA (Exclusive Area)

GROUNDWATER SUSTAINABILITY
AGENCY AREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/17/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 1-4 |

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### 1.5.2 Regional Urban Water Management Plan

The six urban water suppliers in the Coachella Valley – CVWD, CWA, DWA, IWA, MSWD, and Myoma Dunes Mutual Water Company (MDMWC) agreed to prepare a 2025 Coachella Valley Regional Urban Water Management Plan (RUWMP) to include regional and individual agency content and other necessary elements as set forth in DWR's 2025 Urban Water Management Plan (UWMP) Guidebook. The Coachella Valley RUWMP was prepared to aid in long-term water resources planning and to help ensure that adequate water supplies are available to meet existing and future urban water needs. The 2025 Coachella Valley RUWMP uses the same demand forecast and supply model used for this 2027 MCSB Update and the 2027 Indio Subbasin Alternative Plan Update. The data and assumptions for all three plans are being coordinated and integrated by the participating agencies. The 2025 Coachella Valley RUWMP was submitted to DWR in June 2026.

### 1.5.3 Salt and Nutrient Management Plan

SNMPs are mandated by the State of California's Recycled Water Policy, adopted in 2009 and amended in 2018 by the State Water Resources Control Board (SWRCB, 2018). The policy encourages the use of recycled water from municipal wastewater sources as it becomes an increasingly important source of water for California. Because recycled water contains salts and nutrients, SNMPs are required to evaluate current and future recycled water projects and ensure that groundwater basins are adequately managed to protect groundwater beneficial uses. In June 2015, CVWD, DWA, and IWA submitted the CV-SNMP to evaluate recycled water projects for the protection of long-term water supplies and to ensure recycled water reliability within the Coachella Valley (MWH 2015). On February 19, 2020, these agencies received a letter from the Colorado River Basin Regional Water Quality Control Board (RWQCB) providing findings and recommendations on the 2015 CV-SNMP. As a result, the Coachella Valley urban water and wastewater agencies – CVWD, CWA/Coachella Sanitary District (CSD), City of Palm Springs, DWA, IWA, MSWD, MDMWC, and Valley Sanitary District (VSD), referred to as the CV-SNMP Agencies – developed the CV-SNMP Development Workplan (Development Workplan) to define the scope of work for updating the 2015 CV-SNMP. As part of preparing the Development Workplan, the CV-SNMP Agencies were required to prepare 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 the CV-SNMP Groundwater Monitoring Program Workplan (GMP Workplan) to the RWQCB in December 2020 (West Yost, 2020). The GMP Workplan outlines an expanded groundwater monitoring program that will sufficiently determine whether concentrations of nitrates as nitrogen (N) and total dissolved solids (TDS), collectively N/TDS, in groundwater are consistent with water quality objectives. The RWQCB approved the GMP Workplan in February 2021. The GMP Workplan covers all subbasins within the Coachella Valley Groundwater Basin; includes sampling from the deep, shallow, and perched zones of the aquifer; focuses on critical areas near large water reclamation facilities that are also known as

wastewater treatment plants (WWTPs), groundwater replenishment facilities (GRFs), and other potential sources of salt and nutrient loading; and emphasizes areas near production wells. The GMP Workplan establishes the monitoring network, sampling frequency, and reporting. Annual reporting of water quality data from this program began in 2022.

The CV-SNMP Agencies submitted the Development Workplan to the RWQCB in September 2021 (West Yost, 2021). The Development Workplan outlines a scope of work for updating the CV-SNMP in accordance with the Recycled Water Policy and addresses RWQCB recommendations. The Development Workplan outlines the steps and schedule to update the CV-SNMP. The RWQCB approved the Development Workplan on October 4, 2021. 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 CV-SNMP update will provide regional groundwater quality information and recommended TDS objectives that may be considered by the GSAs when evaluating groundwater quality sustainability under SGMA.

### 1.5.4 Integrated Regional Water Management Plan

As stated in the *2009 California Water Plan Update:* "The broad purpose of Integrated Regional Water Management (IRWM) is to promote a regional planning and implementation framework to comprehensively address water supply, quality, flood, and ecosystem challenges and to implement integrated solutions through a collaborative multi-partner process that includes water managers, tribes, non-governmental organizations, State, federal, and local governments, and disadvantaged communities." Consistent with this, the Coachella Valley IRWM Plan was created by the CWA, CVWD, DWA, IWA, MSWD, and VSD and last updated in 2018 to outline an integrated regional approach for addressing water management issues through a process that identifies and involves water management stakeholders from the Coachella Valley (CVRWMG 2018). The 2018 Coachella IRWM Plan was also expanded to include a Stormwater Resources Plan component. The goal of the IRWM Plans is to secure long-term water supply reliability within California by first recognizing the inter-connectivity of water supplies, then encouraging the development and implementation of projects that yield multiple benefits for water supplies, water quality, and natural resources.

## 1.6 Stakeholder Involvement

Stakeholder communication and engagement were conducted as part of this 2027 MCSB Update to engage stakeholders within the Planning Area and to meet the SGMA requirements. Interested parties that were invited to participate included public and private water users, tribal representatives, city and county land use planning agencies, neighboring GSAs, as well as state and federal agencies with focused effort on Disadvantaged Communities (DACs). The goals of public engagement were to understand the needs and increase participation of stakeholders and communities within the Planning Area and increase awareness and understanding of this MCSB Alternative Plan. In addition to e-mail notices regarding the three public workshops, a

website to communicate the activities of this MCSB Alternative Plan was maintained at MissionCreekSubbasinSGMA.org, which provides public workshop presentations, answers to frequently asked questions, Spanish-language materials, and contact information. Outreach to DACs included targeted telephone calls and e-mails to organizations serving DAC communities to encourage participation. The Communication and Engagement Plan included in **Appendix D** contains elements of the stakeholder involvement process and a list of organizations represented by stakeholders.

# 2. Plan Setting

This section describes the Planning Area, including a description of the Planning Area, land uses, demographics, water infrastructure, and environmental factors.

## 2.1 Planning Area Description

The Planning Area is located within the northwestern portion of the Coachella Valley Groundwater Basin. The Coachella Valley is located northwest of the Salton Sea within the Colorado Desert (DWR, 2004) in southern California **(Figure 1-1)**. The Coachella Valley is about 65 miles long and covers an area of approximately 400 square miles. It 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 is drained primarily by the Whitewater River, which enters in the northwest portion of the valley and discharges to the southeast into the Salton Sea via a 17-mile channel called the Coachella Valley Stormwater Channel. Land-surface elevations vary from more than 230 feet below sea level at the Salton Sea to more than 10,000 feet above sea level at the peaks of the San Jacinto and San Bernardino mountains. 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.

The Mission Creek Subbasin (MCSB) lies within the northwestern portion of the Coachella Valley Groundwater Basin. The Planning Area for this 2027 MCSB Alternative Plan Update (2027 MCSB Update) includes the MCSB and the Garnet Hill Subarea (GHSA) of the Indio Subbasin, as well as portions of the Desert Hot Springs Subbasin (DHSSB). As noted in Section 1, for the purposes of the Sustainable Groundwater Management Act (SGMA) compliance, this 2027 MCSB Update only addresses the MCSB. For the purpose of water management, groundwater from the MCSB is used to meet water demands both inside and outside the MCSB. Therefore, the Planning Area covers a larger area than the MCSB boundary. For example, the northern portion of the Planning Area (in both Mission Springs Water District [MSWD] and the Coachella Valley Water District [CVWD] service areas) overlies the DHSSB, which receives groundwater pumped from the MCSB. Therefore, the portion of the DHSSB that currently receives or potentially could receive groundwater from the MCSB in the future is included in the Planning Area. The GHSA of the Indio Subbasin is included in the Planning Area to be consistent with the 2013 Mission Creek/Garnet Hill Water Management Plan (MWH, 2013 [2013 MC/GH WMP]).

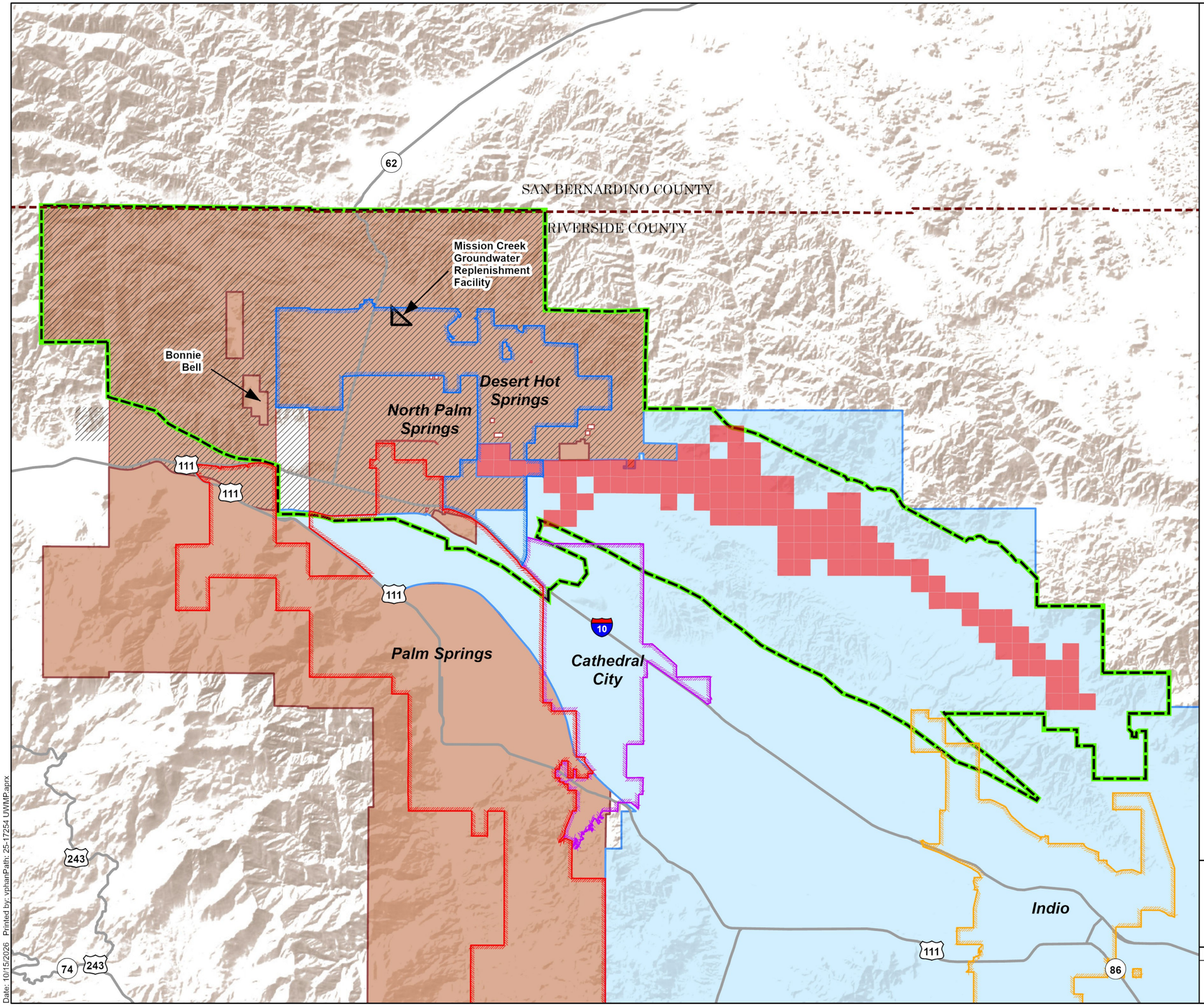
### 2.1.1 Agencies and Governments

The Planning Area contains the City of Desert Hot Springs (City of DHS), and small portions of the Cities of Palm Springs, Cathedral City, and Indio, as well as unincorporated areas of Riverside County, including North Palm Springs and Bonnie Bell (as shown on **Figure 2-1)**. Each incorporated city serves as the land use planning agency within its jurisdictional boundary, and Riverside County serves as the land use planning agency for unincorporated areas. The three major water agencies in the Planning Area are CVWD, Desert Water Agency (DWA), and MSWD, as described previously. The water retailers for the Planning Area include CVWD and MSWD. DWA does not have any retail service area within the Planning Area. A description of each agency follows.

**MSWD** is a public water and wastewater agency organized under the County Water District Law (MWH, 2013). Formed in 1953 as the Desert Hot Springs County Water District, MSWD covers 135 square miles and serves more than 13,300 retail water customers and 9,200 wastewater customers. MSWD's boundary for its retail service area encompasses the City of DHS, portions of unincorporated Riverside County, portions of the City of Palm Springs, and the communities of Bonnie Bell and North Palm Springs. The MSWD service area is shown in hatch on **Figure 2-1**. The majority of the MSWD service area within the Planning Area overlies the DWA jurisdictional area.

**DWA** is an independent special district organized under the Desert Water Agency Law (MWH, 2013) and was formed in 1961 to contract for State Water Project (SWP) water to replenish the Coachella Valley Groundwater Basin. Since that time, DWA's responsibilities have expanded to include retail water service, water recycling, and power generation in the Coachella Valley. DWA's institutional boundary as an imported water replenishment agency extends over approximately 325 square miles and is shown in brown on **Figure 2-1**. Within the Planning Area, DWA does not provide retail water or wastewater services. The majority of DWA's jurisdiction area within the Planning Area overlies the MSWD service area, which is shown as brown with hatch pattern on **Figure 2-1**.

**CVWD** is a public agency organized under the County Water District Law and was formed in 1918 (MWH, 2013). CVWD has a jurisdictional area, shown in blue on **Figure 2-1**, that covers approximately 1,000 square miles and delivers irrigation water to more than 60,000 acres of agricultural land and potable water to more than 110,000 customers. CVWD also provides wastewater collection, treatment, recycling and disposal, regional stormwater protection, groundwater management, and water conservation services. CVWD obtains imported water from the SWP, which is exchanged with the Metropolitan Water District of Southern California (MWD) for Colorado River water through the Colorado River Aqueduct (CRA). CVWD also receives water from the Colorado River that is delivered to the Indio Subbasin primarily via the Coachella Canal. CVWD provides water service within CVWD's Public Water System (PWS) Improvement District-8 (ID-8), shown in red on **Figure 2-1**, that overlies and uses groundwater from the MCSB. CVWD does not provide wastewater collection in the Planning Area.




CVWD Area
DWA Area
MSWD Area
Planning Area
ID No. 8 Service Area
County Boundary
Replenishment Facility

**City Limits**

Cathedral City
Desert Hot Springs
Indio
Palm Springs

N

0 1 2 4
Miles

CITY AND AGENCY BOUNDARIES
Mission Creek Subbasin Alternative Update
Coachella Valley, California

By: Rincon Consultants | Date: 10/1/2026 | Project No.: 1944537*00

Figure **2-1**

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### 2.1.2 Groundwater Basin, Subbasins, and Subareas

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 Coachella Valley Groundwater Basin is divided into four subbasins as shown on **Figure 1-1**: Indio, Mission Creek, Desert Hot Springs, and San Gorgonio Pass Subbasins. The Indio, Mission Creek, and San Gorgonio Pass Subbasins are designated as medium-priority basins and require compliance with SGMA, while the DHSSB is a very low-priority basin that does not require compliance with SGMA.

The Coachella Valley subbasins delineate areas underlain by geological formations that readily yield stored groundwater to water wells and offer natural reservoirs for the regulation of water supplies. More detailed descriptions of the groundwater basins, subbasins, and subareas in the Planning Area are provided in the following sections.

#### 2.1.2.1 Mission Creek Subbasin

The MCSB is designated Number 7-21.02 in the California Department of Water Resources (DWR) Bulletin 118 (DWR 2026) and is within the northwestern Coachella Valley in the north-central portion of Riverside County, California. Several small portions of the MCSB lie outside the boundaries of the Groundwater Sustainability Agencies (GSAs) (**Figure 1-2**). These fringe areas are in San Bernardino County and are not included within the boundaries of a local water district. Portions of the fringe areas 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. Except for the relatively small privately owned portion, the fringe areas fall within the Sand to Snow National Monument designated in February 2016.[2] Discussions with the County of San Bernardino indicated it had 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 (WSP, 2025).

The Mission Creek Fault and the Banning Fault form the northeastern and southwestern boundaries of the MCSB, respectively. Groundwater level differences across the Banning Fault, between the MCSB and the GHSA of the Indio Subbasin, are on the order of 200 to 250 feet. Similar groundwater level differences exist across the Mission Creek Fault between the MCSB and DHSSB (MWH, 2013). The groundwater level differences indicate that the faults form partial barriers to groundwater flow in and out of the MCSB.

The northwestern end of the MCSB includes the active and paleo stream channels of the Whitewater River at an elevation of approximately 5,000 feet above mean sea level (msl). The Whitewater River channel and paleochannel are largely uninhabited, except for the small community of Bonnie Bell. The main MCSB (outside of the Whitewater River channel and

[2] https://www.fs.usda.gov/visit/national-monuments/sand-to-snow-national-monument

northern paleochannel) extends from the base of the San Bernardino Mountain foothills southeastward into the western portion of the Indio Hills. Much of the MCSB is undeveloped and supports sparse desert vegetation.

The City of DHS and the community of North Palm Springs are located in the central part of the MCSB. Palm Springs city limits also extend into the MCSB, terminating just south of the community of North Palm Springs. Individual homes and smaller communities are scattered across the northwestern and other parts of the MCSB. The Indio Hills are largely uninhabited and are comprised of semi-consolidated sediments of low permeability in the groundwater-saturated zone and are not considered part of the main MCSB area for groundwater resources (WSP, 2025).

Groundwater is stored in the alluvial sediments of the MCSB, which extend to a depth as great as 3,000 feet below ground surface (bgs) and are underlain by semi-consolidated, semi-permeable sediments (GCI, 1979). The MCSB has an estimated total storage capacity of 2.6 million acre-feet (AF) (DWR, 1964). Natural inflows include infiltration of runoff in the creeks and washes (e.g., Mission Creek, Big Morongo Creek, Little Morongo Creek, and Morongo Wash), subsurface mountain front recharge, and subsurface inflow from the DHSSB. Additional recharge sources include wastewater percolation, septic system percolation, and return flow infiltration from water applied for urban, agricultural, recreational (such as golf course irrigation), and industrial uses. When available, a significant source of recharge to the MCSB is groundwater replenishment by recharging imported water to the MCSB at the Mission Creek Groundwater Replenishment Facility (MC-GRF).

The primary outflow occurs through groundwater production for urban, agricultural, and industrial uses. CVWD and MSWD account for the majority of groundwater production in the MCSB for delivery to their retail customers within the MCSB and the adjacent DHSSB. Groundwater is also pumped from the adjacent GHSA of the Indio Subbasin for use in the MCSB. In addition, there are several individual groundwater pumpers that produce more than 25 acre-feet per year (AFY) in the CVWD service area and 10 AFY in the DWA jurisdictional area that are required to measure pumping with a water meter and are assessed a replenishment assessment charge (RAC). There are other private wells located in the MCSB that are not required to report their well production to CVWD or DWA based on annual production falling below the agencies' reporting limits of 25 and 10 AFY, respectively. These pumpers are referred to as minimal pumpers, and their groundwater use is estimated in the demand forecast. Other outflows of groundwater from the MCSB include evapotranspiration from phreatophytes in shallow groundwater areas and subsurface outflow to the Indio Subbasin, including outflow to the GHSA of the Indio Subbasin (WSP, 2025).

#### 2.1.2.2 Garnet Hill Subarea of the Indio Subbasin

The area between the Garnet Hill Fault and the Banning Fault is known as the GHSA of the Indio Subbasin (see **Figure 2-1**). The Garnet Hill Fault is a branch of the San Andreas Fault system consisting of a series of northwest-trending right-lateral faults with active folds at each

stepover. These folds are expressed as a series of small hills between each fault segment (MWH, 2013).

The GHSA of the Indio Subbasin is considered an unconfined aquifer with a saturated thickness of 1,000 feet or more and an estimated total storage capacity on the order of 1.0 million AF (DWR, 1964). The GHSA of the Indio Subbasin is naturally recharged by subsurface flow from the MCSB and runoff from the Whitewater River watershed on the west. Irrigation return flow and discharges from municipal and individual subsurface wastewater disposal systems also contribute to recharge but are considered minimal.

Although some recharge to the GHSA of the Indio Subbasin may come from Mission Creek and other streams that flow through during periods of high flood flows, the main sources of recharge to the GHSA of the Indio Subbasin are channel infiltration and subsurface flow in the Whitewater River, subsurface flow through the semi-permeable sedimentary deposits that underlie Whitewater Hill, and subsurface flow across the Banning Fault from the MCSB.

#### 2.1.2.3 Desert Hot Springs Subbasin

Parts of the Planning Area overlie the DHSSB, designated as Subbasin No. 7-21.03 in DWR Bulletin 118 (DWR, 2026a). The DHSSB is included in the Planning Area for the MCSB because a significant portion of the groundwater pumped from the MCSB is delivered for use by residential, commercial, industrial, and some agricultural customers in the DHSSB. The DHSSB is located adjacent to the MCSB and trends northwest-southeast along the foothills of the Little San Bernardino Mountains. Within the Planning Area, the DHSSB is bounded on the southwest by the Mission Creek Fault, which also corresponds to the uplift of the semipermeable rocks of the Indio Hills. This fault acts as a partial groundwater barrier, directing groundwater flow in a southeasterly direction in the DHSSB. The DHSSB is comprised of late Pleistocene and recent unconsolidated heterogeneous alluvial deposits consisting primarily of coarse sand and gravel (DWR, 2026a). Groundwater storage capacity of the DHSSB is estimated at approximately 4.1 million AF (DWR, 1964). Naturally occurring hot thermal springs occur along the Mission Creek Fault in the DHSSB and have been actively pumped for over 50 years to supply local resorts (MWH, 2013). Although water from the DHSSB is not used for domestic consumption, approximately 23 resorts rely on these thermal springs for spas, resorts, and more (Visit DHS, 2020). No specific management plan exists for the DHSSB, and groundwater pumping and water level data are sparse.

## 2.2 Land Use

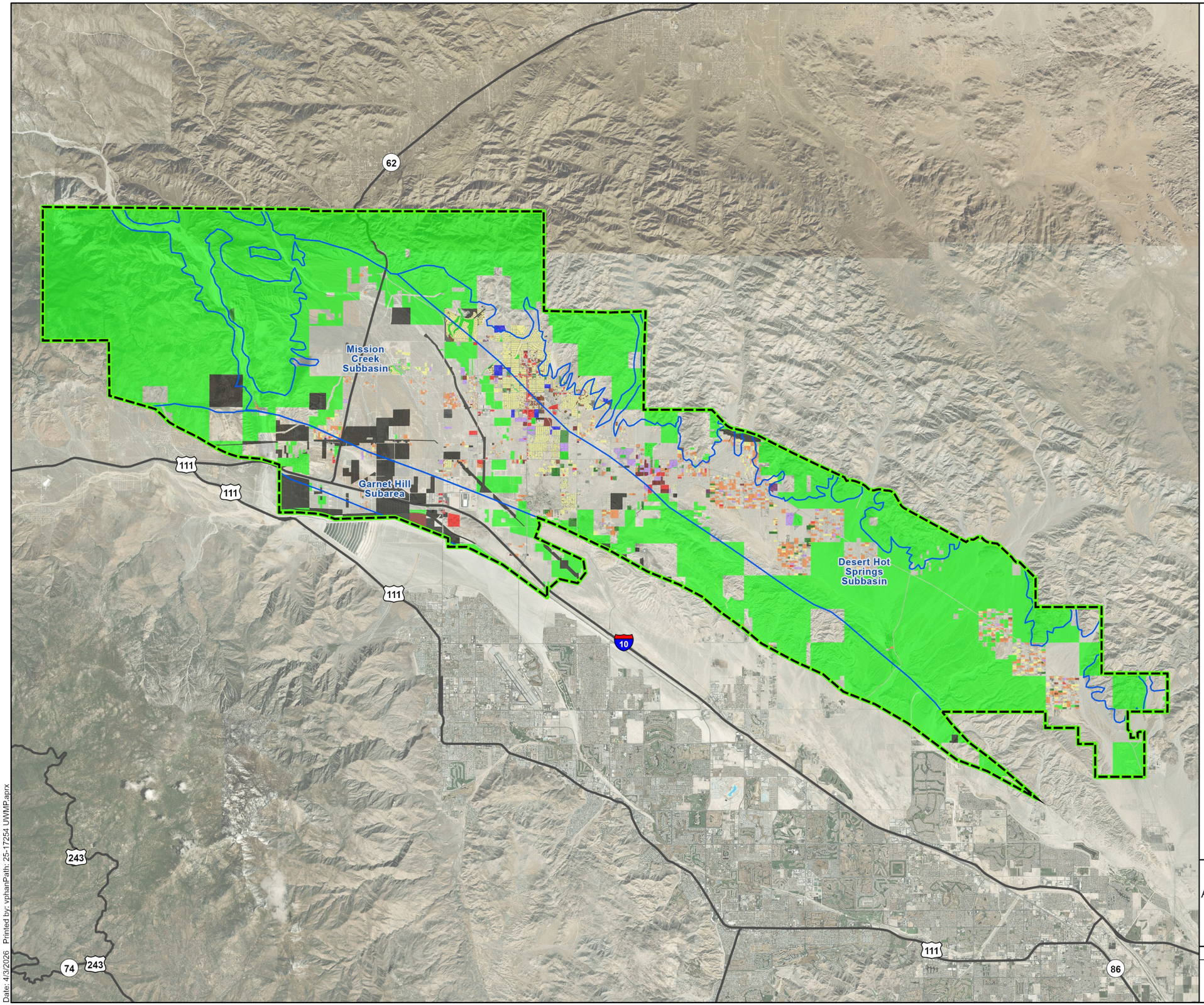
Land use categories provide a good indicator of water demands and can be used to estimate future water demands based on planned developments identified in a city or county General Plan. Land use designations for this 2027 MCSB Update, shown on **Figure 2-2**, are based on the land uses described in the Southern California Association of Governments (SCAG) Connect SoCal (SCAG 2024). As part of its planning process, SCAG gathered input from cities

and counties throughout Southern California about expected growth and development for the next 25 years and incorporated the land use designations in each jurisdiction's General Plan. The SCAG analysis includes estimates of population, households, and employment in each study area (SCAG 2024)**Invalid source specified.**. Further, as part of this 2027 MCSB Update, the Agencies distributed letters to local city and county planning departments to confirm anticipated growth is consistent with SCAG Connect SoCal and to request any additional development plans that were not captured in the SCAG planning process. The following simplified land use classifications are used in this 2027 MCSB Update for the water demand projections, described in Section 3:

- Single Family Residential, which includes single-family dwellings (with and without secondary units) of varying densities.
- Multi-Family Residential, which includes duplexes, triplexes, and apartments of varying densities along with mobile homes/manufactured homes.
- Commercial, which includes shopping centers, offices, spas, resorts, and hotels.
- Industrial, which includes business parks, light industrial, and general industrial.
- Institutional/Governmental, which includes uses dedicated to public service such as schools, courts, churches, hospitals, and other government facilities.
- Agricultural/Landscape, which includes farms, nurseries, golf courses, and other large landscapes.
- Owned by Conservancy, which includes parcels currently owned by conservancies.

Tourism has historically driven land use development patterns in the Planning Area and has increased since 1914, when Cabot Yerxa unearthed mineral water in the Desert Hot Springs area (Cabot's Museum, 2020).[3] The northern Coachella Valley attracts visitors and residents in search of a warmer climate and hot mineral waters. There are approximately 23 spas and resorts related to the thermal springs located in Desert Hot Springs as well as several resorts and golf courses, and regional activities such as the Coachella Music Festival and the Indian Wells Tennis Tournament, all of which attract visitors and residents to the area.

[3] https://www.cabotsmuseum.org/the-water/




Planning Area

Subbasin

**Parcels in Planning Area**

**Land Use**

- Single Family Residential
- Multi-Family Residential
- Mobile Homes and Trailer Parks
- Rural Residential
- Commercial and Services
- General Office
- Facilities
- Education
- Industrial
- Transportation, Communications, and Utilities
- Mixed Commercial and Industrial
- Mixed Residential
- Under Construction
- Open Space and Recreation
- Agriculture
- Vacant
- Unknown

N

0 1 2 4

Miles

LAND USES FOR PARCELS IN PLANNING AREA BASED ON SCAG 2019 RIVERSIDE COUNTY DATA

Mission Creek Subbasin Alternative Update

Coachella Valley, California

| By: Rincon Consultants | Date: 4/3/2026 | Project No.: 1944537*00 |
|---|---|---|
| rincon | | Figure **2-2** |

Date: 4/3/2026 Printed by: vphanPath: 25-17254 UWMP.aprx

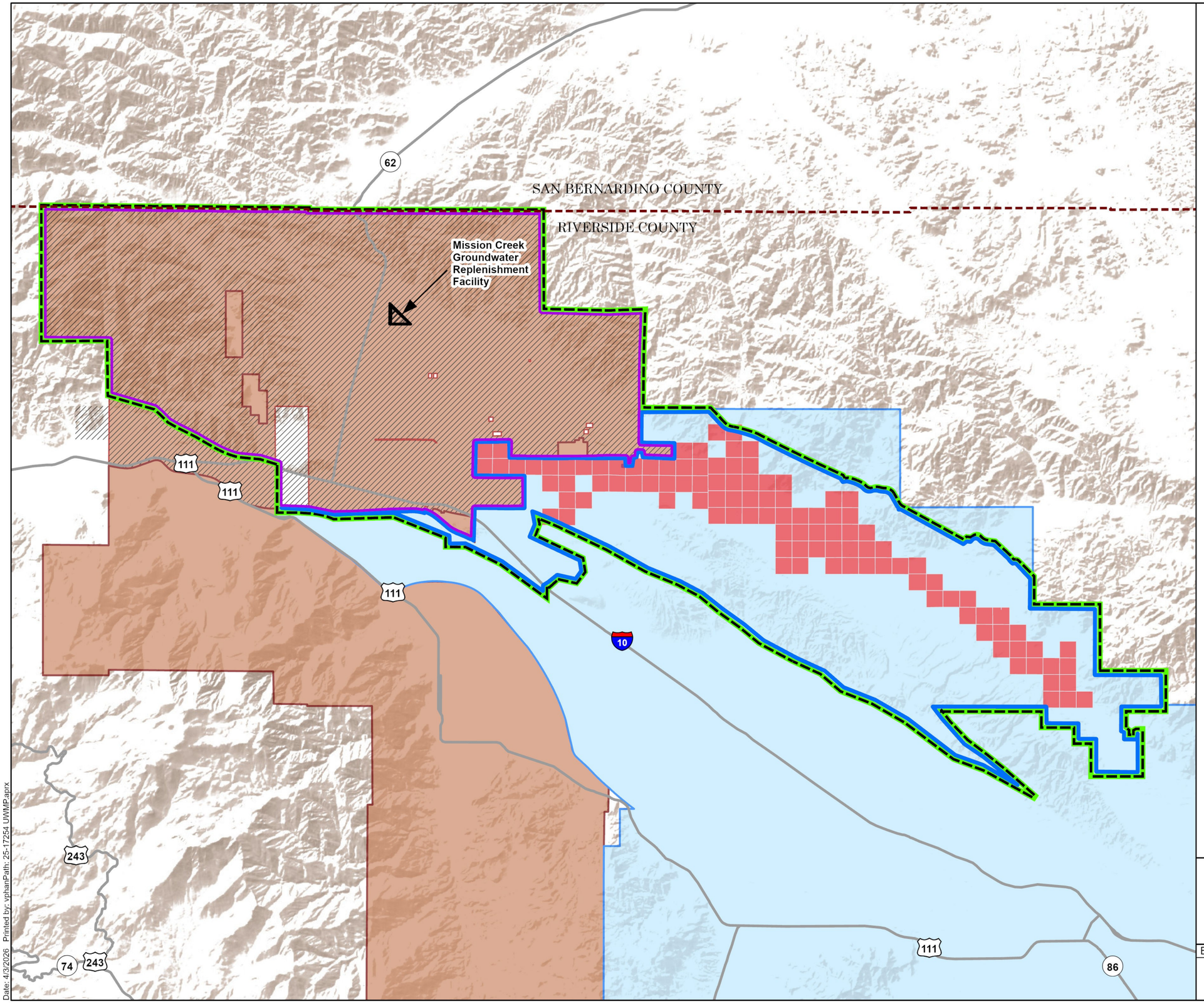
## 2.3 Planning Area Demographics

Similar to land use, population trends provide the basis for water demand projections. This 2027 MCSB Update utilizes Planning Area demographics based on demographic information from the SCAG Connect SoCal regional growth forecast (SCAG, 2024). The forecast includes base year estimates for 2019 and projections for years 2035 and 2050.

SCAG used Transportation Analysis Zones (TAZ), which are similar to census block groups, in their demographic projections to identify where and how much household and employee growth is expected to occur in each subarea. These projections are developed based on local community input, economic data, and input from state agencies such as the Economic and Human Development Policy Committee and the California Department of Finance. These projections are regularly updated based on the latest available data and trends to maintain both accurate and meaningful demographic projections for Southern California.[4] Population estimates that include seasonal residents, and the housing and employment projections used to estimate water demand, are presented in Section 3.

SCAG projections are provided in Geographic Information System (GIS) polygon format for each TAZ and were processed for the Planning Area by Agency areas. As illustrated with the purple boundary on **Figure 2-3**, the northern portion of the Planning Area is referred to in this 2027 MCSB Update as the MSWD/DWA Planning Area. The MSWD/DWA Planning Area encompasses DWA's area shown in brown and MSWD's area shown in hatch pattern on **Figure 2-3**. The remainder of the Planning Area to the southeast is referred to in this 2027 MCSB Update as the CVWD Planning Area. The CVWD Planning Area, shown with a blue boundary on **Figure 2-3**, includes all CVWD's area within the Planning Area including PWS ID-8. These two planning areas are described in greater detail in Section 3, Demand Projections. **Table 2-1** shows population projections for the two planning areas calculated from the SCAG demographic projections.

[4] Source: SCAG Website: https://scag.ca.gov/growth-forecasting




AGENCY BOUNDARIES AND PLANNING AREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: Rincon Consultants | Date: 4/3/2026 | Project No.: 1944537*00 |
|---|---|---|

Figure **2-3**

Date: 4/3/2026 Printed by: vphanPath: 25-17254 UWMP.aprx

**Table 2-1: SCAG Population Projections for Planning Area**

| | CVWD Planning Area | | MSWD/DWA Planning Area | | Total Planning Area | |
|---|---|---|---|---|---|---|
| Year | Population | % Annual Increase[b] | Population | % Annual Increase[b] | Population | % Annual Increase[b] |
| 2019[a] | 9,809 | 1.78 | 44,309 | 0.83 | 54,118 | 1.69 |
| 2035 | 16,765 | 4.43 | 77, 884 | 4.74 | 94,649 | 4.68 |
| 2050 | 17,098 | 0.13 | 100,661 | 1.95 | 117,759 | 1.62 |

a. 2019 percent annual increase is based on annual meter connection increase from 2020-2025.
b. Percent (%) Annual Increase is assumed to be constant between listed time periods.

## 2.4 Water Infrastructure Overview

This subsection provides an overview of the water infrastructure that supports groundwater production and recharge within the Planning Area.

### 2.4.1 Groundwater Production

Of the two retail water purveyors in the Planning Area, MSWD has higher groundwater production from the MCSB and the GHSA of the Indio Subbasin. MSWD's service area also overlies the DHSSB, which is served potable water from the MCSB. DWA does not have any groundwater production facilities in the MCSB or GHSA of the Indio Subbasin. CVWD has four active production wells located in the south-central portion of the MCSB. Similar to MSWD, CVWD's service area also overlies the DHSSB, which is served potable water from the MCSB.

CVWD and DWA are authorized by the California Water Code to levy a RAC for the purposes of replenishing groundwater supplies within their areas. The authorizing legislation requires the installation of water measuring devices on all wells when the collective production for a producer's wells exceeds the RAC thresholds for the respective agency (25 and 10 AFY for CVWD and DWA, respectively). Consequently, all production wells that participate in the RAC programs are metered (including wells with production below the RAC thresholds). From 2020 to 2024, groundwater was extracted from 26 metered wells subject to the RAC, including municipal pumping and 14 privately owned wells. In addition to the metered RAC pumping, it is estimated that there is an additional 500 AFY of groundwater pumping in the MCSB by minimal pumpers that are not subject to the RACs or metering requirements.

Approximately 93 percent (%) of the metered groundwater produced in the MCSB is produced for municipal and recreational use (including golf course irrigation). The remaining approximately 7% of metered groundwater is produced for agricultural or industrial purposes (WSP, 2025). The average annual production over the five-year period from WY 2019-2020 through WY 2023-2024 in the MCSB was 14,086 AFY (including municipal pumping, private metered RAC pumping, and an estimated 500 AFY of unmetered pumping from minimal pumpers). The five-year average annual production by private RAC pumpers for non-municipal

use was 1,379 AFY within CVWD's service area and 1,794 AFY in DWA's jurisdictional area. Groundwater production volumes are presented for each water year in the MCSB Annual Report.

Groundwater for retail delivery is currently produced from one MSWD well in the GHSA of the Indio Subbasin. The average annual production over the five-year period from WY2019-2020 to 2023-2024 for this well was 343 AFY. One private well in the GHSA of the Indio Subbasin is metered, and the average annual production over the five-year period from 2015 to 2019 for this well was 14 AFY. Unmetered pumping by private pumpers is considered minimal in the GHSA of the Indio Subbasin.

For the DHSSB, no recent records for groundwater extraction were available. Annual pumping from the DHSSB was estimated at approximately 1,700 AFY in the late 1990s (Mayer et al., 2007).

### 2.4.2 Groundwater Replenishment Infrastructure

A conveyance system to deliver SWP water directly to the Coachella Valley does not currently exist. However, CVWD and DWA are both SWP Contractors and have entered into an agreement with MWD to exchange their SWP water allocations for Colorado River water. This exchange agreement allows the two agencies to take advantage of MWD's CRA, which passes through the northern portion of Coachella Valley. DWA acquired approximately 190 acres of land adjacent to the CRA in the MCSB to construct spreading basins for recharge of CRA water. In 1997, MWD constructed a 48-inch turnout from the CRA for DWA's recharge site just south of Indian Avenue and west of Worsley Road in the northern part of the MCSB. After construction of the spreading basins, recharge activities in the MCSB began at the MC-GRF in November 2002.

**Figure 2-3** shows the location of the MC-GRF, which is used to recharge imported water in the MCSB. The MC-GRF is owned, operated, and maintained by DWA, with cost share by CVWD. This facility is used to recharge a portion of CVWD's and DWA's SWP water allocation with exchanged Colorado River water when supplies are available. The remainder of their allocations are recharged outside of the MCSB to the WWR-GRF in the western area of the Indio Subbasin.

CVWD and DWA pay DWR's expenses for capital and fixed operation and maintenance for the delivery of their SWP water delivered to MWD. MWD then delivers SWP exchange water to the MCSB at no cost. DWR's charges are recovered in two ways by CVWD and DWA. One portion of delivery cost is recovered from SWP property taxes while the remainder of the costs are recovered from the RAC. The SWP property tax portion is generally used to pay SWP water fixed/capital costs while the RAC portion funds other expenses such as power, operation, and maintenance costs.

## 2.5 Environmental Factors

This section describes the environmental resources of the Coachella Valley that are relevant to the Planning Area and its population projections, anticipated demands, and groundwater resources that are considered in this 2027 MCSB Update.

The Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP), developed by the Coachella Valley Association of Governments (CVAG) and administered by the Coachella Valley Conservation Commission (CVCC), provides a regional vision for balanced growth to meet the requirements of federal and state endangered species laws, while promoting enhanced opportunities for recreation, tourism, and job growth. The CVMSHCP aims to conserve open space and protect plant and animal species. By providing comprehensive compliance with federal and state endangered species laws, the CVMSHCP not only safeguards the desert's natural resources for future generations but also allows for more timely construction of roads and other infrastructure essential to improving quality of life in the Coachella Valley (CVCC, 2020).

The CVMSHCP was approved by the United States Fish and Wildlife Service (USFWS) in October 2008 and was amended most recently in August 2016, which brought MSWD into the plan. The purpose of the CVMSHCP is to balance the goals of maintaining biological diversity and meeting economic growth objectives in the CVMSHCP Plan Area through the designation of open space. Drawing from state and federal regulatory laws governing the protection of threatened and endangered species, the CVMSHCP is based on the California and the Federal Endangered Species Acts (ESA), National Environmental Policy Act, Natural Community Conservation Planning Act, the California Fish and Game Code, and the California Environmental Quality Act. **Table 2-2** summarizes the acreage of each designated conservation area within the Planning Area (CVCC, 2020).

Within the Planning Area, the CVMSHCP designates about 95,600 acres of land within 14 conservation areas. As signatories to the CVMSHCP, CVWD and MSWD are obligated to fully implement the terms and conditions of the CVMSHCP and the Second Amendment to the Implementing Agreement.[5] Both agencies are ongoing participants in the CVMSHCP.

[5] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=131208&inline

**Table 2-2: Conservation Areas in Planning Area**

| Conservation Area Designation | Acreage within Planning Area (acres) |
|---|---|
| Cabazon Conservation Area | 845 |
| Desert Tortoise and Linkage Conservation Area | 2,169 |
| Edom Hill Conservation Area | 3,299 |
| Indio Hills Palms Conservation Area | 1,843 |
| Indio Hills/Joshua Tree National Park Linkage Conservation Area | 11,631 |
| Joshua Tree National Park Conservation Area | 772 |
| Long Canyon Conservation Area | 809 |
| Stubbe and Cottonwood Canyons Conservation Area | 8,057 |
| Thousand Palms Conservation Area | 17,340 |
| Upper Mission Creek/Big Morongo Canyon Conservation Area | 26,088 |
| West Deception Canyon Conservation Area | 3,926 |
| Whitewater Canyon Conservation Area | 14,064 |
| Whitewater Floodplain Conservation Area | 1,509 |
| Willow Hole Conservation Area | 3,254 |
| **Total** | **95,606** |

**Table 2-3** summarizes the acreages of federal lands within the Planning Area. United States federal lands were not considered suitable for future growth due to federal ownership.

**Table 2-3: Federal Lands in Planning Area**

| Federal Lands Classification | Acreage within Alternative Plan Update Planning Area (acres) |
|---|---|
| Bureau of Indian Affairs | 4 |
| Bureau of Land Management | 51,493 |
| Forest Service | 5,064 |
| Local Government | 377 |
| National Park Service | 826 |
| Small Tract | 5,192 |
| Undefined | 1,976 |
| **Total** | **64,932** |

## 2.6 Known and Potential Groundwater Dependent Ecosystems in the MCSB

The CVMSHCP identified one known groundwater dependent ecosystem (natural community) and four potential ecosystems in the MCSB that may be groundwater dependent (CVAG, 2016). The primary groundwater dependent ecosystem in the MCSB is mesquite hummocks. Four other natural communities that may be groundwater dependent include: (1) Sonoran cottonwood-willow riparian forest, (2) southern sycamore-alder riparian woodland, (3) desert fan palm oasis woodland, and (4) desert dry wash woodland. **Figure 2-4** shows the occurrence of these communities in the MCSB. These four communities are located either outside the

influence of groundwater management activities in the MCSB or in areas where regional groundwater occurrence is of sufficient depth that groundwater management activities will not impact the communities. Section 2.6.1 summarizes the occurrence and condition of the mesquite hummocks. An additional discussion of other known or potential groundwater dependent ecosystems in the MCSB is provided in Section 2.6.2.

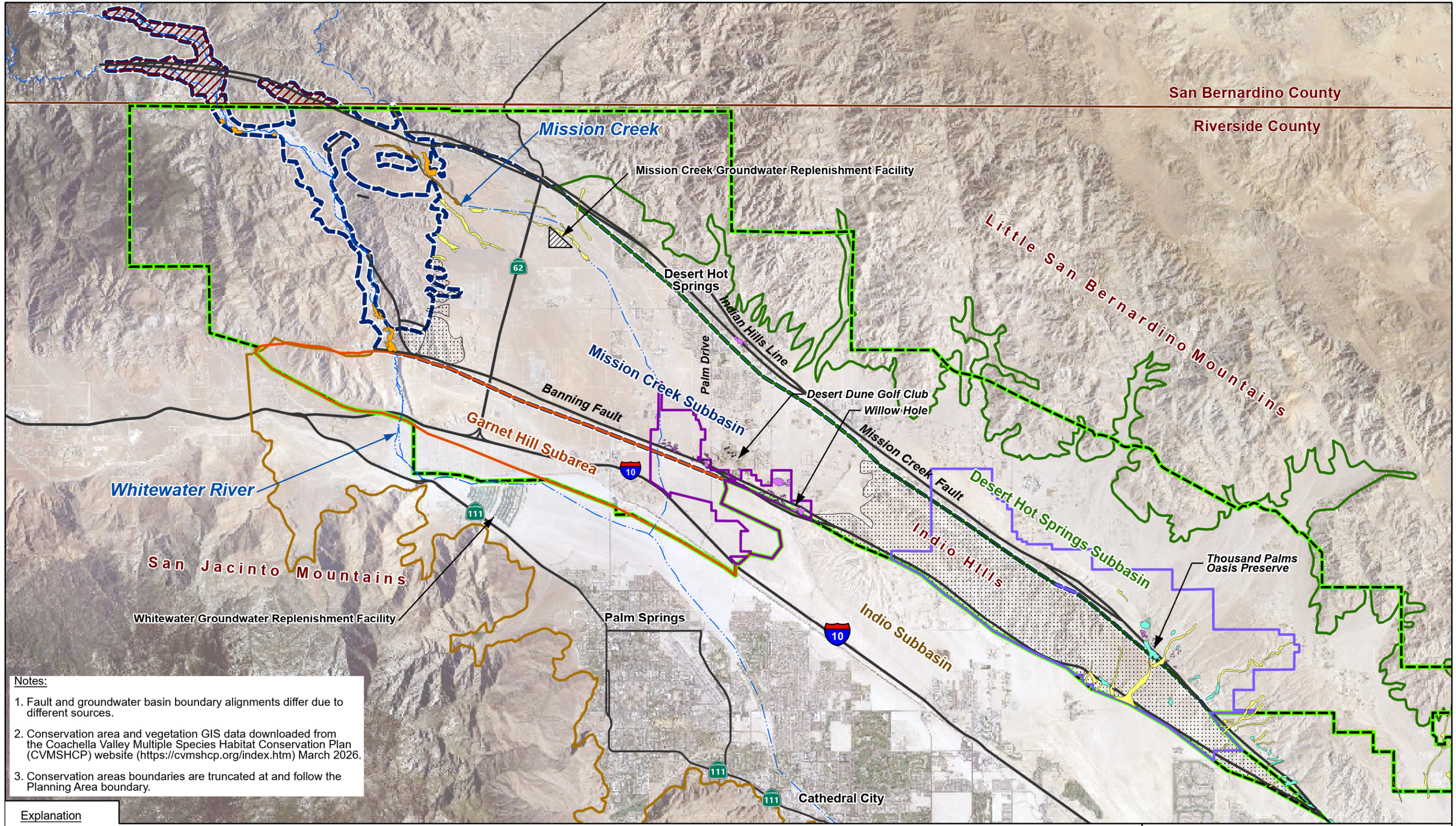
### 2.6.1 Mesquite Hummocks

Mesquite hummocks were historically found throughout the Coachella Valley (CVAG, 2016). They occupied about 8,300 acres of the Coachella Valley in 1939 but were reduced to less than 1,000 acres by 1998. Most are present along the Banning and San Andreas Faults where groundwater levels historically have been within about 50 feet of the ground surface. They have been impacted in the past several decades, potentially by the factors discussed below.

The mesquite hummock natural community is composed of stands of honey mesquite (*Prosopis glandulosa* var. *torreyana*). In areas with active wind-blown sand movement, mesquite hummocks provide a structure that can be a nucleus for accumulating and stabilizing large quantities of aeolian sand. Mesquite hummocks are found within sand dunes at the Willow Hole Conservation Area in the MCSB (**Figure 2-5**). Mesquite hummocks also occur on level terrain such as at the margins of Thousand Palms Oasis Preserve in the DHSSB and just outside of the MCSB (at the far southeastern end of the MCSB as shown on **Figure 2-5**).

Mesquite hummocks are typically associated with high soil moisture and often associated with springs or fault areas that result in relatively high groundwater conditions (i.e., near surface or relatively shallow groundwater conditions). Honey mesquite has been categorized as a facultative phreatophyte, meaning that it can shift its primary water uptake between a relatively deep tap root (recorded at up to 170 feet deep) to shallower near-surface roots that take in water from rainfall events. While this suggests that honey mesquite can thrive either with high groundwater conditions or with precipitation alone, all long-lived honey mesquite stands occur in the Coachella Valley where there are relatively high groundwater conditions, often associated with fault zones (UCR-CCB, 2020).

To evaluate groundwater level impacts on mesquite hummocks, a 2014 study by the University of California Riverside-Center for Conservation Biology (UCR-CCB) for the CVMSHCP used ground-penetrating radar along the surface of the dunes associated with mesquite stands to assess the depth to groundwater. Findings showed probable near-surface (high) groundwater at one vigorous stand, but at all other sites there was no groundwater detected from the surface using this method (UCR-CCB, 2020). Ground penetrating radar, however, is not a precise method of measuring depths to groundwater. The 2014 study did not include depth to groundwater level measurements in nearby wells for calibration of the ground penetrating radar survey (CVWD, 2014). Overall, the study was inconclusive regarding depth to groundwater and the presence of mesquite stands. Regional well records studied showed increases in depth-to-water over time, but the data were not at a scale fine enough to definitively attribute declines in mesquite stands to groundwater level declines.




Notes:

1. Fault and groundwater basin boundary alignments differ due to different sources.
2. Conservation area and vegetation GIS data downloaded from the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) website (https://cvmshcp.org/index.htm) March 2026.
3. Conservation areas boundaries are truncated at and follow the Planning Area boundary.

Explanation

- Facility
- Planning Area
- Streams
- Highway/road
- Fault
- Mission Creek Subbasin fringe area
- Garnet Hill Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin

Conservation Areas

- Thousand Palms Conservation Area
- Willow Hole Conservation Area

CVMSHCP Vegitation Natural Communities

- Desert dry wash woodland
- Desert fan palm oasis woodland
- Sonoran cottonwood-willow riparian forest
- Southern sycamore-alder riparian woodland
- Mesquite hummocks

0 6,000 12,000
Approximate Scale in Feet

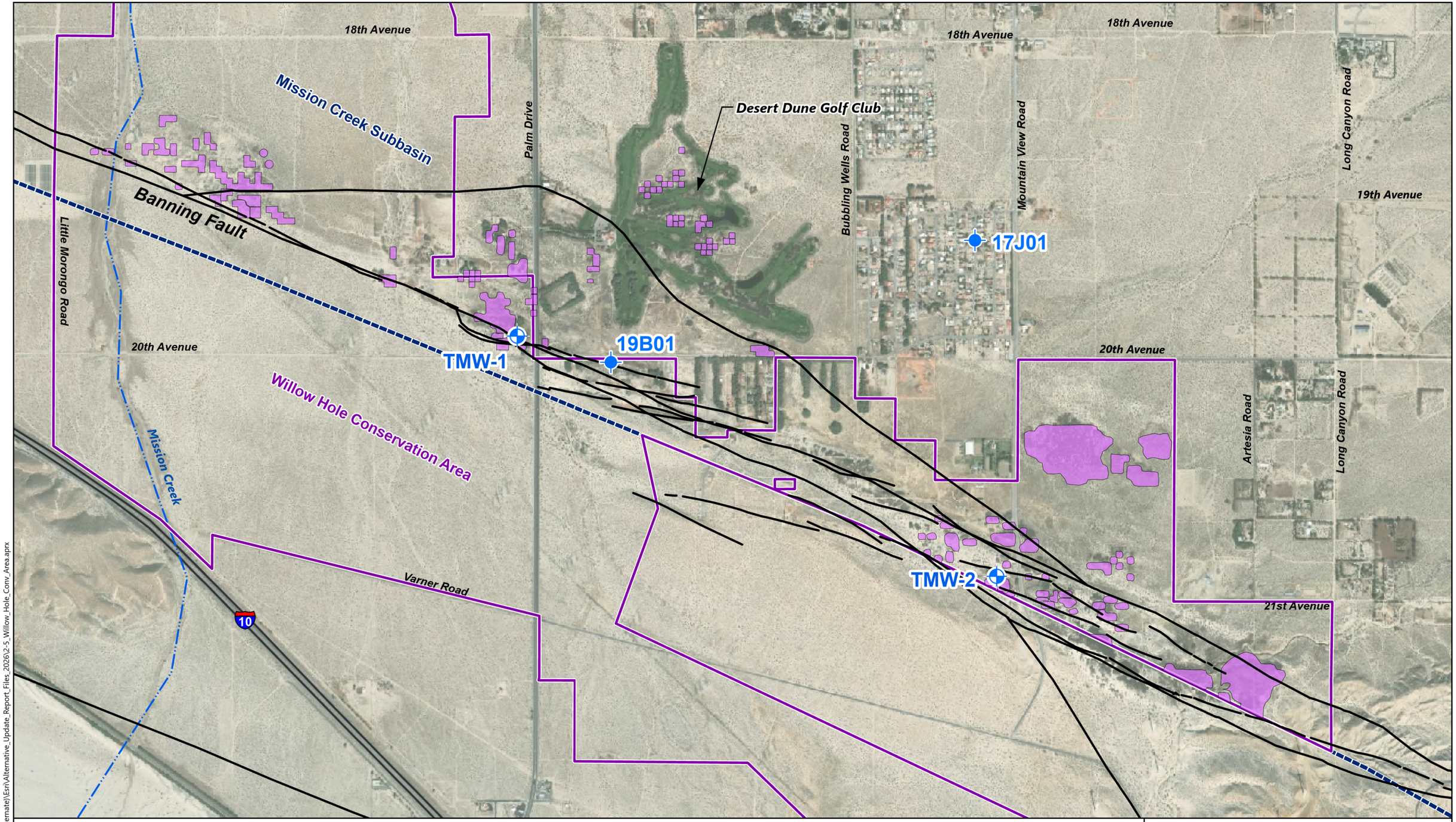
Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA.Water.CA.gov.

N

KNOWN AND POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEMS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 2-4 |

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Explanation

- Monitoring well for mesquite hummock habitat reporting
- Monitoring well for Sustainable Groundwater Management Act Annual Reporting
- Streams
- Highway/road
- Fault
- Mission Creek Subbasin
- Mesquite hummocks
- Willow Hole Conservation Area

Notes:

1. Fault alignments downloaded from Riverside County Data Portal (https://gis.rivco.org).
2. Conservation area and vegetation GIS data downloaded from the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) website (https://cvmshcp.org/index.htm) March 2026.
3. Conservation areas boundaries are truncated at and follow the Planning Area boundary.

0 750 1,500

Approximate Scale in Feet

Basemap modified from aerial photograph provided by Esri and Maxar, dated November 3, 2018.

N

# WILLOW HOLE CONSERVATION AREA
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 9/4/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 2-5 |

Date: 9/4/2026 Printed by: USMW719917
Path: Y:\CM1916\7351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_2026\2-5_Willow_Hole_Conv_Area.aprx

Mesquite hummocks are present in eight Conservation Areas designated by the CVMSHCP: Cabazon, Willow Hole, Thousand Palms, Indio Hills Palms, East Indio Hills, Dos Palmas, Coachella Valley Stormwater Channel and Delta, and Santa Rosa and San Jacinto Mountains (CVAG, 2016). Of those eight CVMSHCP Conservation Areas, only the Willow Hole Conservation Area contains mesquite hummocks within the MCSB, as discussed below. Nearly all the approximately 125 acres of mesquite hummocks mapped in the Willow Hole Conservation Area (CVAG. 2016), are within the MCSB. **Figure 2-5** presents the Willow Hole Conservation area in greater detail, showing that a small area of mesquite hummocks occurs in the GHSA of the Indio Subbasin. This figure also shows the location of monitoring wells used to monitor groundwater levels in the Willow Hole Conservation Area.

The CVMSHCP intends to ensure that approximately 114 acres of the 125 acres of mesquite hummocks in the Willow Hole Conservation Area are conserved (CVAG, 2016). This largely continuous community extends west of Palm Drive and lies along the Banning Fault, which is a branch of the San Andreas Fault Zone, south of Desert Hot Springs.

High groundwater conditions in the Willow Hole Conservation Area are caused by the Banning Fault acting as a partial barrier to groundwater flow, and low-permeability sediments of the Indio Hills to the southeast, restricting southeasterly groundwater flow. The Banning Fault in this area consists of echelon faults, that is, closely spaced parallel or subparallel faults that may overlap (see **Figure 2-5**). These conditions may result in unique, relatively small groundwater subareas between the fault splays that are not directly linked to the main MCSB or the GHSA of the Indio Subbasin.

The presence of localized distinct groundwater subareas is supported by depth to groundwater data in the Willow Hole area that shows a wide range in groundwater levels in August 2018. MSWD installed groundwater monitoring wells TMW-1 and TMW-2 in 2018 to monitor groundwater levels in association with a mesquite hummocks restoration program (EnviroLogic, 2019). The monitoring wells are located approximately 2 miles apart as shown on **Figure 2-5**. In August 2018, the depths to groundwater in wells TMW-1 and TMW-2 were approximately 36.5 and 47.1 feet bgs, respectively.

Groundwater level measurements collected since 2018 indicate that depth to water increased to approximately 40 feet bgs at well TMW-1 and decreased to approximately 46 feet bgs at well TMW-2 by February 2021. Although pressure transducers and dataloggers were installed in the wells, they were stolen, and the replacements were set above the water levels. The only recent data collected from the wells was collected on May 8, 2026. These measurements showed a decrease in water levels at well TMW-1 to 52.9 feet bgs and an increase at well TMW-2 to 34.5 feet bgs. These groundwater levels are consistent with reported groundwater levels (i.e., within about 50 feet of ground surface) in areas where mesquite hummocks historically have been found. One additional water level measurement is available just south of Desert Dunes Golf Club at well 03S05E19B001S (19B01), shown on **Figure 2-5**. This well indicates groundwater depths of approximately 4.5 to 5.5 feet bgs in 2020 through 2024 (WSP, 2025). This well historically exhibited flowing artesian conditions, meaning that the hydraulic head (the height to

which water will rise in the well casing) is greater than ground surface, resulting in discharge of water from the wellhead unless the well casing extends a sufficient height above ground, or the well is capped. These differences in depth to groundwater over relatively small distances in this area of modest topographic relief, which preclude ground surface level differences explaining the observed depth to groundwater level differences, are consistent with a localized influence of faulting on hydrogeologic conditions in the area.

Groundwater monitoring at well 03S05E17J001S (17J01), located approximately 0.5 miles east of the Desert Dunes Golf Club Fault and approximately 0.65 miles northeast of a mapped fault (**Figure 2-5**), indicates depth to groundwater of about 85 to 88 feet bgs in 2020 through 2024 (WSP, 2025). This is considered representative of regional groundwater levels and occurs in an area where mesquite hummocks have not been observed.

Additional evidence of the unique groundwater conditions near the Banning Fault is found in continuous monitoring of depth to water in the mesquite hummock monitoring wells as reported by EnviroLogic (2019). Continuous water level monitoring indicated that well TMW-2 responded almost immediately to a heavy precipitation event on February 14, 2019 (nearly 3.7 inches in 24 hours) with water levels rising by approximately 1.5 feet. Water levels stayed at this elevated level for at least 4 months following the precipitation (EnviroLogic, 2019). Well TMW-1, conversely, showed no immediate response to this precipitation and only a potential long-term response (less than a few tenths of an inch over several months). Groundwater in the same connected aquifer tends to respond similarly to precipitation. The different response in these two similarly constructed wells further supports the conclusion that the high groundwater levels in wells TMW-1, TMW-2, and 19B01 represent localized, somewhat isolated, conditions that vary from groundwater levels in the surrounding area.

The ongoing CVMSHCP Monitoring and Management Program will assess the hydrological regimes that are essential to maintenance of mesquite hummocks in the Conservation Areas. As part of that monitoring, UCR-CCB conducted a preliminary study looking for potential causes of declines in mesquite (UCR-CCB, 2020). Their objective was to identify the causes of declines in Coachella Valley mesquite hummocks, to determine how quickly declines are occurring, and to suggest what may be done to stop them. The preliminary study determined that possible factors in mesquite hummocks declines are decreasing groundwater levels, the presence of non-native athel tamarisk (salt cedar) that causes lower groundwater levels through transpiration of large quantities of groundwater (evaporative pumping), insect damage, below average precipitation, fire, and off-road vehicle use.

The health of the mesquite hummocks and groundwater levels will continue to be monitored as part of the CVMSHCP Monitoring and Management Program. The CVCC continues to monitor species associated with the mesquite hummocks in the Willow Hole Conservation Area and has conducted re-treatment of invasive tamarisk regrowth in 1.61 acres in the Willow Hole area in 2024 (CVCC, 2025).

### 2.6.2 Other Potential Groundwater Dependent Ecosystems

The four other natural communities occurring within the MCSB that may be groundwater-dependent under specific conditions include: Sonoran cottonwood-willow riparian forest, southern sycamore-alder riparian woodland, desert fan palm oasis woodland, and desert dry wash woodland. The locations of these communities in the MCSB are shown on Figure 2-**4**. Although each of these communities may potentially be groundwater dependent, they do not appear to be in areas where groundwater management would impact them.

Potentially groundwater-dependent Sonoran cottonwood-willow riparian forest, desert fan palm oasis woodland, and desert dry wash woodland ecosystems are in the southern part of the Thousand Palms Conservation Area at the far southeastern end of MCSB near the Thousand Palms Oasis Preserve and within an erosional gap of the low-permeability Indio Hills. This portion of the MCSB is located approximately 10 miles southeast of known pumping in the main MCSB. Groundwater in this area is not expected to be impacted by any activities in the main part of the MCSB.

Potentially groundwater-dependent southern sycamore-alder riparian woodland and Sonoran cottonwood-willow riparian forest ecosystems occur in the northwestern MCSB along the Mission Creek stream course. The Sonoran cottonwood-willow riparian forest also occurs along the southern Whitewater River channel. The locations of these plant communities suggest that they are associated with surface water runoff in the Mission Creek and Whitewater River. In addition, these plant communities in the northwestern part of the MCSB are located at least three miles northwest of the nearest known groundwater pumping and in an area where groundwater is relatively deep (several hundred feet or deeper). Consequently, groundwater pumping in the MCSB is not expected to influence groundwater in these areas.

A potentially groundwater-dependent desert dry wash woodland ecosystem occurs in the northwestern MCSB in association with the Mission Creek stream channel, Big Morongo Creek stream channel, and other unnamed drainages in hills separating the Whitewater River channel from the main MCSB. The location of this ecosystem community suggests that it is associated with surface water runoff in these drainages. This ecosystem covers areas where depth to regional groundwater is at least several hundred feet bgs, including near the MC-GRF. Even during periods of increased groundwater recharge, the depth to groundwater in these areas is several hundred feet (Wood, 2021). This does not preclude shallower groundwater in localized or extensive perched zones at shallower depths that could support localized ecosystems. However, these perched zones, if present, would not be impacted by pumping in the main MCSB. Consequently, groundwater fluctuations in the main MCSB aquifer are not anticipated to have any impact on this ecosystem.

# 3. Demand Projections

## 3.1 Introduction

Reliable estimates of historical and future water use are necessary for regional water planning. A wide range of variables influence future water demand, including changes to economic trends, population, employment, seasonality, environmental needs, water conservation efforts, regulations, and land use. These factors can rapidly change the demographics of a region and corresponding water demands.

Water demand projections in the 2022 Mission Creek Subbasin Alternative Plan Update (2022 MCSB Update) were based, in part, on projections of population growth in the Planning Area (Wood and Kennedy Jenks, 2021). The analysis presented in this report uses updated housing and employment projections from the Southern California Association of Governments (SCAG) as the basis for projected future water demands, as described below.

Using available information from published reports and historical water use data for the Planning Area, this chapter presents updated water demand projections for the 25-year planning horizon (2025-2050) established for this 2027 Mission Creek Subbasin Alternative Plan Update (2027 MCSB Update). The projections align with the updated demographic forecast for the Planning Area by 2050. Projections are presented in 5-year increments from 2025 through 2050 and include consideration of water conservation savings.

The estimates of water demands are broken into two major categories: (1) municipal demand, and (2) demand from private pumping. Municipal demands in the Planning Area are met by Coachella Valley Water District (CVWD) and Mission Springs Water District (MSWD) within their respective retail service areas. Historical demands from each retail service area were used to develop water use factors for land uses within two regions of the Planning Area, as described in Section 3.3.

Private pumping in the Planning Area consists of: (1) small private wells for individual residences that are unmetered and pump less than 25 acre-feet per year (AFY) in CVWD's area and less than 10 AFY in Desert Water Agency's (DWA's) area, and (2) larger private wells for agricultural, golf, and industrial demands that are metered and report their groundwater production to CVWD or DWA if the well owner pumps greater than 25 AFY in CVWD's area or greater than 10 AFY in DWA's area, depending on their location relative to the agencies' boundaries.

Demand projections for the two categories, municipal and private pumping, were developed separately and combined into total demand projections for the Planning Area.

## 3.2 Factors Affecting Water Demand Projections

Factors such as recent land use planning and future California regulations regarding water conservation may affect water demand projections in the Planning Area. Uncertainties that could affect water demands include the following:

- **Revised Growth Forecast** – SCAG released new socioeconomic growth forecasts in early 2024 (*Connect SoCal 2024*) that updated previous projections for population, housing, and employment in the region. SCAG forecasts are developed in coordination with city and county municipalities and are based on the land use designations in their adopted General Plans.
- **Long-Term Conservation Regulations** – Water conservation has long been a part of water management in California and in the Planning Area. Following the 2012-2016 drought, California passed two major pieces of conservation legislation, Assembly Bill (AB) 1668 (Friedman) and Senate Bill (SB) 606 (Hertzberg), that further emphasize water conservation. As outlined in *Making Conservation A California Way of Life* (California Department of Water Resources [DWR] and State Water Resources Control Board [SWRCB], 2018), the legislation requires establishment, implementation, reporting, and enforcement of urban water use objectives, along with agricultural water use efficiency. These objectives and standards are in the early stages of implementation and reporting. The assumptions used for expected conservation impacts included in this analysis are discussed further in Section 3.3.8.

## 3.3 Municipal Demand

This section summarizes the process used to develop municipal water demand projections for the Planning Area. The Planning Area includes the retail service areas of two water agencies – CVWD and MSWD – and overlies all or portions of three groundwater subbasins/subareas: Mission Creek Subbasin (MCSB), Desert Hot Springs Subbasin (DHSSB), and Garnet Hill Subarea (GHSA) of the Indio Subbasin, as shown on **Figure 3-1**.

For the purposes of analysis, the Planning Area was divided into two regions as shown on **Figure 3-1**.

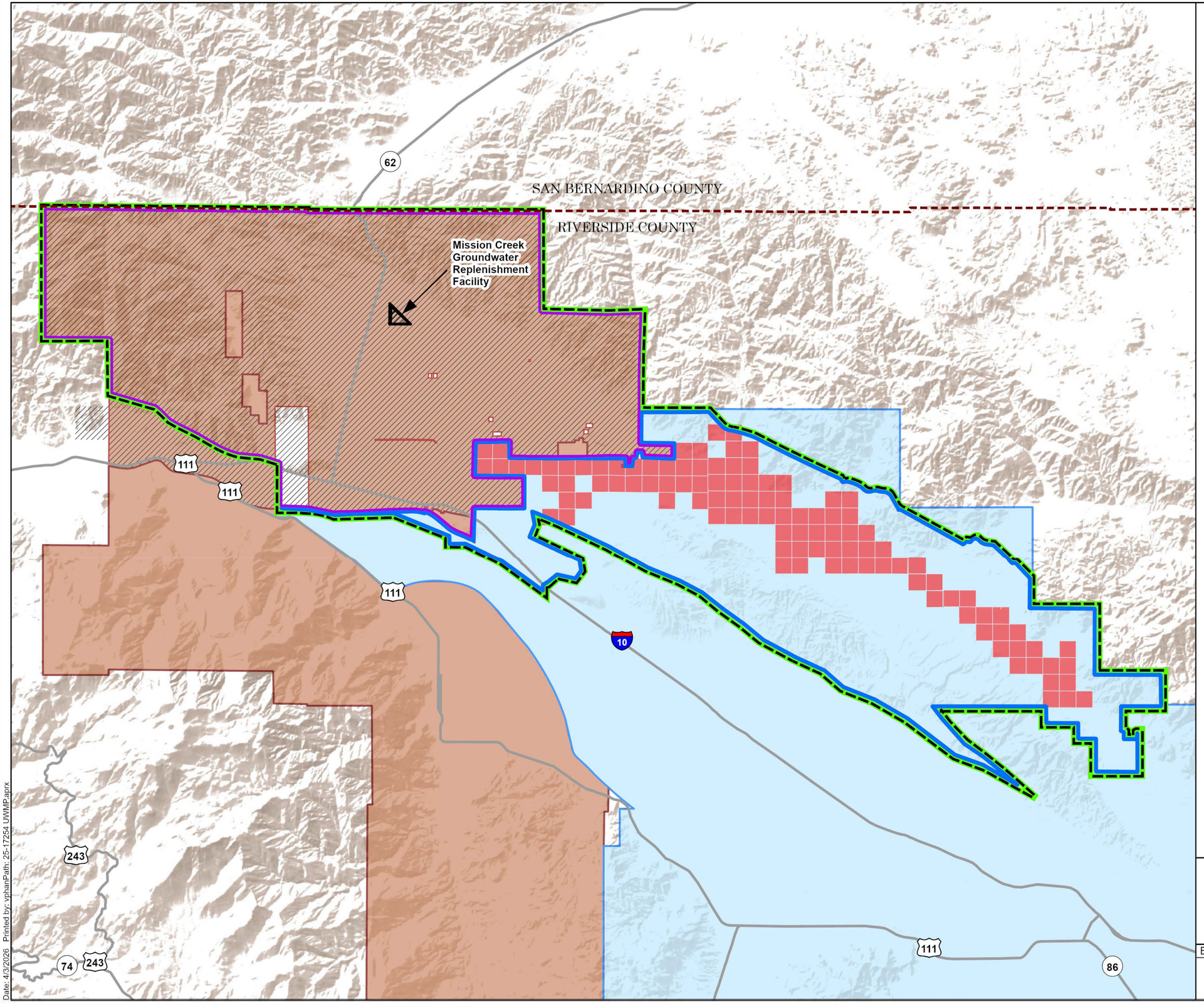
1. **CVWD Demand Area** is the portion of the CVWD service area that is within the Planning Area. The CVWD Planning Area is delineated by a blue boundary on **Figure 3-1**. Water consumption meter data from CVWD's Improvement District No. 8 (ID-8), shown in red, was used to develop water use factors for the entirety of the CVWD Demand Area.
2. **MSWD/DWA Demand Area** encompasses the portion of DWA's jurisdictional area, shown in brown, and MSWD's service area, shown in hatch pattern, within the Planning Area. The MSWD/DWA Planning Area is delineated by a purple boundary on **Figure 3-1**. Water consumption meter data from MSWD's retail service area was used to develop water use factors for the entirety of the MSWD/DWA Demand Area.

### 3.3.1 Municipal Demand Methodology

The municipal demand forecast used unit demand factors and adjustment factors based on a variety of information, including customer billing data and a geographic information system (GIS) database with parcel-level land use information. The base projection year was established as 2025 using interpolated data from the 2019 baseline year from SCAG via *Connect SoCal 2024*. Future water demand projections were based on SCAG growth projections for 2025,[1] 2035, and 2050. Future water demands were projected in 5-year increments with linear projections used for the other 5-year increments. The methodology used to develop municipal water demand projections was as follows:

1. **SCAG Regional Growth Forecast** — SCAG provided socioeconomic forecasts for population, households, and employment based on geographic units called traffic analysis zones (TAZs) that were correlated to each Demand Area. These SCAG data served as the starting point for analysis. Additional information was required to estimate total housing units for the region.
2. **Housing Unit Analysis** — Additional information about vacancy rates was used to estimate baseline and projected housing units for the Planning Area, including housing units used by seasonal residents and other part-time uses. Recent development data and land use information were used to allocate future housing units into the single-family and multiple-family sectors.
3. **Employment Analysis** — SCAG employment forecasts were used to allocate future commercial, industrial, and institutional (CII) employees to comparable water billing categories to project demands.
4. **Unit Demand Factors** — Customer billing data provided by the CVWD, DWA, and MSWD, collectively the Agencies, from October 2019 to September 2024 was evaluated to determine baseline water use factors by billing category for each Demand Area. The multiple-year average was used to capture annual weather variations. Water demand projections were calculated using *gallons per household* for residential and landscape uses, and *gallons per employee* for CII uses.
5. **Water Loss** — Water loss estimates were based on validated Water Loss Audit reports provided by the Agencies. An average of 5 years of available water loss audits (for 2020 through 2024) were used to develop a water loss estimate. Water Loss was assumed to decrease with the implementation of Advanced Metering Infrastructure (AMI).
6. **Adjustment Factors** — Future demands were adjusted for indoor and outdoor conservation based on savings from the natural replacement of indoor devices, installation of smart irrigation controllers, turf replacement rebates, non-functional turf bans, and from implementation of DWR's *2015 Model Water Efficiency Landscape Ordinance* (MWELO) (DWR, 2015) for future developments.

[1] 2025 forecast is a projection based on SCAG demographic data and does not reflect actual 2020-2025 water use.




AGENCY BOUNDARIES AND PLANNING AREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: Rincon Consultants | Date: 4/3/2026 | Project No.: 1944537*00 |
|---|---|---|
| rincon | | Figure **3-1** |

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Socioeconomic data and demand projections were totaled by each Demand Area, which is defined as being limited to the portion of the Agency's jurisdictional area in the Planning Area. For example, the CVWD Demand Area includes all of CVWD's jurisdictional area in the Planning Area, whether or not those demands are currently served by their domestic water system. For customers that are not connected to the CVWD domestic water system but are in the CVWD Demand Area, demands met by private wells or small water systems are allocated to CVWD as the overlying Groundwater Sustainability Agency (GSA).

### 3.3.2 SCAG Regional Growth Forecast

Socioeconomic projections of population, households, and employment were provided by SCAG, which is a joint powers authority that encompasses six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties). These data were originally prepared for the *2024-2050 Regional Transportation Plan/Sustainable Communities Strategy*, also known as *Connect SoCal 2024* (SCAG 2024b). Household and employment estimates developed for *Connect SoCal 2024* include base year estimates for 2019 and projections for 2035 and 2050. Forecasts for 2025, 2030, 2040, and 2045 were based on linear interpolation. The final socioeconomic growth projections were released with the final version of *Connect SoCal 2024*, which was adopted by SCAG on April 4, 2024.

*Connect SoCal 2024's* regional growth forecast is comprised of the most recent and detailed data available for the Planning Area. This regional growth forecast is based on jurisdictional General Plans and is intended to represent the most likely growth scenario considering a combination of recent and past trends and regional growth policies. To assess growth at the regional and county level, SCAG reviewed preliminary data with local jurisdictions as part of the Local Data Exchange (LDX) process. Jurisdictions provided feedback on growth forecasts, along with data elements such as GIS maps and surveys. Input from municipal planners generally revised growth forecasts upwards based on regional housing allocations.[2]

The major data sources used to develop SCAG's growth forecast at the county level are:

- California Department of Finance (DOF) population and household estimates
- California Employment Development Department (EDD) jobs report by industry
- 2019 existing land use and General Plans from local jurisdictions
- 2020 Decennial Census P.L.-94 171 Redistricting Data
- American Community Survey (2015-2019 5-Year Estimates)
- County assessor parcel databases
- 2019 business establishment data from InfoGroup
- Latest available entitlement agreements as articulated by local jurisdictions
- 6th cycle housing element update data, if available

[2] https://scag.ca.gov/rhna

- Adopted Connect SoCal 2020 policies and growth vision
- Jurisdictional review through the LDX process

*Connect SoCal 2024* projects that the population of Riverside County will increase by approximately 50 percent through 2050. The *Connect SoCal 2024* update also notes that the region's population declined between 2019 and 2023 and attributes this decrease to COVID-19 pandemic impacts. Traffic and visitation declined during the pandemic but has recovered to, or exceeded, pre-pandemic levels in most communities. SCAG notes that the median age is increasing and unpredictable events like the COVID-19 pandemic may cause significant deviations from projected long-term trends.

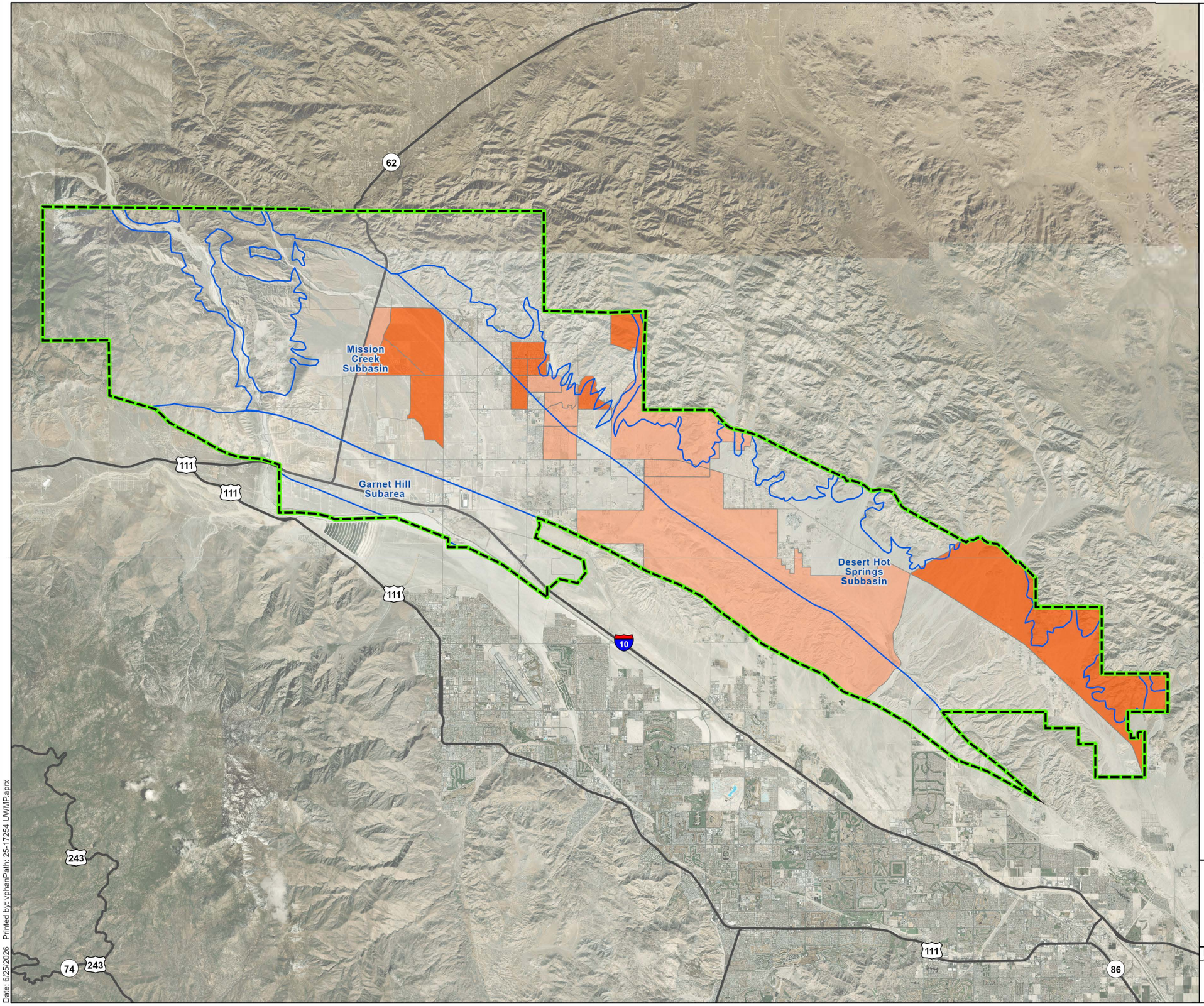
#### 3.3.2.1 Seasonal Population

The Coachella Valley is unique in that it includes a high number of homes identified as vacant for "seasonal, recreational, or occasional uses" as defined by the Census Bureau. These homes are not the primary residence of owners or renters based on where they spend most of their time. In the Coachella Valley, these include part-time retirement homes for people who live in one primary location, but also have a second home in a warmer location to spend winters and/or weekends. Tourism is also an important part of the region's economy, and many homes are used as short-term rentals. The emergence of the sharing economy and internet-based platforms for short-term rentals has more recently resulted in changes to the short-term rental market. The region's seasonal population is not counted under the Census Bureau's definitions of households and population used by SCAG.

For the purposes of this 2027 MCSB Update, growth in residential water demand is a function of current and projected households from SCAG's 2024 regional growth forecast. Seasonal and short-term rental homes are not assumed to deviate significantly as a percentage of total housing units, and future demands associated with these housing types are assumed to correlate with household increases. Vacant housing units and other amenities, such as municipal parks and common areas that serve the seasonal population, have year-round water uses, particularly for outdoor irrigation. Due to the seasonality of the tourist industry and outdoor irrigation requirements in the summer, these homes often use the most water when they are vacant. SCAG's population forecast was expanded for this 2027 MCSB Update to reflect seasonal population in the Planning Area.

#### 3.3.2.2 Growth Forecast for the Planning Area

SCAG provided socioeconomic forecasts at various levels of geographic units, including 11,267 TAZs, which were developed independently by SCAG and resemble the Census Bureau's block groups. These TAZs were used to split forecasts of households and employment by water agency and by Plan Area. To split individual TAZs, data were clipped along jurisdictional boundaries for further analysis using parcel-level land use data. Using land use data provided greater precision when locating population centers. **Figure 3-2** is a map of the Plan Area showing the largest household growth by TAZ.




Planning Area

Subbasin

**Population Growth 2019 - 2050 (Persons Per Square Mile)**

Less Than or Equal to 500

501 - 1,000

1,001 - 2,500

N

0 1 2 4

Miles

TAZ BASED POPULATION PROJECTIONS
FOR PLAN AREA
Mission Creek Subbasin Alternative Update
Coachella Valley, California

By: Rincon Consultants | Date: 6/25/2026 | Project No.: 1944537*00

Figure **3-2**

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### 3.3.2.3 Socioeconomic Forecast for the Planning Area

**Table 3-1** lists the socioeconomic population, household, and employment forecasts for the Agencies in the Planning Area. Household and employment forecasts were taken by partitioning SCAG growth estimates spatially by each Agency's service area. Population estimates were developed by multiplying household estimates by persons per household data from the 2020 U.S. Census.

**Table 3-1: Socioeconomic Growth Forecast for Agencies Within Plan Area**

| | Permanent Population | | Households | | Employment | |
|---|---|---|---|---|---|---|
| **Water Provider** | **2019** | **2050** | **2019** | **2050** | **2019** | **2050** |
| Coachella Valley Water District | 9,809 | 17,098 | 3,156 | 5,501 | 1,706 | 2,529 |
| Mission Springs Water District | 44,309 | 100,661 | 14,683 | 33,390 | 5,485 | 10,815 |
| **Planning Area Total** | **54,118** | **117,759** | **17,839** | **38,891** | **7,191** | **13,344** |

Note: SCAG population estimates do not include seasonal population.

Source: *Connect SoCal 2024*

### 3.3.2.4 Forecast Population with Seasonal Residents

For the purposes of analysis, SCAG's socioeconomic forecast was used to project the region's total population, including seasonal residents. The projection used vacancy rates and persons per household estimates from the State of California Department of Finance (DOF) for cities and unincorporated areas (see Section 3.3.2.3). By definition, these seasonal residents would spend less than half the year in these seasonal housing units. However, vacant housing units and other amenities that serve seasonal residents would have year-round water uses, primarily associated with outdoor irrigation.

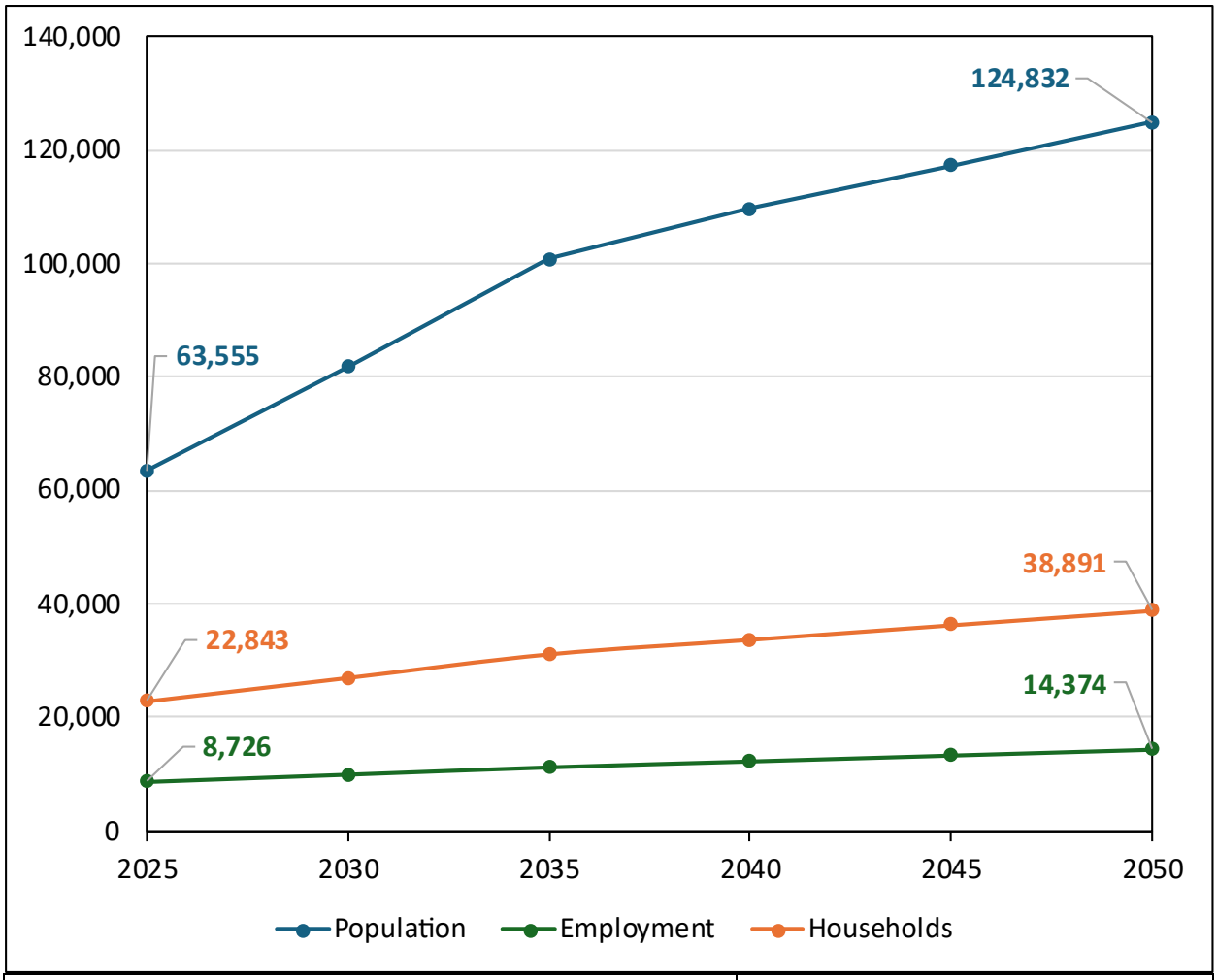
To estimate total service area population, both permanent residents and seasonal residents were estimated. Estimates of the permanent population were made using SCAG housing estimates, housing density, and water meter connections. The water service areas shown in **Figure 3-1** was intersected with 2019 housing totals from SCAG's *Connect SoCal 2024* growth projection (SCAG, 2024). Household totals for 2025 were estimated by multiplying the 2019 totals by the growth in residential meter connections for each agency from 2019 to 2025. The permanent population was estimated by multiplying the 2025 household totals by the number of persons per household for each jurisdiction within the Planning Area using Census data. The seasonal population was then estimated by dividing the permanent population totals by the occupancy rate from the Census for each jurisdiction to determine the number of housing units, and multiplying the total number of housing units by the difference between the average vacancy rate for California and the vacancy rate of each jurisdiction in the Planning Area. **Table 3-2** provides a forecast of Planning Area population with seasonal residents.

**Table 3-2: Population Growth Forecast for Agencies Within Planning Area**

| Water Provider | 2019 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Coachella Valley Water District | 10,768 | 11,344 | 14,545 | 18,199 | 18,756 | 18,977 | 19,199 |
| Mission Springs Water District | 48,223 | 52,210 | 67,254 | 82,645 | 90,833 | 98,233 | 105,633 |
| **Planning Area Total** | **58,991** | **63,554** | **81,799** | **100,844** | **109,589** | **117,210** | **124,832** |

**Figure 3-3** shows that the overall Planning Area population is projected to grow by 61,278 (96 percent), and households are anticipated to grow by 16,048 (70 percent), from 2025 to 2050. Overall household growth is expected to increase by approximately 3 percent annually. This growth is generally consistent with the average 3 percent annual growth across Agencies in the Planning Area from 2000 to 2024 per DOF housing estimates, which are impacted by a higher growth period in the early 2000's (DOF, 2026). Employment is anticipated to grow slower than population or households, with 5,648 new employees (65 percent) by 2050. This is likely a result of net travel out of the region for work, as well as a large number of retirees in the Planning Area.

**Figure 3-3: Socioeconomic Growth Forecast for Planning Area**




| Socioeconomic Growth Forecast for Plan Area | DRAFT |
|---|---|

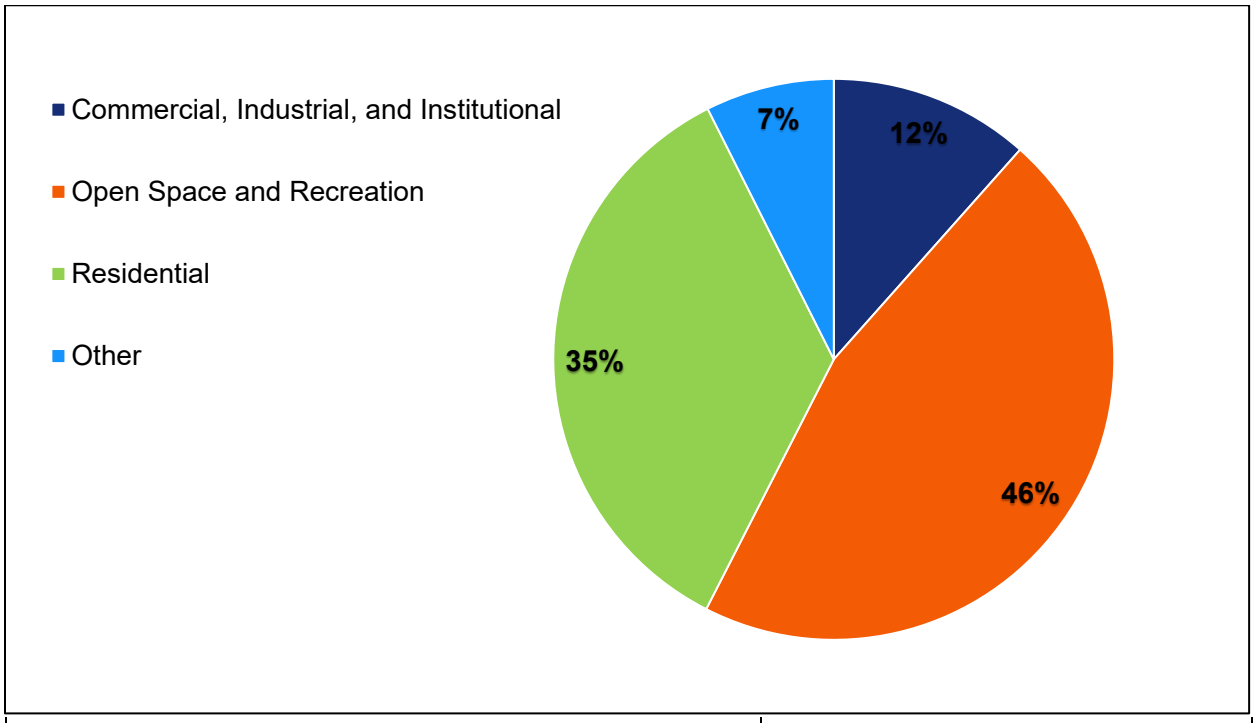
## 3.3.3 SCAG Land Use

Land use information derived from both General and Specific Plans compiled as part of SCAG's *Connect SoCal 2024* was used during analysis to spatially allocate residential growth and quantify future development of agricultural land. Land use data were retrieved from SCAG's *2019 Annual Land Use*[3] (SCAG 2019). These data are available in various formats, including SCAG's GIS Open Data Portal.[4] SCAG's land use data include existing land uses, adopted General Plan land use, Specific Plan land use, and adopted zoning codes for each jurisdiction. Since each jurisdiction in the region has their own approach to categorizing land uses, SCAG

[3] https://hub.scag.ca.gov/datasets/ea9fda878c1947d2afac5142fd5cb658_0/about
[4] http://gisdata-scag.opendata.arcgis.com/

aggregated these categories into their own land use definitions. These land use data were then reviewed by local jurisdictions as part of SCAG's LDX process, and SCAG's final dataset reflects each jurisdiction's local input. **Figure 3-4** shows the 2019 Land Use categories within the Planning Area. Open Space and Recreation comprises the majority of land in the Planning Area at about 46 percent. Residential land use comprises approximately 35 percent of land use within the Planning Area, while Commercial, Industrial, and Institutional (CII) land use comprises approximately 12 percent of the Planning Area.

**Figure 3-4: Land Use Within the Plan Area**




**Land Use Within the Plan Area**

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### 3.3.3.1 Housing Unit Projections

The growth forecast for residential and landscape used in this 2027 MCSB Update is based on a forecast of total housing units. SCAG's *Connect SoCal 2024* provides socioeconomic projections of households, or occupied housing units, which exclude all vacant units. Additional information about vacancy rates and housing types from the DOF E-5 Population and Housing Estimates for cities, counties, and the State 2020-2025 was used to transform SCAG projections into estimates of total housing units and to separate housing units into the categories of single-family and multiple-family residences (DOF, 2026).

### 3.3.3.2 Vacancy Rates

SCAG's *Connect SoCal 2024* counts are limited to occupied households and had to be increased to account for vacant housing units. Vacancy rates were applied to SCAG household projections for each jurisdiction to develop estimates of total housing units.

Vacancy rates were used instead of a vacant unit count to account for jurisdictions that were split between water agencies or that were both inside and outside of the Planning Area. As the unincorporated areas in the Planning Area are within Riverside County, unincorporated Riverside County vacancy rates were used to determine housing units in those areas. It was assumed that vacancy rates would remain constant for each jurisdiction across future projections. Although vacancy rates have been generally decreasing across the Planning Area, it is unlikely this decrease will remain constant through 2050, and as reduced vacancy rates signifies reduced housing units in proportion to household numbers, assuming constant vacancy rates leads to a high bias and more conservative estimates for demand. Average estimates from 2020 to 2024 were used for vacancy rates.

**Table 3-3** provides the average estimates of households, housing units, and vacancy rates from the DOF for 2020 to 2024. Cities with higher vacancy rates were assumed to have higher rates of seasonal households.

**Table 3-3: DOF Vacancy Rates for Plan Area Cities (2020-2024)**

| Jurisdiction | Households | Housing Units | Vacancy Rate |
|---|---|---|---|
| Desert Hot Springs | 10,744 | 11,754 | 9% |
| Unincorporated Riverside County | 125,406 | 141,157 | 11% |

Source: DOF, 2025; Table E-5

### 3.3.3.3 Baseline Housing Units by Type

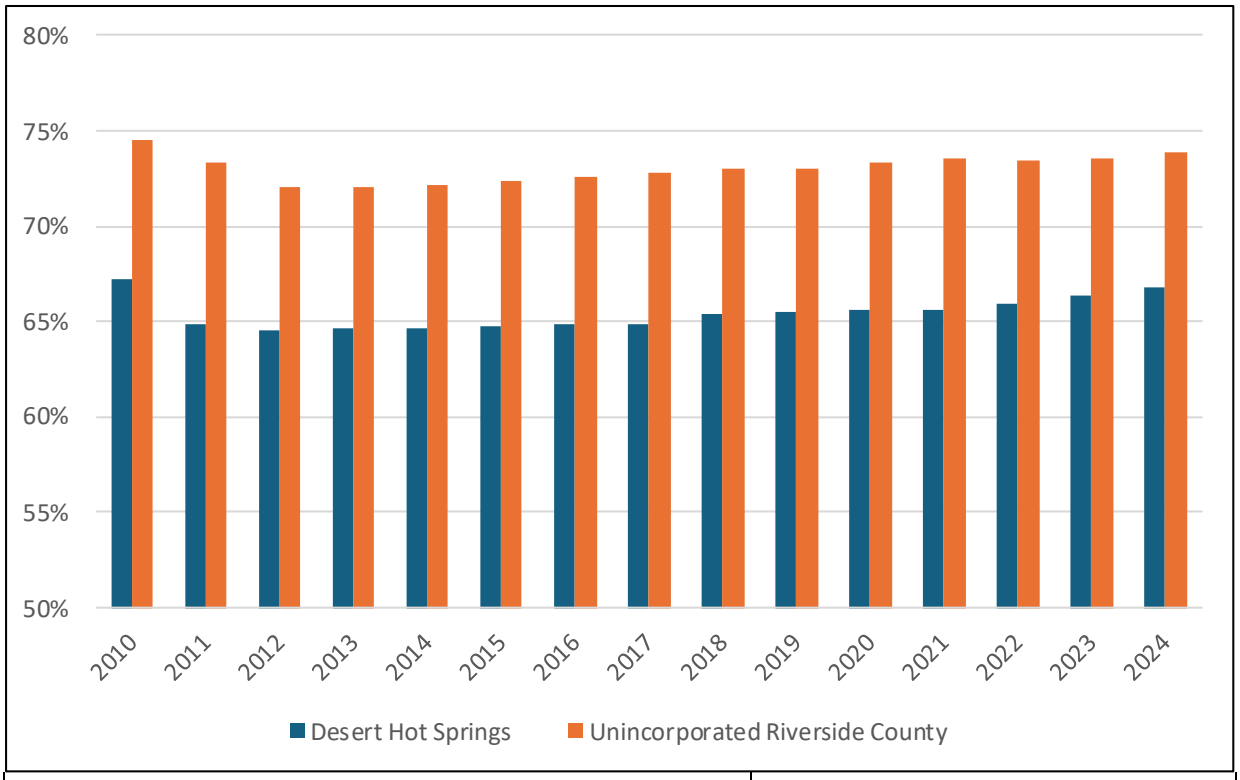
For the baseline housing unit estimate, additional housing data were used to split housing units into categories of single- and multiple-family units to align with customer billing data. This information was derived from DOF estimates for 2024, as shown in **Table 3-4**. **Figure 3-5** shows the percentage of single-family residential housing units to total housing units by jurisdiction from 2010 to 2024. The percentage has remained relatively stable historically, with a slight increase from 2012 to 2024. 2024 percentages were used to estimate the split of residential single- and multiple-family baseline housing units.

**Table 3-4: Housing Unit Type for Plan Area (2024)**

| Jurisdiction | Single-Family | Multiple-Family |
|---|---|---|
| Desert Hot Springs | 67% | 33% |
| Unincorporated Riverside County | 74% | 26% |

Source: DOF, 2025; Table E-5

**Figure 3-5: Single Family Residential Rates from 2010 to 2024**




| | |
|---|---|
| **Single Family Residential Rates from 2010 to 2024** | DRAFT |

## 3.3.3.4 Future Housing Units by Type

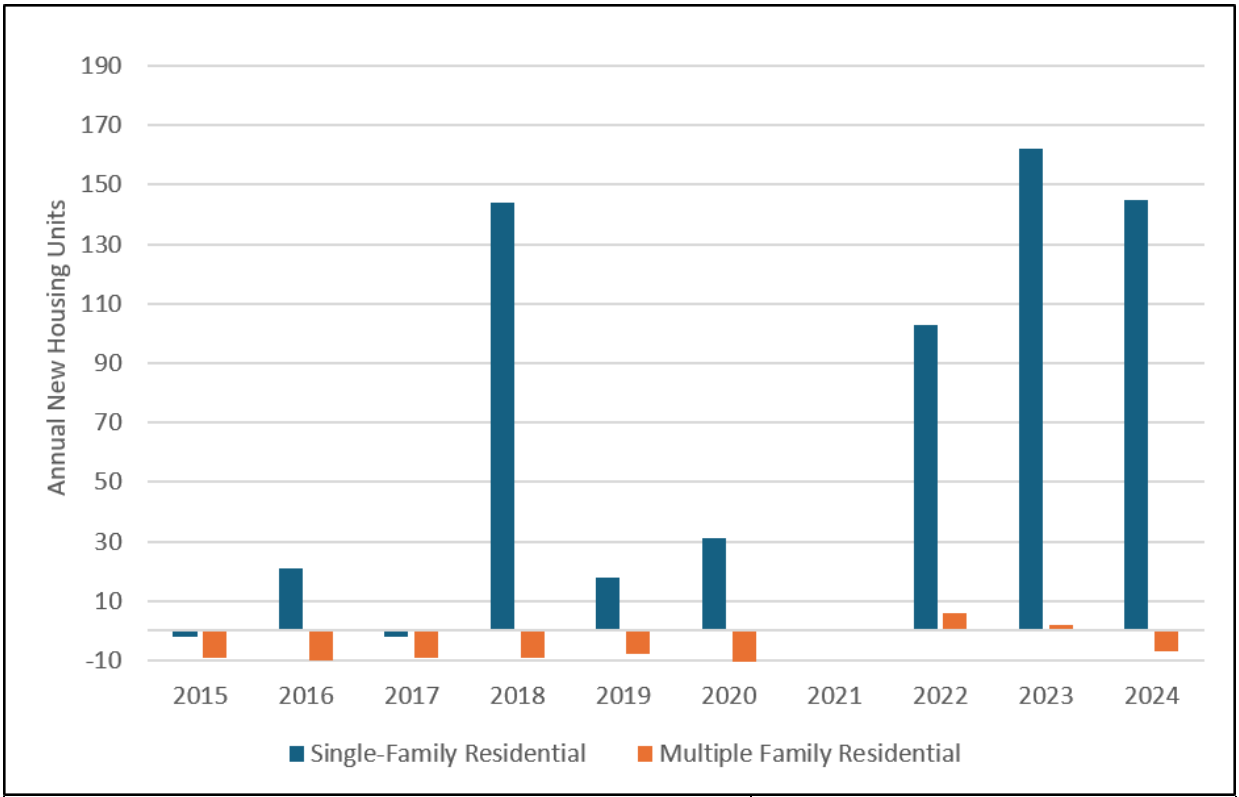
Residential development plans were used as the basis for projecting future development within the City of Desert Hot Springs. The number of planned multiple-family and single-family units was totaled, and the ratio for each housing type to total number of units was applied to additional projected housing units. For the unincorporated areas within the Planning Area, 2024 ratios for Unincorporated Riverside County were used to determine ratios for future development.

**Table 3-5** lists the final projected allocation of new housing units into housing types. Historically, new housing units in the City of Desert Hot Springs have been dominated by single-family units, as shown in **Figure 3-6**. While estimations for new residential units also assume a majority of single-family units, this may be high-biased, as the California Department of Housing and Community Development has passed several laws and incentives designed to increase housing construction, including AB 725 and SB 684, and multiple-family units are anticipated to increase faster than single-family units in California.

**Table 3-5: New Units in Plan Area by Housing Type**

| City | Single-Family | Multiple-Family |
|---|---|---|
| Desert Hot Springs | 89% | 11% |
| Unincorporated Riverside County | 74% | 26% |

**Figure 3-6: New Housing Units in Desert Hot Springs by Housing Type, 2015 to 2024**




**New Housing Units in Desert Hot Springs by Housing Type, 2015 to 2024**

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rincon | WSP

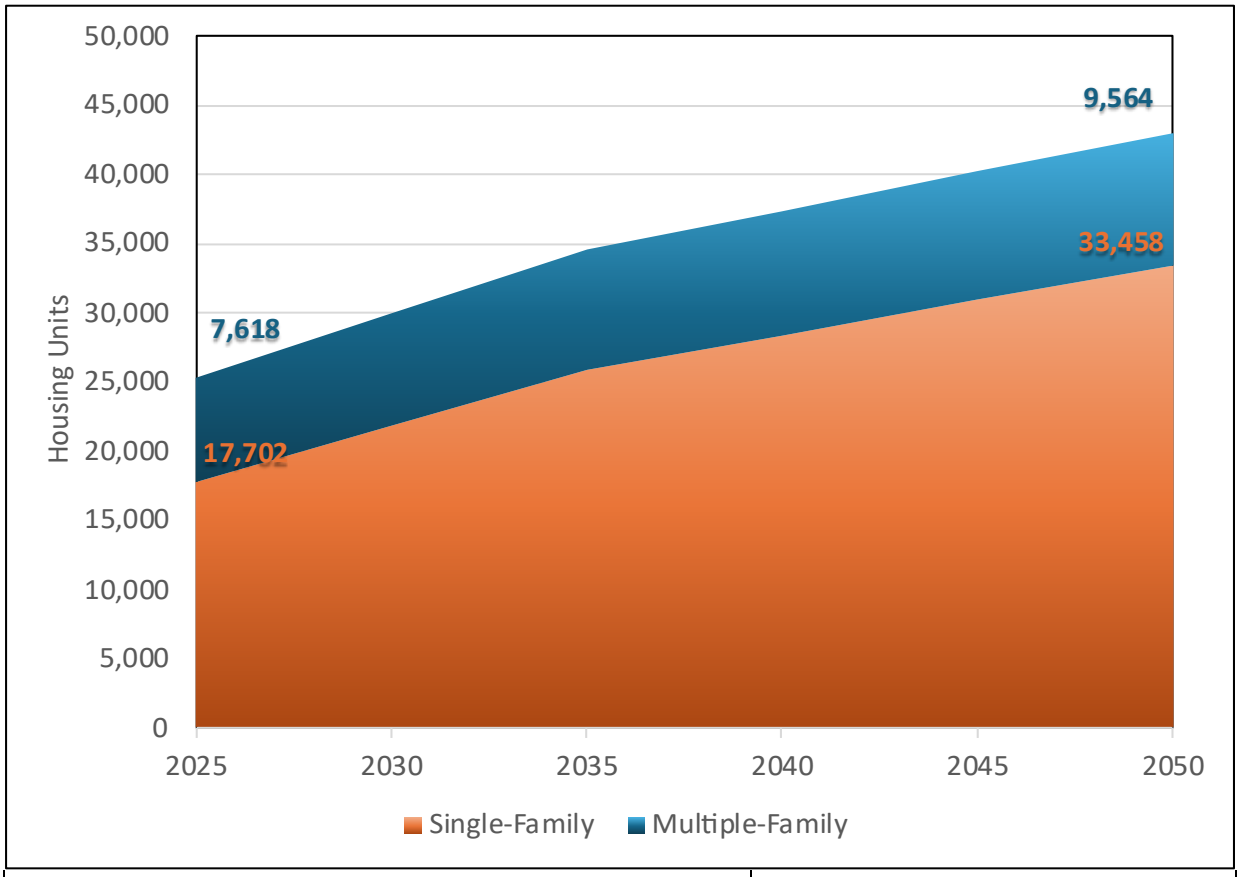
## 3.3.3.5 Final Housing Unit Projection

**Table 3-6** and **Figure 3-7** provide the total number of projected housing units by type for the Planning Area. These were used as the basis for developing demand factors and other projections. Overall, the Planning Area is projected to grow by 17,703 housing units (70 percent) from 2025 to 2050. Multiple-family housing units are anticipated to proportionally increase as California incentives drive development towards higher density housing.

### Table 3-6: Housing Units by Type for the Plan Area

| Housing Type | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| **Coachella Valley Water District** | | | | | | |
| Single-Family | 3,320 | 3,901 | 4,483 | 4,512 | 4,542 | 4,572 |
| Multiple-Family | 1,176 | 1,382 | 1,588 | 1,599 | 1,609 | 1,620 |
| **Subtotal** | **4,496** | **5,283** | **6,071** | **6,111** | **6,151** | **6,192** |
| **Mission Springs Water District** | | | | | | |
| Single-Family | 14,382 | 17,886 | 21,391 | 23,889 | 26,388 | 28,886 |
| Multiple-Family | 6,442 | 6,769 | 7,097 | 7,380 | 7,662 | 7,945 |
| **Subtotal** | **20,824** | **24,655** | **28,488** | **31,269** | **34,050** | **36,831** |
| **Planning Area** | | | | | | |
| Single-Family | 17,702 | 21,787 | 25,874 | 28,401 | 30,930 | 33,458 |
| Multiple-Family | 7,618 | 8,151 | 8,685 | 8,979 | 9,271 | 9,565 |
| **Plan Area Total** | **25,320** | **29,938** | **34,559** | **37,380** | **40,201** | **43,023** |

### Figure 3-7: Housing Units by Type for Plan Area




**Housing Units by Type for Plan Area**

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### 3.3.4 Employment Projections

SCAG's *Connect SoCal 2024* employment estimates were used to project future CII water use. SCAG projects regional employment across 20 broad industry sectors as established by the North American Industry Classification System (NAICS). These sectors are based on a set of national employment forecasts and a region's share of the nation's employment. For the Coachella Valley, employment is projected to grow at a slower rate than the overall population. This is a result of net travel out of the region for work, as well as the large number of retirees in the Planning Area. **Table 3-7** provides employment projections for the Demand Areas in the Planning Area. Employment trends were impacted by the COVID-19 pandemic as remote work increased and demographic shifts occurred.

**Table 3-7: Baseline and Forecast Employees by Agency**

| Water Provider | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Coachella Valley Water District | 1,818 | 1,911 | 2,005 | 2,267 | 2,529 | 2,791 |
| Mission Springs Water District | 6,908 | 8,093 | 9,279 | 10,047 | 10,815 | 11,583 |
| **Planning Area Total** | **8,726** | **10,004** | **11,284** | **12,314** | **13,344** | **14,374** |

### 3.3.5 Unit Demand Factors

Municipal water demand in the growth projection was calculated using a per-housing unit demand factor (*gallons per housing unit per day*) for residential and landscape uses and a per-employee demand factor (*gallons per employee per day*) for non-residential uses. A benefit of this approach over typical per-capita unit water use approaches was the ability to better estimate water uses associated with land use features, such as lot sizes and building footprints not directly associated with population. In addition, SCAG population estimates were not calculated at the county level, so population estimates for the Planning Area are directly tied to household numbers. In addition to households, there are water demands associated with vacant housing and seasonal population. As vacancy rates and seasonal population proportions are assumed to remain constant for the forecast estimations, the ratio of demand per household and demand per housing unit for baseline residential demand remains the same. Demand per housing unit is used as a metric in this 2027 MCSB Update as it is a more accurate reporting metric for total demands. Demands are directly correlated to household growth, but the increase is a function of housing unit growth, which includes usage from seasonal residents and outdoor landscaping of vacant lots. Residential uses were divided into single- and multiple-family housing unit types to align with customer billing categories. Demand factors were calculated using a 5-year average of water demand from customer billing data provided by Plan Area water providers. Indoor and outdoor landscape use was estimated to adjust for landscape water use in new developments.

### 3.3.5.1 Historical Billing Data

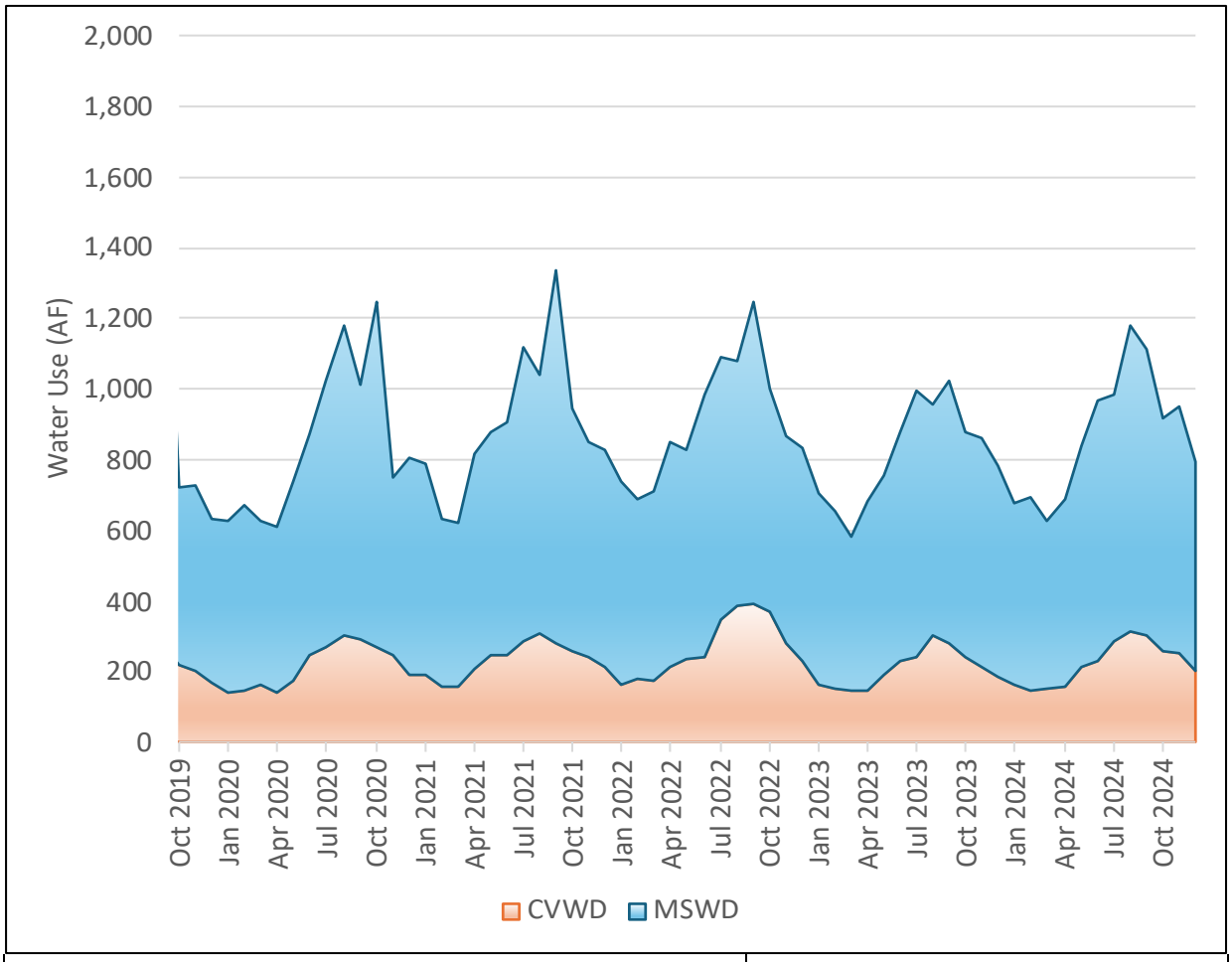
**Table 3-8** lists the total annual domestic water use for each Agency in AFY. Baseline water use was based on a 5-year average measured from October 2019 to September 2024. The 5-year average was selected to account for annual variations in water use from weather, as well as other irregularities that can occur over shorter time periods. California's water year (WY) of October through September was chosen for the annual reporting period to better align with the region's weather patterns and Sustainable Groundwater Management Act (SGMA) reporting.

**Table 3-8: Baseline Domestic Water Use for Plan Area Agencies (AFY)**

| Agency | WY 2020 | WY 2021 | WY 2022 | WY 2023 | WY 2024 | 5-Year Average |
|---|---|---|---|---|---|---|
| Coachella Valley Water District | 2,501 | 2,800 | 2,808 | 2,550 | 2,619 | 2,656 |
| Mission Springs Water District | 7,560 | 7,960 | 7,690 | 7,254 | 7,753 | 7,644 |
| **Plan Area Total** | **10,061** | **10,760** | **10,498** | **9,804** | **10,372** | **10,300** |

**Figure 3-8** shows a graph of the monthly baseline water use for each of the Municipal Supply Agencies. The baseline period includes the COVID-19 pandemic, which impacted travel, employment, and population for several years beginning in March 2020. As indicated in **Table 3-8**, the highest water use was in WY 2021, and the lowest water use was in WY 2023. Over the five-year period, there is little variation in annual water use, and the lowest and highest water usage differs by less than 1,000 AFY. For each Agency, five-year average water use is consistent with the most recent water use data. Given the effects of climate change, drought periods, and new conservation legislation that will be implemented during the planning horizon, downward pressure on water demand is expected. Demand impacts from passive and active conservation are discussed further in Section 3.3.8.

**Figure 3-8: Baseline Water Use by Agency (Acre-Feet per Month)**




| Baseline Water Use by Agency (Acre-Feet per Month) | DRAFT |
|---|---|

## 3.3.5.2 Baseline Demand Factors

For analysis, billing data from each Agency were aggregated into five generic customer sectors, as shown in **Table 3-9**. Each of these customer sectors was associated with an output from the regional growth forecast to develop a unit factor. For the single- and multiple-family sectors, future water demand was based on single- and multiple-family housing units, respectively. For the landscape sector, future water demand was based on total housing units using the assumption that future landscape uses, such as common areas and parks, are driven by future residential development. For the CII sector, future water demand was based on the total number of employees, using the assumption that CII growth is tied to employee growth. The other sector, which includes water uses such as temporary construction meters, was assumed to stay constant and was based on the five-year average

**Table 3-9: Variables Used in Unit Factors Calculation**

| Customer Sector | Output from Growth Forecast |
|---|---|
| Single-Family Residential | Single-Family Housing Units |
| Multiple-Family Residential | Multiple-Family Housing Units |
| Landscape | Total Housing Units |
| Commercial, Industrial, and Institutional | Employees |
| Other | Baseline Average |

These unit factors were applied to growth forecasts to develop a baseline municipal demand projection before conservation or unaccounted-for water.

## Demand Factors by the Agencies and Jurisdiction

Demand factors for single-family, multiple-family, landscape, and CII factors were projected by Agency, as demands and growth rates in each Agency's service area differ regionally. **Table 3-10**, lists the single-family, multiple-family, landscape, and CII demand factors in each Agency's service area. These totals were calculated by matching customer-level database information with SCAG housing and employment information, using 2025 as a baseline year for housing units and employee numbers.

**Table 3-10: Demand Factors by Agency and Billing Type**

| Agency | Water Use (millions of gallons) | Housing Units/Employees | Unit Factor (gphud/gpcd) |
|---|---|---|---|
| ***Single-Family Residential*** | | | |
| Coachella Valley Water District | 499 | 3,320 | 412 |
| Mission Springs Water District | 1,451 | 14,382 | 276 |
| **Plan Area Total** | **1,950** | **17,702** | **302** |
| ***Multiple-Family Residential*** | | | |
| Coachella Valley Water District | 290 | 1,176 | 675 |
| Mission Springs Water District | 415 | 6,442 | 176 |
| **Planning Area Total** | **705** | **7,618** | **253** |
| ***Landscape*** | | | |
| Coachella Valley Water District | 31 | 4,496 | 19 |
| Mission Springs Water District | 291 | 20,824 | 38 |
| **Plan Area Total** | **322** | **25,320** | **35** |
| ***CII*** | | | |
| Coachella Valley Water District | 31 | 1,818 | 47 |
| Mission Springs Water District | 217 | 6,908 | 86 |
| **Plan Area Total** | **248** | **8,726** | **78** |

Acronyms:

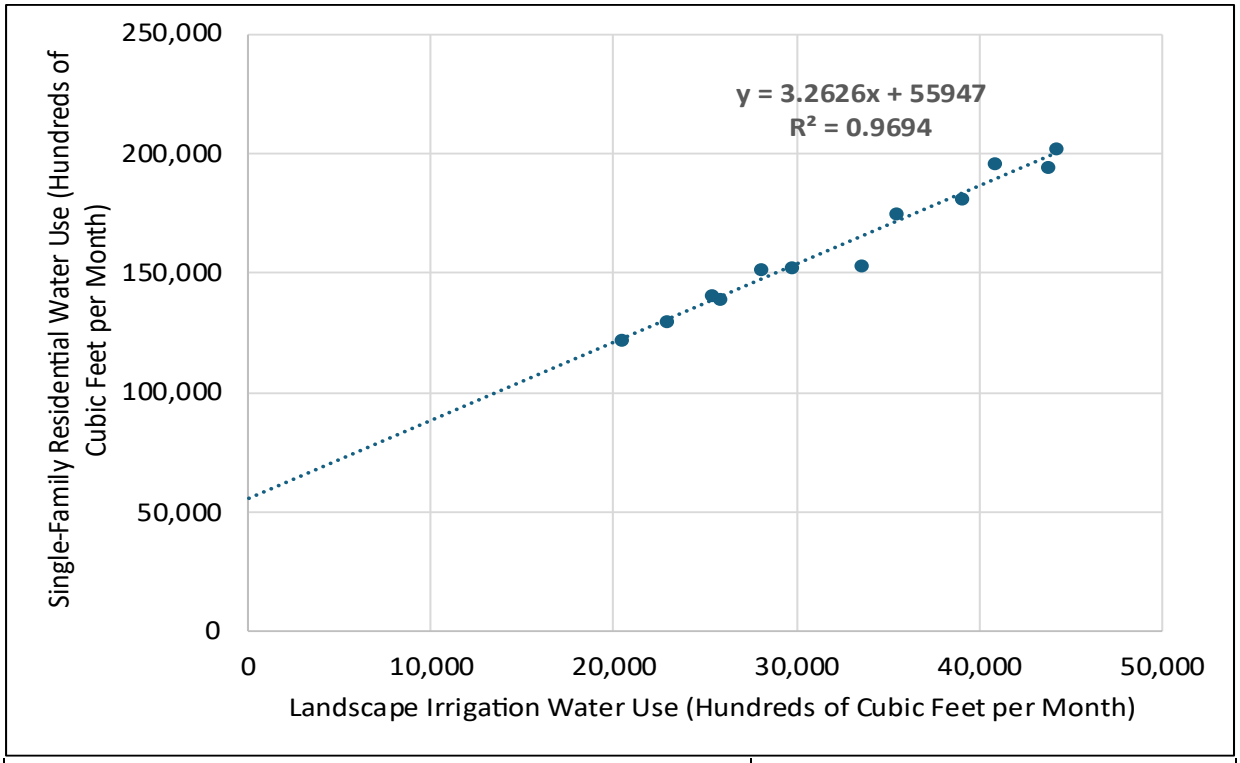
Gphud: gallons per housing unit per day; gpcd: gallons per capita per day

### 3.3.5.3 Indoor and Outdoor Water Use Estimates

Outdoor water use was estimated to distinguish landscape water savings in new developments. For some customers, water used for landscaping is not directly metered. An industry standard approach to measuring outdoor use, referred to as the minimum month method, is to assume all winter use is categorized as indoor consumption. This method underestimates outdoor use because of winter irrigation in dry climates such as the Coachella Valley.

The method used for this forecast documented the pattern of seasonal variation from dedicated irrigation meters and applied it to other sectors with mixed meters. With dedicated irrigation meters, winter irrigation is directly measured, and seasonal irrigation patterns could be applied to other sectors. **Figure 3-9** is an example plot comparing baseline landscape irrigation and single-family residential water use for MSWD. As shown, the seasonal variation of dedicated landscape meters correlates to single-family water use. Seasonal variation patterns were applied to water use for each Agency. For jurisdictions where water demand was poorly correlated with the seasonal variability of dedicated landscape usage, percentages from nearby jurisdictions were assumed for outdoor usage.

**Figure 3-9: Example of Indoor Water Use Estimation, MSWD Single-Family Water Use**




| Example of Indoor Water Use Estimation, MSWD Single-Family Water Use | DRAFT rincon wsp |
|---|---|

**Table 3-11** lists the resulting outdoor water factors developed through analysis of each Agency's data. These values are an average based on the 5-year billing data used for each Agency within the Planning Area. All use from dedicated landscape meters is assumed to be outdoor use. CII outdoor use is varied, ranging from 29 to 87 percent. Single-family outdoor use is greater than multiple-family outdoor use across all agencies and jurisdictions, as single-family homes generally have larger areas associated with irrigation, such as lawns and gardens.

**Table 3-11: Outdoor Water Use Percentages for Agencies**

| Water Provider | Single- Family | Multiple- Family | CII | Landscape |
|---|---|---|---|---|
| Coachella Valley Water District | 88% | 47% | 87% | 100% |
| Mission Springs Water District | 65% | 30% | 29% | 100% |

## 3.3.6 Baseline Municipal Forecast

**Table 3-12** shows the baseline municipal demand forecast for the MCSB. This is the projected municipal water use before considering passive conservation and system water loss.

**Table 3-12: Baseline Domestic Water Use for Plan Area Agencies (AFY)**

| Year | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Coachella Valley Water District | 2,656 | 3,101 | 3,546 | 3,582 | 3,618 | 3,655 |
| Mission Springs Water District | 7,644 | 9,074 | 10,504 | 11,534 | 12,564 | 13,594 |
| **Plan Area Total** | **10,300** | **12,175** | **14,050** | **15,116** | **16,182** | **17,249** |

## 3.3.7 Water Loss

Water loss includes real loss, which is physical water lost from a utility's storage tanks and pressurized distribution system up to the point of customer consumption (e.g., at the water meter) and apparent loss, which include customer metering inaccuracies and data handling errors. As of 2015, SB 555 requires California urban water suppliers to submit an annual water loss audit to the DWR. This audit attempts to quantify all inputs and outputs of a supplier's potable distribution system along with many other factors related to quantifying water losses. SB 555 also directed the SWRCB to develop customized performance standards for volumetric water loss for individual urban retail water suppliers, which were adopted in 2022. The performance standards are quantified by volume of real and apparent loss, either in gallons per connection per day or gallons per mile of pipe per day. This value is a performance indicator that is automatically calculated as an output of the American Water Works Association Water Loss Audit prepared annually by urban water suppliers, which is also submitted to the DWR.

Five years of available validated Water Loss Audit reports were retrieved from the DWR's Water Use Efficiency (WUE) Data Portal for the CVWD[5] (DWR 2025). Water Loss Audits calculate water loss based on the difference between production and consumption. MSWD's water loss

[5] https://wuedata.water.ca.gov/

was calculated from the difference between production and demand for 2020 through 2024. For this analysis, water loss was projected as a percentage of baseline annual demands from 2020-2024, averaging approximately 2.5 percent across the Planning Area. **Table 3-13** lists baseline annual demands by Agency for 2020-2024, average annual water loss for 2020-2024, and water loss as a percentage of baseline demand totals.

**Table 3-13: Water Loss Reporting by Water Provider (5-Year Average)**

| Water Provider | Baseline Annual Demand | Average Water Loss 2020-2024 | Water Loss Percent |
|---|---|---|---|
| Coachella Valley Water District | 2,646 | 101 | 3.82% |
| Mission Springs Water District | 7,644 | 154 | 2.02% |
| **Plan Area Total** | **10,290** | **255** | **2.48%** |

## 3.3.8 Conservation Savings

The municipal water demand projection used an inventory growth and replacement model, and historical and projected housing units for the Planning Area, to estimate water savings rates for single-family residential, multi-family residential, and non-residential plumbing fixtures and appliance inventories. Separate models were developed for outdoor water use, toilets, clothes washers, faucets, and urinals. Future outdoor water uses were reduced based on an adjusted outdoor use estimate for new developments and additional active conservations from programs initiated by the Agencies.

### 3.3.8.1 Indoor Passive Water Savings

The municipal water demand forecast estimates conservation that occurs as a result of changes in state and federal water efficiency requirements for plumbing fixtures and is sometimes referred to as passive conservation. These standards have resulted in a significant reduction of indoor water use over time. Going forward, codes and standards for fixtures and appliances will continue to reduce indoor water demand through the replacement of existing fixtures, and more efficient technologies used in new developments.

Passive conservation savings are based on a demographically driven growth and replacement model that accounts for fixtures from new construction and natural replacement using the same demographic data used in SCAG's *Connect SoCal 2024*. Savings estimates are provided for the single-family residential, multi-family residential, and non-residential sectors. The passive conservation model estimates water savings for toilets, showerheads, clothes washers, dishwashers, and urinals. The model estimates the stock of different types of water fixtures annually from 1990 to 2045.

**Table 3-14** shows the assumptions used to estimate indoor passive conservation savings.

### Table 3-14: Water Savings Assumptions for Appliance Replacement

| Fixture/Appliance | Average Water Use | Assumed Replacement Water Use | Replacement Rate (% per Year) | Frequency of Use | Water Savings (gallons per person/employee per year) |
|---|---|---|---|---|---|
| Residential Toilets Installed Pre 1992 | 3.5 gpf[1] | 1.28 gpf[2] | 2[3] | 4.8 flushes per person per day[4] | 561 |
| Residential Toilets Installed Post 1992 | 1.6 gpf[1] | 1.28 gpf[2] | 2[3] | 4.8 flushes per person per day[4] | 3,892 |
| Residential Showerheads | 2.5 gpm[5] | 2 gpm[4] | 10[6] | 8.7 minutes per use 4.7 uses per person per week[4] | 1,067 |
| Residential Clothes Washers | 23 gpc[7] | 17.5 gpc[6] | 1[3] | 2.3 cycles per person per week[4] | 9,643 |
| Residential Faucets | 2.2 gpm[7] | 1.8 gpm[7] | 7[6] | 10.1 minutes per person per day[4] | 1,476 |
| Residential Dishwashers | 6 gpc[7] | 3.5 gpc[7] | 7[6] | 0.85 cycles per person per week[4] | 111 |
| Non-Residential Toilets Installed Pre 1992 | 3.5 gpf[1] | 1.28 gpf[2] | 2[3] | 2.4 flushes per employee per day[4] | 281 |
| Non-Residential Toilets Installed Post 1992 | 1.6 gpf[2] | 1.28 gpf[2] | 2[3] | 2.4 flushes per employee per day[4] | 1,946 |
| Non-Residential Urinals | 1 gpf[8] | 0.5 gpf[2] | 4[6] | 1,160 gallons per employee per year[9] | 580 |

Acronyms: gpf: gallons per flush, gpm: gallons per minute, gpc: gallons per cycle
Sources:
[1]California Statute
[2]California (AB715) 2007
[3]Porse et al. (2025) JAWRA, Quantifying Replacement Rates from Indoor and Outdoor Urban Water Conservation Incentives in California
[4]Urban Water Conservation and Efficiency Potential in California, Pacific Institute (2014)
[5]Metropolitan Water District, Urban Water Management Plan (2020)
[6]EPA Water Sense. Water Efficiency Management Guide Residential Kitchen and Laundry (2017)
[7]Federal Standard (DOE) 2012
[8]Energy Policy Act of 1992
[9]Estimated using assumptions for businesses with 25 male employees from Waterless Co, Inc. 2023. A Closer Look at Urinals, Water Consumption, and the Environment

Water fixtures installed in new construction were assumed to comply with current plumbing codes. Natural replacement rates vary by device and are linked to the expected life of the device. When devices fail and are replaced, when spaces are remodeled, or for other reasons, new devices were assumed to comply with current plumbing codes. Estimations from a study by the Pacific Institute were used for assumptions of the frequency of use for each device. Water savings in gallons per person per year (for residential devices) and gallons per employee per year (for commercial devices) were calculated from these assumptions.

**Table 3-15** lists the projected residential indoor passive conservation savings (in AF) for new and existing developments in the Planning Area. These savings are calculated from the per capita water savings assumptions in the previous table for current and new housing. Savings from device replacement were capped by the savings estimated from complete device turnover (when all devices have been replaced).

**Table 3-15: Indoor Water Savings in the Plan Area (Acre-Feet)**

| Water Provider | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| Coachella Valley Water District | 172 | 298 | 423 | 450 | 470 | 489 |
| Mission Springs Water District | 537 | 931 | 1,320 | 1,661 | 1,982 | 2,303 |
| **Planning Area Total** | **709** | **1,229** | **1,743** | **2,111** | **2,452** | **2,792** |

## 3.3.8.2 Outdoor Water Savings

Outdoor water conservation savings include both active and passive conservation assumptions. Passive savings were calculated from the implementation of the MWELO and California's non-functional turf ban (DWR, 2015; AB 1572). Active savings were calculated with estimated savings from smart irrigation controllers and turf conversions. **Table 3-16** lists the projected outdoor conservation savings (in AF) for new and existing developments in the Plan Area by the Agencies. The methodology for estimating outdoor savings is described below.

### Model Water Efficient Landscape Ordinance (Passive Water Savings)

MWELO sets a minimum standard for outdoor water conservation in California and applies to new construction projects with landscape areas of 500 square feet or more. The size threshold for existing landscapes that are being rehabilitated is 2,500 square feet. MWELO also allows for special landscape areas (SLAs) that allow for extra water in non-residential areas for specific landscape functions such as recreation or for areas irrigated with recycled water.

Passive water savings resulting from implementation of MWELO were based on an evapotranspiration adjustment factor (ETAF), which when applied to reference evapotranspiration, adjusts for plant water requirements and irrigation efficiency. The current ETAF for new residential landscapes is 0.55 and the ETAF for non-residential landscapes is 0.45. Existing landscapes were assumed to have an ETAF of 0.7, meaning that new residential landscapes were assumed to use 21 percent less water, and new non-residential landscapes were assumed to use 36 percent less water. It was also assumed that 25 percent of dedicated

landscape meters were categorized as SLAs such as sports fields, and therefore no savings were assumed to come via MWELO requirements. No savings were assumed from existing landscapes, as these projections typically receive incentives under conservation programs, and are not considered passive savings. Section 8, *Projects and Management Actions* describes active conservation programs that incentivize outdoor water use efficiency.

### Non-Functional Turf Ban (Passive Water Savings)

California legislation passed in 2023 prohibits the use of potable water for irrigation of non-functional turf (decorative grass with no other function, such as recreation) on CII properties (AB 1572). The ban will go into effect in 2027 through 2031 for Institutional (2027), Commercial and Industrial (2028), Homeowner's Associations (2029), and properties owned by local governments in disadvantaged communities (2031). An assumed reduction of 30 percent in existing dedicated landscape irrigation demands for 2030 through 2050 was used to estimate conservation due to this ban.

### Smart Irrigation Controllers (Active Water Savings)

The Agencies have programs in place offering rebates for the installation of smart irrigation controllers, which conserve water by improving outdoor irrigation efficiency. Water savings from the installation of smart irrigation controllers was estimated using installation rates from a 2025 study published in the Journal of the American Water Resources Association (JAWRA) and water savings estimates from a 2017 water conservation study by the Los Angeles Department of Water and Power (LADWP) (Porse et al., 2025; LADWP, 2017). An installation rate of 0.62 percent was applied to housing units by jurisdiction. Each installed unit was assumed to save 13,636 gallons per household annually.

### Turf Conversion (Active Water Savings)

The Agencies have been actively encouraging conservation in the Coachella Valley through various programs, including rebates for turf conversion; replacing existing high water use turf with drought tolerant landscaping. Water savings from these conversion programs were estimated using a 2024 regional study by the Coachella Valley Regional Water Management Group (CVRWMG), which used water savings data from turf rebate programs conducted between 2014 and 2023 by each Agency to estimate water savings in each Agency's service area per acre of turf converted (CVRWMG, 2024). A replacement rate of 0.08 percent per year was used based on estimations from the 2017 JAWRA water conservation study (Porse et al., 2017). Water savings assumptions of 17 gallons per square foot per year were used based on the 2024 CVRWMG study.

**Table 3-16: Outdoor Water Savings Within the Planning Area (Acre-Feet)**

| Water Provider | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| ***Coachella Valley Water District*** | | | | | | |
| MWELO | 28 | 101 | 174 | 179 | 187 | 195 |
| Non-Functional Turf Ban | 0 | 22 | 29 | 29 | 29 | 29 |
| Smart Irrigation Controllers | 16 | 21 | 26 | 31 | 36 | 41 |
| Turf Conversion | 1 | 1 | 2 | 3 | 3 | 4 |
| **Total** | **45** | **145** | **231** | **242** | **255** | **269** |
| ***Mission Springs Water District*** | | | | | | |
| MWELO | 92 | 305 | 519 | 679 | 832 | 985 |
| Non-Functional Turf Ban | 0 | 201 | 268 | 268 | 268 | 268 |
| Smart Irrigation Controllers | 45 | 59 | 73 | 87 | 100 | 114 |
| Turf Conversion | 4 | 6 | 9 | 12 | 14 | 17 |
| **Total** | **141** | **571** | **869** | **1,046** | **1,214** | **1,384** |
| ***Planning Area Total*** | | | | | | |
| **Total** | **186** | **716** | **1,100** | **1,288** | **1,469** | **1,653** |

## 3.4 Private Groundwater Production

In addition to the municipal water demand, other types of demand must be accounted for when estimating total demand in the Planning Area. Other demands in the Planning Area include private wells serving agricultural, golf, and industrial demands, as well as residences and businesses. Private well pumping falls into two categories (see Section 2.4.1):

1. Metered well production from larger wells serving agricultural, golf, and industrial demands that are subject to the Replenishment Assessment Charge (RAC) levied by DWA or CVWD, depending on location, and
2. Estimated unmetered production from smaller private wells that produce groundwater below the CVWD or DWA thresholds for reporting (25 AFY and 10 AFY, respectively).

### 3.4.1 Metered Private Groundwater Production

As described in Section 2.4.1, metered groundwater pumping data for the years 2020 to 2024 were extracted for 14 private wells subject to the CVWD or DWA RAC. Pumping from 13 of the private wells averaged 3,173 AFY for the MCSB portion of the Planning Area (1,379 AFY in the CVWD Planning Area and 1,794 AFY in the MSWD/DWA Planning Area). The remaining private well, which is in the GHSA of the Indio Subbasin, has an average pumping of 11.6 AFY. These metered private wells provide irrigation for golf course properties (69 percent), agricultural uses such as fish farms and equestrian facilities (21 percent), and industrial uses (10 percent).

The average metered private groundwater demand in the Planning Area from 2020-2024 was 3,185 AFY. This metered private groundwater demand is assumed to remain constant through the planning horizon.

### 3.4.2 Unmetered Private Groundwater Production

Unmetered groundwater demand is estimated to be a smaller percentage of the total water demand in the Planning Area. Estimates of this demand relied on extrapolation from available metered municipal and private pumping data. Nearly all the unmetered private well pumping is believed to occur for domestic purposes within the CVWD area of the MCSB.

Previous reports estimated that unmetered private well pumping within the Planning Area was approximately 480 AFY, which was rounded to approximately 500 AFY for reporting purposes given the uncertainty in the estimate (Wood, 2025). Unmetered pumping is from private groundwater pumpers that produce less than the reporting thresholds established by CVWD and DWA (25 AFY and 10 AFY, respectively). As a result, these pumpers (minimal pumpers) are not required to report groundwater pumped or pay the RAC.

Using SCAG population estimates and CVWD meter data, the population in the CVWD Planning Area that is outside the ID-8 service area was assumed to be served by unmetered private pumping. Applying the CVWD residential average unit consumption, unmetered private well pumping was estimated to be 540 AFY. Unmetered private demand is assumed to remain constant over the planning horizon.

## 3.5 Total Projected Demand

The final water demand projections for the Planning Area (i.e., the amount of groundwater pumping needed to meet demand projections) are calculated by combining all demands including:

- Projected groundwater production required to meet current and future municipal demands.
- Historical private metered groundwater production subject to the RACs, assumed to remain constant through the planning horizon.
- Estimated unmetered private well demand, assumed to remain stable through the planning horizon.

As shown in **Table 3-17**, total municipal demand is expected to increase from 12,903 AFY in 2025 to 16,459 AFY by 2050, an increase of 3,556 AFY or approximately 28 percent. Unmetered and metered private well demand is assumed to be constant over the planning period (541 AFY and 3,218 AFY, respectively).

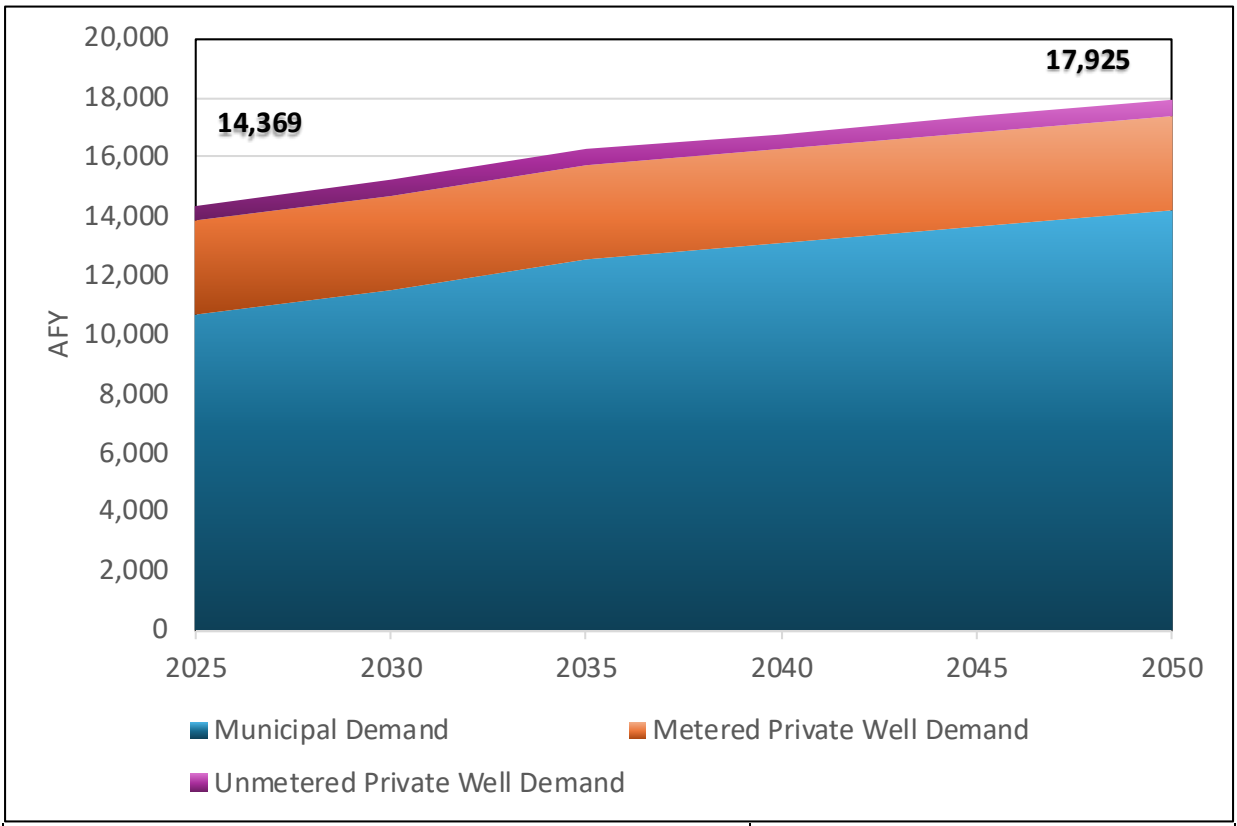
In summary, total projected demand between 2025 and 2050 increases from 14,369 AFY (in 2025) to 17,925 AFY (in 2050), an increase of 3,556 AFY or approximately 25 percent. **Table 3-17** presents water demand projections for the Planning Area in five-year increments.

**Table 3-17: Demand Projections for the Planning Area**

| Year | Municipal Demand (AFY) | Unmetered Private Well Demand (AFY) | Metered Private Well Demand (AFY) | Total Projected Demand (AFY) |
|---|---|---|---|---|
| 2025 | 10,644 | 540 | 3,185 | 14,369 |
| 2030 | 11,514 | 540 | 3,185 | 15,239 |
| 2035 | 12,539 | 540 | 3,185 | 16,264 |
| 2040 | 13,070 | 540 | 3,185 | 16,795 |
| 2045 | 13,635 | 540 | 3,185 | 17,360 |
| 2050 | 14,200 | 540 | 3,185 | 17,925 |

**Figure 3-10** presents projected demand as a stacked graph. Municipal demand is anticipated to increase by 3,556 AFY, or approximately 33 percent. No change in existing metered and unmetered private pumping is assumed, and no passive conservation adjustment is applied to this type of use. The total of the stacked graphs shows the projected total groundwater demand for the Planning Area.

**Figure 3-10: Total Demand Projections for the Planning Area**




**Total Demand Projections for the Planning Area**

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# 4. Water Resources

This section describes the various water resources utilized within the Planning Area – comprised of the Mission Creek Subbasin (MCSB), Garnet Hill Subarea of the Indio Subbasin (GHSA), and Desert Hot Springs Subbasin (DHSSB) – including surface water (precipitation and streamflow), imported water, and wastewater treatment and disposal. This section also describes groundwater conditions in the Planning Area with a focus on recent years since the submittal of the Alternative Plan Update in 2022. Additional details for historical groundwater extraction and wastewater return flows are provided in discussion of the groundwater modeling effort in Section 5 and Appendix A.

## 4.1 Local Surface Water

Surface water in the MCSB, GHSA, and DHSSB includes streamflow in addition to runoff from several drainage areas. The various types of surface water occurring in the area, including precipitation, streamflow, and related drainage areas, are described in the following sections.

### 4.1.1 Precipitation and Temperature

**Table 4-1** provides a summary of climate statistics based on 30 years of temperature and precipitation data from 1991 to 2020 (referred to as the 1991-2020 30-year climate normals, updated every 10 years by the National Oceanic and Atmospheric Administration [NOAA]) at the Palm Springs Airport, located approximately two miles south of the GHSA's southern boundary (**Figure 4-1**). Average maximum temperatures exceed 100 degrees Fahrenheit (°F) in the months of June, July, August, and September. Average maximum temperatures in May and October are in the low to mid 90s°F, and average maximum temperatures in the months of November through April range from 69.2°F to 87.6°F. Average minimum temperatures range from 47.6°F in January to 79.8°F in August. Most of the precipitation occurs during December through February with an average precipitation of 0.68 inches in December, 1.14 inches in 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.

**Table 4-1: Climate Summary – Monthly Normals 1991 to 2020, Palm Springs Airport**

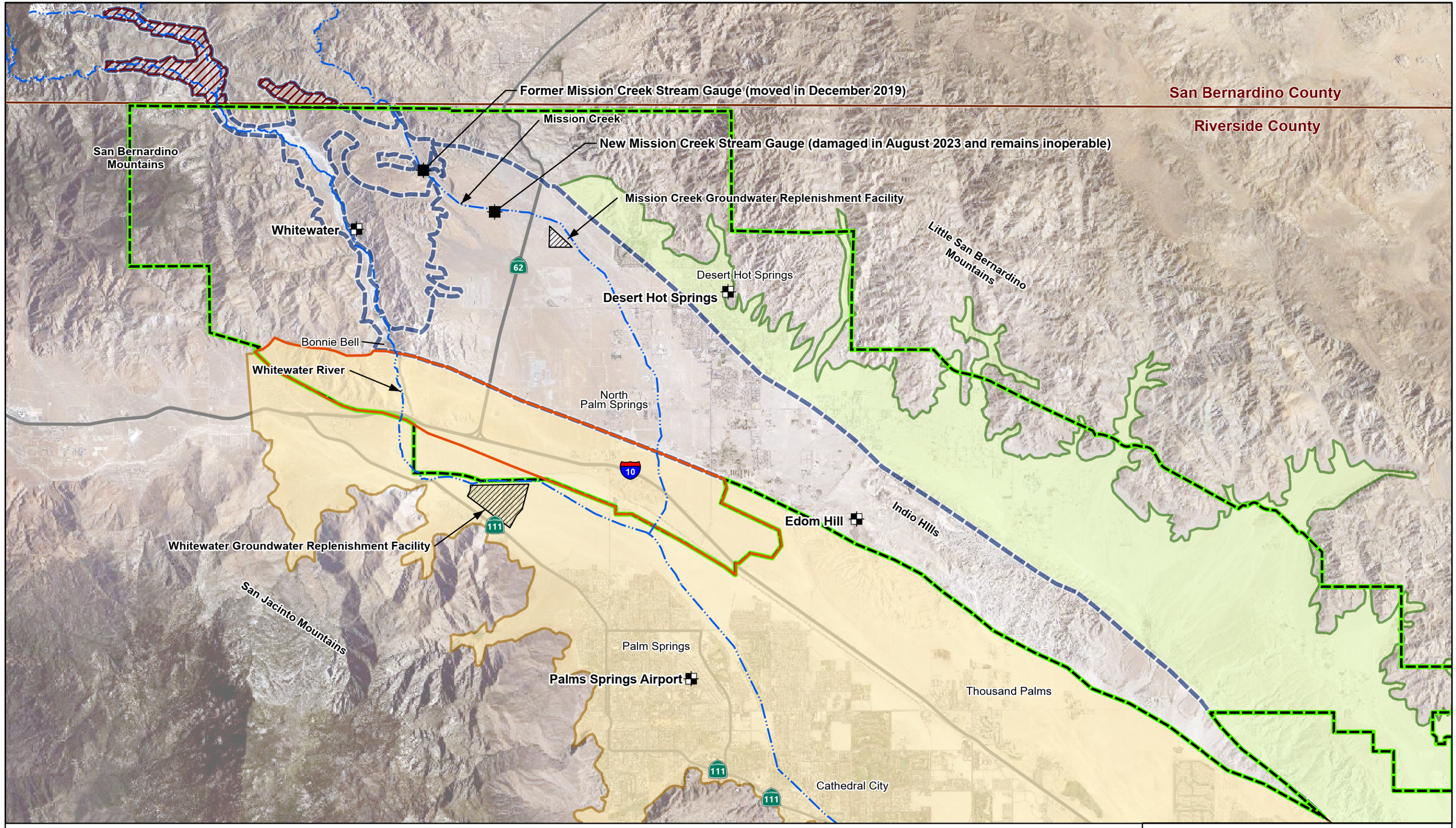
| | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| Average Maximum Temperature (°F) | 70.5 | 73.7 | 80.6 | 86.7 | 94.7 | 103.6 |
| Average Minimum Temperature (°F) | 47.6 | 49.7 | 54.4 | 59.1 | 65.9 | 72.7 |
| Average Temperature (°F) | 59.0 | 61.7 | 67.5 | 72.9 | 80.3 | 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 | 77.8 | 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.

Annual precipitation from Water Year (WY) 1960-1961 to WY 2023-2024 for the Riverside County Flood Control and Water Conservation District (RCFCWCD) station at Desert Hot Springs is shown on **Figure 4-2**. The rain gauge station is in the DHSSB as shown on **Figure 4-1**. This station is used for the plot of annual precipitation because it has the longest record (59 years) of the three stations located within the Planning Area. 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 precipitation that occurs within the tributary watersheds of the Planning Area either evaporates, is consumed by vegetation, percolates directly into underlying alluvium and fractured rock, or becomes runoff. A portion of the flow percolating into the soil and bedrock of the mountain watersheds surrounding the MCSB, GHSA, and DHSSB eventually becomes subsurface inflow to these groundwater bodies.




Explanation

- Rain gauge location
- Stream gauge location
- Facility
- Streams
- Highway/road
- Planning Area
- Mission Creek Subbasin fringe area
- Garnet Hill Subarea of Indio Subbasin
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin

0 6,000 12,000
Feet

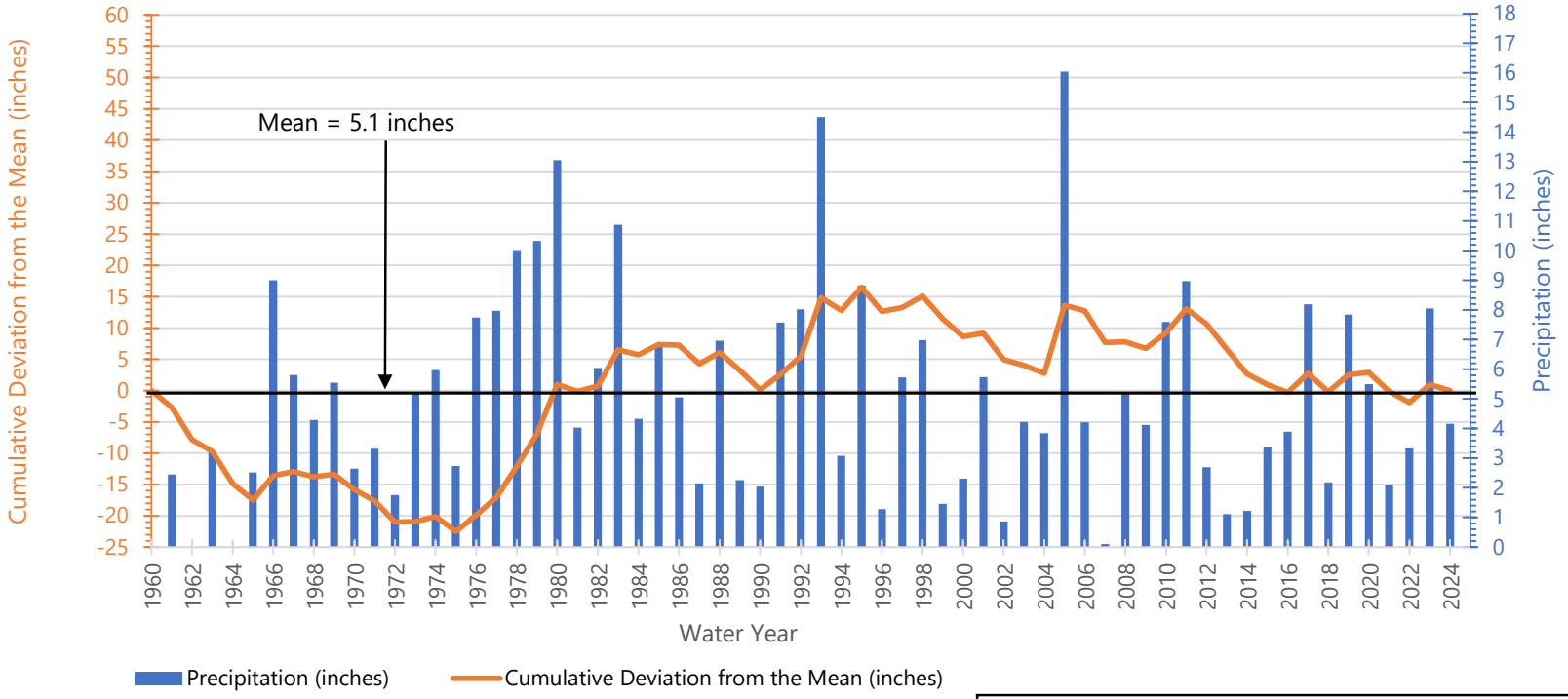
Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018

N

# GAUGING STATIONS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 6/12/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | Figure | 4-1 |

Date: 9/4/2026 Printed by: USMW719917
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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.

ANNUAL PRECIPITATION AND CUMULATIVE DEPARTURE FROM THE MEAN AT DESERT HOT SPRINGS RAIN GAUGE STATION
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 9/16/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-2 |

### 4.1.2 Drainage Area

Natural recharge in the MCSB, GHSA, and DHSSB occurs as infiltrated surface water flows and subsurface inflows. Due to the relatively high evapotranspiration rates compared to precipitation, recharge from direct precipitation on the valley floor, and in the low-lying hills at the northwest part of the MCSB (east of Whitewater River), is considered to be negligible.

Surface water flow in the MCSB, GHSA, and DHSSB consists of temporary or intermittent streams that originate in the San Bernardino and Little San Bernardino mountains.

Mission Creek is the only stream that flows to the valley floor on a consistent basis, and a stream gauge is maintained by the United States Geological Survey (USGS) (described in Section 4.1.3). Surface water flow in this stream typically infiltrates into the ground a short distance from its entrance into the MCSB. Additionally, streams flowing through Big Morongo Creek, Little Morongo Creek, and Long Canyon occasionally reach the valley floor for short periods of time during localized, intense storms in the mountains (MWH, 2013). None of the surface flow from the local watercourses is sufficiently reliable to be used directly for municipal, industrial, or agricultural uses. However, a portion of this runoff naturally replenishes groundwater in the MCSB, GHSA, and DHSSB as mountain front recharge.

The GHSA, MCSB, and DHSSB in the upper portion of the Coachella Valley receive mountain front recharge from 13 watersheds in the San Bernardino and Little San Bernardino Mountains including the South Fork Whitewater River, Mission Creek (gauged streamflow described below), North Chino Canyon,[1] Garnet Wash, Big Morongo Canyon, Little Morongo Canyon, Morongo Wash, Long Canyon, East Wide Canyon, Thousand Palms Canyon, Fan Canyon, Pushawalla Canyon, and Berdoo Canyon. These watershed areas are shown on **Figure 4-3**. Mountain front recharge from these watersheds is discussed in Section 5 and in **Appendix B**.

### 4.1.3 Gauged Streamflow

The USGS measures streamflow at one gauging station in the MCSB, with the location shown on **Figure 4-1** and the stream flow data shown in **Figure 4-4**. 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 that location (Wood, 2020). Mission Creek stream flows were estimated using nearby stream gauges until a new stream gauge was installed in December 2019 at a location approximately 1.4 miles downstream of the old location (Figure 4-1). On August 20, 2023, the new stream gauge station was damaged by flooding during Tropical Storm Hilary and the streamflow record used in this 2027 MCSB Alternative Plan Update (2027 MCSB Update) ends on August 19, 2023. The gauge is managed by the USGS in cooperation with RCFCWCD. The Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) [Agencies] are not aware of any plans to restore or replace the stream gauge in the near future. Recorded Mission

[1] The Chino Canyon Watershed includes the Chino Canyon in the San Jacinto Mountains and a much smaller canyon in the northwest part of the MCSB. The watershed in the MCSB was assigned the name North Chino Canyon Watershed.

Creek discharge during WY 2022–2023 through August 19, 2023, totaled 1,158 acre-feet (AF). **Figure 4-4** shows total discharges from WY 1967-1968 through August 19, 2023. The water year annual average runoff from Mission Creek, based on the available record from WY 1967-1968 through WY 2021-2022, was 1,776 acre-feet per year (AFY) (WSP, 2023).

Historical stream gauge data were used to calibrate runoff from the Mission Creek watershed to the USGS's Basin Characterization Model (BCM) of estimated surface and subsurface flow (mountain front recharge [MFR]) from the watershed. That data was then used to estimate MFR from all of the remaining watersheds that feed into the MCSB. Consequently, although the Mission Creek stream gauge is no longer in operation, the historical data from this stream gauge continues to provide valuable information to estimate recharge to the MCSB. A comparison of the Mission Creek stream gauge runoff to the estimated MFR for WY 1967-1968 to WY 2021-2022 is provided as **Figure 4-5.** Additional information on BCM data and MFR estimates is provided in Appendix A.

San Bernardino Mountains

South Fork Whitewater River -Whitewater River

Mission Creek

Mission Creek

Big Morongo Creek

Little Morongo Creek

Mission Creek Groundwater Replenishment Facility

San Bernardino County

Riverside County

Morongo Wash

Long Canyon

East Wide Canyon

Little San Bernardino Mountains

North Chino Canyon

Garnet Wash

Thousand Palms Canyon

Desert Hot Springs

East Wide Canyon

Fan Canyon

Mission Creek Subbasin

Garnet Hill Subarea

Desert Hot Springs Subbasin

Whitewater River

Whitewater Groundwater Replenishment Facility

Indio Hills

Indio Subbasin

Pushawalla Canyon

San Jacinto Mountains

Palm Springs

Berdoo Canyon

Cathedral City

62

10

111

## Explanation

- Facility
- Streams
- Highway/road
- Garnet HIll Subarea of Indio Subbasin
- Mission Creek Subbasin fringe area
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin

## Recharge Watershed

- Berdoo Canyon
- Big Morongo Creek
- East Wide Canyon
- Fan Canyon
- Garnet Wash
- Little Morongo Creek
- Long Canyon
- Mission Creek
- Morongo Wash
- North Chino Canyon
- Pushawalla Canyon
- South Fork Whitewater River Whitewater River
- Thousand Palms Canyon

## Note

North Chino Canyon watershed is the north part of the Chino Canyon-Whitewater River watershed. The main portion of this watershed is in the San Jacinto Mountains.

0 1.5 3

Approximate Scale in Miles

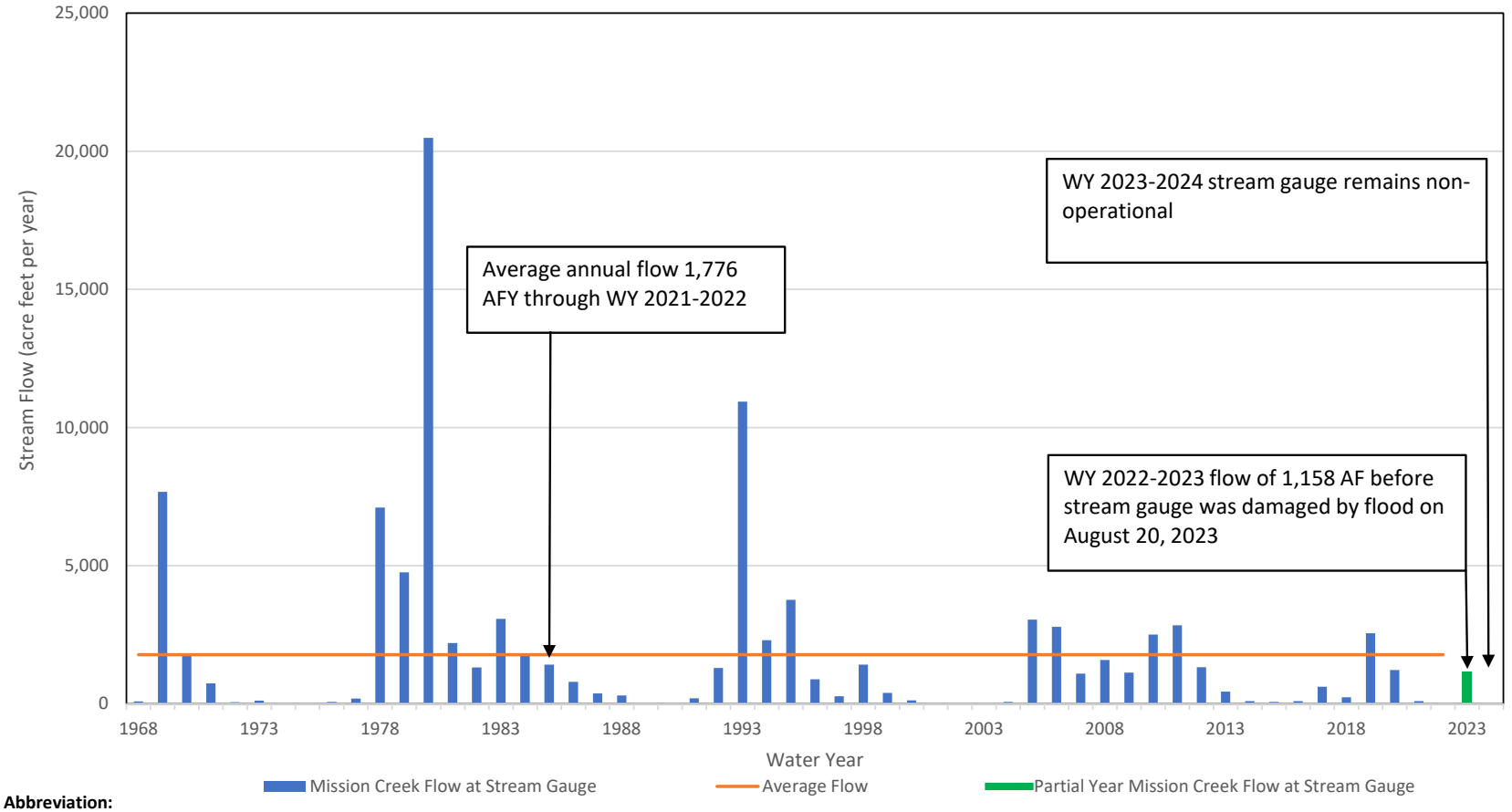
Basemap modified from aerial photograph provided by National Agricultural Program (NAIP), 2018

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MOUNTAIN FRONT RECHARGE WATERSHEDS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-3 |

Date: 9/15/2026 Printed by: USMW719917
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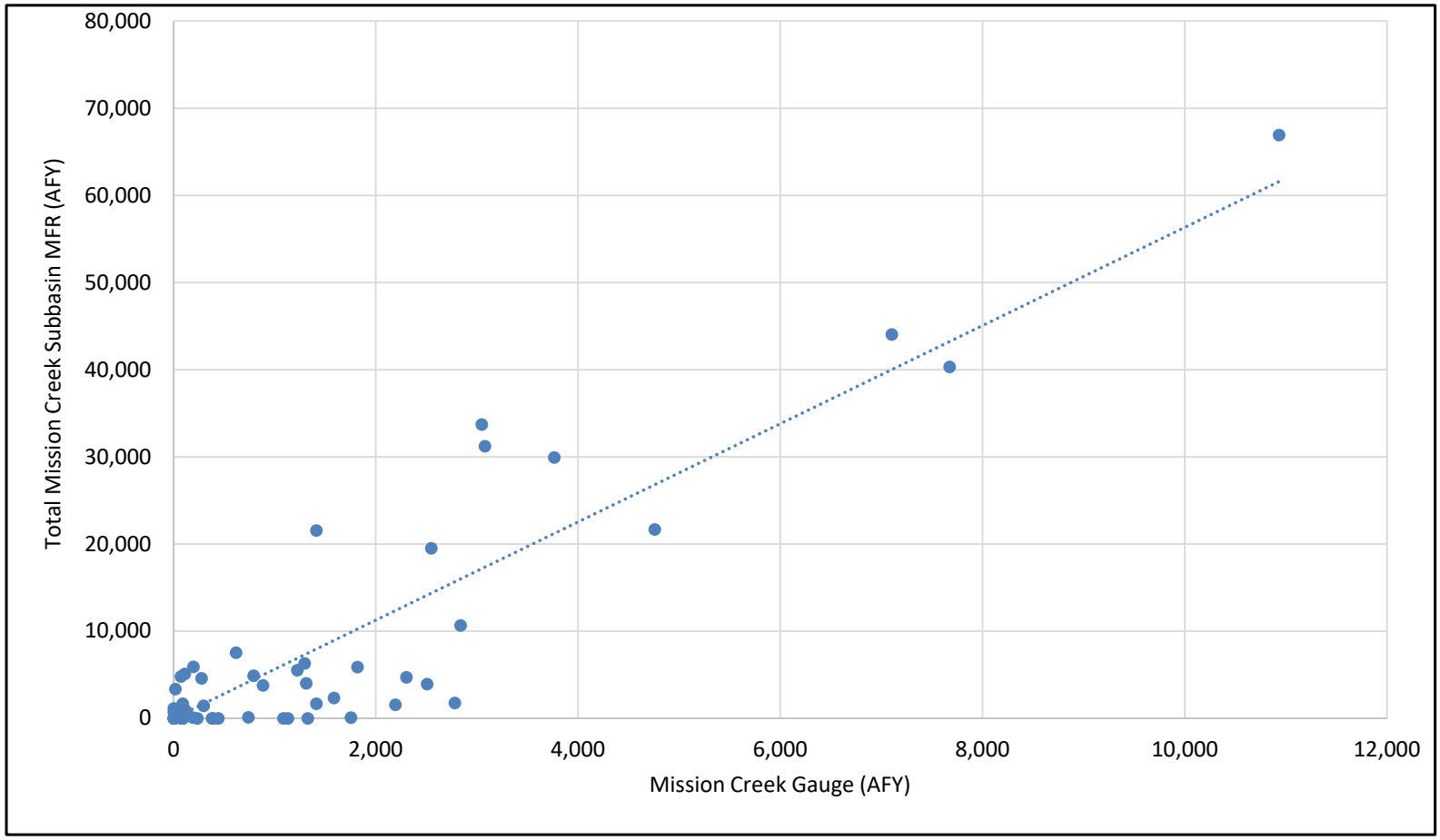

**Abbreviation:**
AFY = Acre feet per year

**Notes:**
1. The Mission Creek gauging station was moved approximately 1.4 miles southeast in December 2019.
2. Provisional and/or estimated flow data used for April 2023 through August 19, 2023.
3. On August 20, 2023, the Mission Creek gauging station was damaged by flooding and no flow records are available through the end of WY 2022-2023. Because the period of measurement ended during a flood event, the actual Mission Creek stream flow for WY 2022 – 2023 was greater than the measured total by an unknown but likely significant amount.
4. Gauging station continues to be non-operational though September 30, 2024.

Source: USGS Current Water Conditions, https://waterdata.usgs.gov/ca/nwis/inventory/?site_no=10257600

WATER YEAR DISCHARGE AT MISSION CREEK STREAM GAUGE
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 9/14/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 4-4 |




Abbreviations:
AFY = Acre-feet per year
MFR = Mountain Front Recharge/Runoff

Note:
Water year 1980 is an outlier with gauge stream flow of more than 20,000 AFY (off scale in the plot) and BCM-derived mountain front recharge of 53,500 AFY. The data were removed from the linear regression calculation.

MISSON CREEK GAUGE VS
MISSION CREEK SUBBASIN MFR
Mission Creek Alternative Update
Coachella Valley, California

| By: grr | Date: 9/14/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 4-5 |

## 4.2 Imported Water

In addition to natural replenishment from precipitation and stream flow, the MCSB receives groundwater replenishment from recharge of imported State Water Project (SWP) exchange water. The SWP is managed by the California Department of Water Resources (DWR) and includes more than 705 miles of aqueduct and conveyance facilities extending from Lake Oroville in Northern California to Lake Perris in Southern California. The SWP has contracts to deliver 4.172 million AFY to the SWP Contractors. The SWP Contractors consist of 29 public entities with long-term contracts with DWR for all, or a portion of, their water supply needs.

CVWD and DWA each have a Water Supply Contract with DWR for SWP water, with a combined Table A amount of 194,100 AFY, as detailed in Section 4.2.1. However, there are no physical facilities to deliver SWP water to the Coachella Valley. Instead, CVWD and DWA entered into separate agreements in 1967 with Metropolitan Water District of Southern California (MWD), under which CVWD and DWA exchange their SWP water for an equal amount of Colorado River water from the Colorado River Aqueduct (CRA). The original 1967 Exchange Agreements have been updated and amended over time with the most recent amendment in 2025. The 2025 Third Amendment (MWD and CVWD, 2025) committed to working toward a long-term extension to 2085. The Third Amendment also updated the delivery, billing, and payment terms.

The following sections describe the various sources, reliability, and reliability enhancement programs for current and future SWP exchange water that allow for replenishment of CRA water in the Indio Subbasin and MCSB. The following sections describe the forecast for SWP water delivery to MCSB and the Indio Subbasin under two potential climate change scenarios. These forecasts are applied in the groundwater model forecast provided in Section 7.

Imported water availability and use for the MCSB and Indio Subbasin are interrelated. To ensure consistency, the description of imported water projection of future imported water supplies and model scenarios has been coordinated between the two *Alternative Plan Updates* for the Indio Subbasin and MCSB.

### 4.2.1 State Water Project Table A Water

Each SWP contract contains a “Table A” exhibit that defines the maximum annual amount of water each SWP Contractor can receive, excluding certain interruptible deliveries. DWR uses Table A amounts to allocate available SWP supplies and some SWP project costs among the SWP Contractors. Each year, DWR 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 River Delta (Delta). The available supply is then allocated according to each SWP Contractor’s Table A amount.

CVWD's and DWA's collective increments of Table A water are listed in **Table 4-2**. Original Table A SWP water allocations for CVWD and DWA were 23,100 AFY and 38,100 AFY, respectively, for a combined amount of 61,200 AFY. CVWD and DWA obtained a combined 100,000 AFY transfer from MWD under the 2003 Exchange Agreement. In 2004, CVWD purchased an additional 9,900 AFY of SWP Table A water from the Tulare Lake Basin Water Storage District (Tulare Lake Basin) in Kings County (DWR, 2004). In 2007, CVWD and DWA made a second purchase of Table A SWP water from Tulare Lake Basin totaling 7,000 AFY (DWR, 2007a and 2007b). In 2007, CVWD and DWA also completed the transfer of 16,000 AFY of Table A SWP water from the Berrenda Mesa Water District in Kern County (DWR, 2007c and 2007d). These latter two transfers became effective in January 2010. With these additional transfers, the combined total SWP Table A amount for CVWD and DWA is 194,100 AFY.

Previously, the 100,000 AFY MWD Transfer obtained under the 2003 Exchange Agreement included a "Call-Back" component that allowed MWD to call-back the 100,000 AFY and assume the entire cost of delivery if it needed the water. In 2019, the Amended and Restated Agreement for Exchange and Advance Delivery of Water (CVWD, 2019) ended MWD's right to call-back that 100,000 AFY of Table A water.

**Table 4-2: State Water Project Table A Amounts (AFY)**

| Agency | Original SWP Table A | Tulare Lake Basin Transfer #1 | Tulare Lake Basin Transfer #2 | MWD Transfer | Berrenda Mesa Transfer | Total Table A |
|---|---|---|---|---|---|---|
| **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 |

Source: WY 2023-2024 Annual Report (WSP, 2025)

In some years, DWA and CVWD carry over SWP water to the following year by storing it in the San Luis Reservoir. This carryover water is SWP water that is allocated to a SWP Contractor and approved for delivery in a given year but was not able to be delivered to the SWP Contractor by the end of that year. This water is exported from the Delta, but instead of being delivered to the SWP Contractor, it is stored in the SWP's share of the San Luis Reservoir south of the Delta, when space is available, for the SWP Contractor to use in the following year. This variability is reflected in the historical delivery values.

### 4.2.2 Other SWP Water Types

There are other types of SWP water that can be purchased, such as individual water purchase opportunities and transfers/exchanges. These may be conveyed to CVWD and DWA as available, but no commitments exist.

## Yuba Accord

In 2008, CVWD and DWA entered into separate agreements with DWR for the purchase and conveyance of supplemental SWP water under the Yuba River Accord Dry Year Water Purchase Program (Yuba Accord). This program provides dry year supplies through a water purchase agreement between DWR and Yuba County Water Agency, which settled long-standing operational and environmental issues over instream flow requirements for the lower Yuba River. Yuba Accord water transfers could include both surface water and groundwater substitution transfers for an estimated total of up to 140,000 AFY through 2050. The amount of water available for purchase varies annually and is allocated among participating SWP Contractors based on their Table A amounts. CVWD and DWA may purchase up to 1.72 percent (%) and 0.69%, respectively, of available Yuba Accord water in years it is made available.

Yuba Accord deliveries have varied in volume from zero to a historic high of 2,664 AFY to CVWD and DWA in 2013. Over the 17-year period from 2008-2024, the average annual amount of Yuba Accord water purchased by the Groundwater Sustainability Agencies (GSAs) was 633 AFY by CVWD and 147 AFY by DWA. This 2027 MCSB Update assumes the same 17-year average of Yuba Accord deliveries annually through 2050.

## Article 21

Another type of SWP water is Article 21 “Interruptible Water” (described in Article 21 of the SWP water contracts), which is water that SWP Contractors may receive on a short-term basis, in addition to their Table A water, if they request it in years when it is available. Article 21 water is used by many SWP Contractors to help meet demands in low allocation years. Article 21 water is not available every year, and amounts vary when it is available, which is proportionately allocated among participating SWP Contractors. The availability and delivery of Article 21 water cannot interfere with normal SWP operations and cannot be carried over for delivery in a subsequent year. Between 2010-2024, DWA and CVWD received an annual average of 37,082 AFY in Article 21 and carryover supplies. This 2027 MCSB Update assumes delivery of Article 21 and carryover supplies at 75% of the annual average in the Representative Concentration Pathway (RCP) 4.5 climate scenario, and 50% of the historical average in the RCP 8.5 climate scenario.

The SWP Contractors believe that as reliability increases over time with operation of the Delta Conveyance Project (DCP, see description below), Article 21 water will become more available to the SWP Contractors for purchase. This 2027 MCSB Update assumes that once the DCF is constructed, approximately 9,600 AFY of additional Article 21 water will be available to DWA and CVWD on average annually.

### 4.2.3 Advance Deliveries

The 1984 Advance Delivery Agreement (as amended in 2019 and 2025) allows MWD to deliver up to 800,000 AFY of Colorado River water for storage in the Coachella Valley Groundwater Basin to be credited against its future SWP exchange obligations, with deliveries occurring on a flexible schedule through an extended period. Advance deliveries are highly variable and tend to be concentrated in wet years, with the Indio Subbasin providing the majority of the storage. Advance delivery account increases represent MWD's advance deliveries (water in excess of SWP exchange obligations) and decreases represent deductions taken from the account when MWD credits against previously stored water in-lieu of delivering SWP exchange water. The Advance Delivery Account balance for 2003 – 2024 ranged from 44,601 AF in 2009 to 433,648 AF in 2024. This 2027 MCSB Update assumes that MWD will continue Advanced Delivery put/take throughout the planning horizon with the account balance netted to zero by 2075.

### 4.2.4 SWP Imported Water Reliability

SWP supplies vary annually due to weather and runoff variations in Northern California and regulatory limitations on exports from the Delta.

#### Delta Exports

Exports from the Delta through the SWP and Central Valley Project (CVP; managed by the United States Bureau of Reclamation (USBR)) have decreased since 2005 due to several key environmental decisions. While both the SWP and CVP provide water for municipal, industrial, and agricultural uses, the CVP serves a large portion of the State's agricultural demand. In 2005, the United States Fish and Wildlife Service (USFWS) released a Biological Opinion that Delta export (combined SWP and CVP) pumping operations would not jeopardize the continued existence of the Delta smelt, a small, endangered fish endemic to the Delta. Environmental groups challenged the action, and in May 2007, federal Judge Oliver Wanger ruled that the Biological Opinion was faulty in its assumptions and needed to be performed again. In 2008, the USFWS and National Marine Fisheries Service (NMFS) released a new Biological Opinion that addressed Delta fisheries, restricting operations of the SWP and CVP diversion pumps. In 2009, Judge Wanger struck down the USBR acceptance of the new Biological Opinion, saying USBR failed to comply with the National Environmental Policy Act related to cutbacks in water exports for Central Valley farmers.

In 2009, the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) established the Delta Stewardship Council to create a comprehensive, long-term, legally enforceable plan to guide management of the Delta's water and environmental resources. The Delta Plan (Delta Stewardship Council, 2013) includes policies and recommendations to achieve "coequal goals," which means the two goals of providing more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. In 2016, USBR and DWR developed the California WaterFix, a twin-tunnels alternative focused on conveyance and ecosystem improvements to significantly reduce reverse flows and fish species impacts associated with the

existing south Delta intakes. In 2019, USFWS and NMFS issued revised Biological Opinions (USFWS, 2019) to address California WaterFix. Concurrently, USBR issued the 2018 Addendum (USBR, 2018) to the 1986 Coordination Operation Agreement (USBR, 1986) with accompanying SWP and CVP operations changes, which reduced SWP exports and increased CVP exports, along with more conservative operation of Lake Oroville. In 2019, Governor Newsom directed state agencies to proceed with modernizing Delta conveyance with a single tunnel project (see DCP description below).

More recently, updated regulatory requirements, including new Biological Opinions issued in 2024 (USFWS, 2024, NMFS, 2024) and the SWP Incidental Take Permit (California Department of Fish and Wildlife (CDFW), 2024), have further refined operational constraints on Delta exports. These evolving regulatory frameworks continue to influence the timing and magnitude of SWP and CVP deliveries under a wide range of hydrologic conditions.

### SWP Reliability

SWP Contractors are required to submit annual delivery schedules to the DWR for a suite of potential water allocations; for example, delivery schedules for 10%, 15%, 30%, and 40% allocations were provided for calendar year 2024. DWR makes an initial SWP Table A allocation for planning purposes, typically in December, prior to the start of each calendar year. Throughout the year, as additional information regarding water availability becomes available and DWR performs hydrologic analyses, the SWP allocation/delivery estimates are updated. Typically, the final SWP allocation for the year is derived by June, and although not typical, can still be updated into the Fall. **Table 4-3** presents the historical draft and final Table A allocations over the past 20 years (i.e., 2005 to 2024). Note that CVWD's and DWA's contracted Table A amounts increased in 2010.

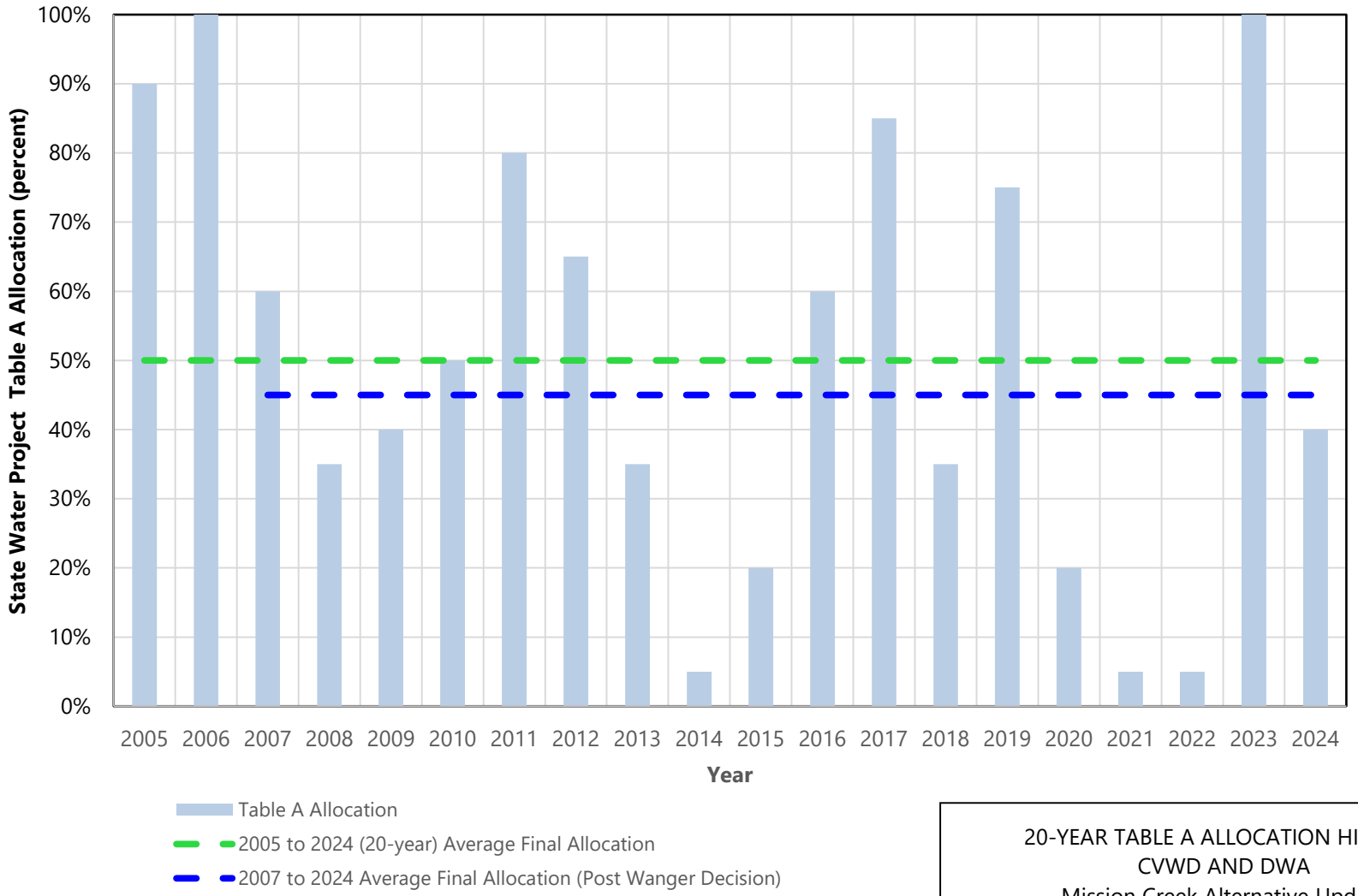
**Table 4-3: Historical SWP Table A Allocations, CVWD and DWA (2005–2024)**

| Year | 100% Table A Volume (AFY) | Water Year Type[1] | SWP Initial Allocation (%)[2] | SWP Final Allocation (%)[2] |
|---|---|---|---|---|
| 2005 | 171,100 | Above Normal | 40% | 90% |
| 2006 | 171,100 | Wet | 55% | 100% |
| 2007 | 171,100 | Dry | 60% | 60% |
| 2008 | 171,100 | Critically Dry | 25% | 35% |
| 2009 | 171,100 | Dry | 15% | 40% |
| 2010 | 194,100 | Below Normal | 5% | 50% |
| 2011 | 194,100 | Wet | 25% | 80% |
| 2012 | 194,100 | Below Normal | 60% | 65% |
| 2013 | 194,100 | Dry | 30% | 35% |
| 2014 | 194,100 | Critically Dry | 5% | 5% |
| 2015 | 194,100 | Critically Dry | 10% | 20% |
| 2016 | 194,100 | Below Normal | 10% | 60% |
| 2017 | 194,100 | Wet | 20% | 85% |
| 2018 | 194,100 | Below Normal | 15% | 35% |
| 2019 | 194,100 | Wet | 10% | 75% |
| 2020 | 194,100 | Dry | 10% | 20% |
| 2021 | 194,100 | Critically Dry | 10% | 5% |
| 2022 | 194,100 | Critically Dry | 0% | 5% |
| 2023 | 194,100 | Wet | 5% | 100% |
| 2024 | 194,100 | Above Normal | 10% | 40% |
| **20-year Average (2005-2024)** | | | **21%** | **50%** |
| **17-year Average Since Wanger Decision (2008-2024)** | | | **18%** | **45%** |

[1] Source: DWR, 2024c. "CDEC Water Year Type Dataset." Water year type for Sacramento Valley. Available: https://data.ca.gov/dataset/cdec-water-year-type-dataset (accessed June 2026).

[2] Source: DWR, 2026, Bulletin 132-23 and notices to contractors https://water.ca.gov/programs/state-water-project/management/swp-water-contractors.

Final SWP allocations between 2005 and 2024 have ranged from a high of 100% in 2006 and 2023, to a low of 5% in 2014, 2021, and 2022. **Figure 4-6** shows the variability of Table A allocations for the period of 2002 through 2024. The reliability of SWP deliveries has declined since 2007 when Judge Wanger overturned the Biological Opinion about Delta export pumping operations (2007 Wanger decision). This decision significantly impacted DWR's ability to convey SWP supplies across the Delta for export. Since the 2007 Wanger decision, SWP final allocations have averaged 45% annually. This period has also been marked by five critically dry years.




**Notes:**
Source: CDWR, 2026, Bulletin 132-23 and https://water.ca.gov/programs/state-water-project/management/swp-water-contractors.

20-YEAR TABLE A ALLOCATION HISTORY
CVWD AND DWA
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 4/13/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 4-6 |

## Future SWP Deliveries

DWR's Draft SWP Delivery Capability Report (DCR) 2025 (DWR, 2025) was released in December 2025. The delivery reliability of water from the SWP system is an important component for the SWP Contractors' water supply planning. The SWP delivery amounts in the 2025 DCR are estimated using the CalSim 3 simulation model, consistent with prior DCRs, but based on an updated baseline aligned with the 2025 SWP Adaptation Strategy and revised hydrologic and operational assumptions. DWR's analysis for the 2025 DCR indicates that the long-term average SWP Table A delivery under existing conditions is approximately 2.234 million acre-feet (MAF) per year, or about 54% of the approximately 4.133 MAF available for delivery from the Delta. This reflects a slight increase compared to the 2023 DCR due to updated modeling assumptions, including revised operational criteria and incorporation of current regulatory conditions.

**Table 4-4** provides a summary of the SWP delivery amounts for existing conditions using the CalSim 3 modeling for the 2025 DCR. The CalSim 3 model uses historical records from 1922 to 2021. By using this adjusted 100-year historical record, the delivery estimates modeled for existing conditions reflect a reasonable range of potential hydrologic conditions from wet years to critically dry years.

**Table 4-4: Estimated Average, Wet-, and Dry-Period Deliveries of SWP Table A Water**

| | Estimated SWP Table A Deliveries (AFY) | Percent of Maximum SWP Table A for Export (4,133 TAF/Y) |
|---|---|---|
| Long-Term Average | 2,234,000 | 54% |
| Wet Periods | | |
| Single Wet Year (1983) | 3,896,000 | 94% |
| Single Wet Year (1998) | 3,970,000 | 96% |
| Single Wet Year (2017) | 3,469,000 | 84% |
| 2-Year (1982-1983) | 3,640,000 | 88% |
| 4-Year (1980-1983) | 3,118,000 | 75% |
| 6-Year (1978-1983) | 3,085,000 | 75% |
| 10-Year (1978-1987) | 2,896,000 | 70% |
| Dry Periods | | |
| Single Dry Year (1977) | 237,000 | 6% |
| Single Dry Year (2014) | 321,000 | 8% |
| Single Dry Year (2021) | 397,000 | 10% |
| 2-Year Drought (1976-1977) | 936,000 | 23% |
| 2-Year Drought (2014-2015) | 403,000 | 10% |
| 6-Year Drought (1929-1934) | 627,000 | 15% |
| 6-Year Drought (1987-1992) | 897, 000 | 22% |

Source: 2025 SWP Delivery Capability Report (DWR, 2025a)

The 2025 DCR incorporates updated climate and system conditions and presents future delivery estimates using risk-based "Level of Concern" (LOC) scenarios (DWR 2025). This 2027 MCSB Update incorporates the 75th percentile LOC scenario as the moderate climate scenario and the 95th percentile LOC scenario as the severe climate scenario.

- **75th percentile LOC scenario** represents a moderately adverse future condition, reflecting a level of risk under which approximately 25 percent of potential future outcomes could be worse. It includes: temperature increase above current average temperatures of 1.7 °C (3°F); average precipitation amount that is very similar to current conditions; 12 percent increase in the 99th percentile daily precipitation event; and sea level rise of 30 centimeters (11.8 inches) at the Golden Gate Bridge. This scenario is commonly used for water supply planning because it balances risk and practicality while recognizing increasing climate uncertainty.
- **95th percentile LOC scenario** represents a severely adverse future condition, reflecting a level of risk under which approximately 5 percent of potential future outcomes could be worse. It includes: temperature increase above current average temperatures of approximately 2.7 °C (4.9°F); reduction in average precipitation compared to historical conditions; substantially greater intensification of extreme precipitation events; and higher magnitude of sea level rise relative to lower LOC scenarios. This scenario represents a high level of risk aversion and reflects challenging future hydrologic conditions characterized by warmer temperatures, more variable precipitation, and greater system stress. This scenario is used to evaluate system performance under extreme but plausible conditions, and to ensure resilience to the most severe potential impacts of climate change.

Under historical hydrology, long-term average SWP Table A deliveries are approximately 2.234 MAF (54 percent of contracted amounts). Under the 75% LOC scenario, deliveries decrease to approximately 1.90 MAF (46 percent), or about a 15 percent reduction. Under the 95% LOC scenario, this 2027 MCSB Update assumes 43 percent reliability, equivalent to approximately 1.78 MAF of long-term average systemwide Table A deliveries (DWR, 2025).

### 4.2.5 Delta Conveyance Project

The Delta Conveyance Project (DCP) is a DWR water project intended to restore the reliability of SWP and CVP water deliveries south of the Delta. The original concept of two tunnels has been replaced with a single large-diameter tunnel extending from new intake facilities in the north Delta along the Sacramento River to a pumping facility near Bethany Reservoir. DWR certified the Final Environmental Impact Report in December 2023 (DWR, 2023b) and adopted the Bethany Alignment as the approved route (DWR, 2023b). As with the earlier design, the new facilities would provide an alternate diversion point and would be operated in coordination with the existing south Delta pumping plants.

Construction of the DCP is intended to improve water supply reliability for SWP Contractors by addressing the limitations of in-Delta conveyance. Because the SWP currently relies on the Delta's natural channels to convey water, it is vulnerable to earthquakes, sea level rise, climate change, and regulatory pumping restrictions designed to protect in-stream species and habitats. In particular, south Delta pumping constraints can prevent the SWP from capturing water when it is available, especially in wet weather. The DCP would add new diversions in the north Delta to promote a more resilient and flexible SWP in the face of unstable future conditions. Combined with the current through-Delta method, the addition of DCP is referred to as the "dual conveyance" system. Following the 2022 MCSB Alternative Plan Update, CVWD and DWA continue to participate in planning for the DCP. The Agreement in Principle was approved in November 2020, and both agencies contributed funding to advance planning and design. At that time, CVWD and DWA approved participation levels of 3.78% and 1.52%, respectively. The 2025 DCR (DWR, 2025) establishes the current baseline for SWP reliability at 2.234 MAF, or about 54 percent of maximum Table A amounts, with long-term average deliveries projected to decline by 11 percent by 2043 under modeled climate change scenarios without adaptation. The report evaluates the DCP as a system-wide adaptation measure that would allow capture of high-flow events and help offset projected reductions, but it does not assign fixed annual yield amounts to participating agencies. For CVWD and DWA, participation at the previously approved levels reflects a continued commitment to securing a proportional share of these system-wide improvements.

The Agreement in Principle for the DCP was approved in November 2020, as outlined in **Table 4-5**. At the agreed upon participation levels of 1.52% (5,900 AFY) and 3.78% (14,900 AFY), respectively, DWA and CVWD use a planning estimate of 20,800 AFY in additional SWP deliveries for this 2027 MCSBUpdate, consisting of 11,200 AFY of Table A supplies and 9,600 AFY of Article 21 supplies. These amounts are planning assumptions and are not guaranteed annual deliveries.

**Table 4-5: DCP Supply Amounts Assumed for Region**

| Description | CVWD | DWA | Total | DCP Recharge to MC-GRF in 2047+ |
|---|---|---|---|---|
| Table A Supply (AFY) | 8,000 | 3,200 | 11,200 | 903–1,033 depending on climate scenario |
| Article 21 Supply (AFY) | 6,900 | 2,700 | 9,600 | |
| Annual Estimate (AFY) | 14,900 | 5,900 | 20,800 | |
| Share of DCF (%) | 3.78% | 1.52% | 5.30% | |

## 4.2.6 Sites Reservoir Project

The Sites Project Authority is developing the Sites Reservoir Project. The Sites Reservoir Project would construct 1.5 MAF of off-stream storage capture and store stormwater flows from the Sacramento River for release in dry years. It is considered "off-stream" because it will not dam or impede the Sacramento River or other streams. The reservoir would be situated on the west side of the Sacramento Valley, approximately 10 miles west of Maxwell, California. When

operated in coordination with other Northern California reservoirs such as Shasta, Oroville, and Folsom, the Sites Reservoir is anticipated to increase statewide water supply reliability and resiliency. Project implementation would also increase water storage capacity in Northern California by up to 15% (USBR, 2026). Water supply and storage capacity will be made available to water purveyors throughout California who elect to purchase supply from the Sites Reservoir Project, which would increase flexibility and reliability of statewide water supplies in drier periods.

In 2019, CVWD and DWA entered into an agreement with the Sites Project Authority for the next phase of planning (Sites Project Authority, 2019; 2020). In 2022, both agencies authorized funding for Phase 2 Amendment 3 to the 2019 Agreement covering 2022, 2023, and 2024 (WSP, 2025). Since execution of the 2019 agreement, the Sites Project Authority has advanced the Sites Reservoir Project into the implementation phase. The project has received $1.094 billion in state contributions via the Water Storage Investment Program (WSIP), along with $798 million in federal contributions via Department of the Interior and the Water Infrastructure Improvements for the Nation Act (WIIN Act). The Sites Project Authority has advanced permitting[2], continued engineering, modeling, and community outreach efforts, and completed the first land acquisition for the project. USFWS has issued a Construction Biological and Conference Opinion. CDFW has issued Incidental Take Permits for construction and operation, as well as a Lake and Streambed Alteration Agreement. A Draft Water Right Permit was issued in 2026. Construction is anticipated to begin by early 2027, subject to completion of remaining approvals and financing.

CVWD and DWA are participating members at 5.2% (6,400 AFY) and 3.4% (5,100 AFY) levels, respectively, as shown in **Table 4-6**. These estimated supply amounts account for approximately 30% conveyance losses as modeled in CalSim3 modeling performed in July 2025. The agencies anticipate average delivery of 11,500 AFY when the project is completed, of which an estimated 1,162 AFY would be delivered to the MCSB from the Sites Reservoir Project beginning in 2035.

**Table 4-6: Sites Reservoir Supply Amounts**

| Description | CVWD | DWA | Total | Total After 30% Conveyance Loss | Sites Reservoir Recharge to MC-GRF in 2035+ |
|---|---|---|---|---|---|
| Percent of Sites Reservoir Supply | 5.2% | 3.4% | 8.6% | -- | -- |
| Annual Estimate (AFY) | 10,000 | 6,500 | 16,500 | 11,550 | 1,162 |

[2] Sites Reservoir Project permits are available at: https://sitesproject.org/permitting/.

### 4.2.7 Projected SWP Delivery to Subbasins

All SWP Exchange water delivered to DWA and CVWD is recharged at: (1) the Whitewater River Groundwater Replenishment Facility (WWR-GRF) in the Indio Subbasin or (2) the Mission Creek Groundwater Replenishment Facility (MC-GRF) in the MCSB. SWP water is allocated between the subbasins in accordance with the 2014 Mission Creek Water Management Agreement (CVWD and DWA, 2014). This includes any water that is paid for, or planned to be paid for, by the SWP tax, or split between the Replenishment Assessment Charge (RAC) paid by the West Whitewater River Subbasin Area of Benefit (AOB) and Mission Creek Subbasin AOB,[3] including Table A, Article 21, and Yuba Accord water, in addition to any future increase in Table A reliability (e.g., DCF and Sites Reservoir supplies).

In WY 2023–2024, for example, a total of 286,639 AF of exchanged water was delivered to the Coachella Valley, of which 5,432 AF was delivered to the MC-GRF and the remainder to the WWR-GRF. Of this amount, 115,119 AF was comprised of SWP Table A and other transfers (associated with Rosedale-Rio Bravo and the Quantification Settlement Agreement (QSA)). In accordance with the Advance Delivery Agreement, MWD also delivered 171,520 AF to the Advance Delivery Account. Of the 286,639 AF of water delivered to the Coachella Valley, 281,207 AF were delivered to WWR-GRF (98%) and 5,432 AF were delivered to MC-GRF (2%).

Available SWP supply allocated to the MC-GRF and WWR-GRF is based on proportional groundwater production between the Mission Creek Subbasin Management Area and the West Whitewater River Subbasin Management Area, to be balanced over a 20-year period beginning December 2004. In 2024, total assessable production in the Mission Creek Subbasin Management Area (inclusive of CVWD's AOB and DWA's AOB) was 12,754 AF, while total assessable production in the West Whitewater River Subbasin Management Area (inclusive of CVWD's AOB and DWA's AOB, plus surface water diversions) was 158,118 AF (CVWD, 2025). Based on a cumulative total of 170,872 AF in assessable production between the two management areas, this resulted in a 7.5%/92.5% split between the Mission Creek Subbasin Management Area and West Whitewater River Subbasin Management Area, respectively, in 2024. As shown in **Table 4-7**, the projected allotment of SWP exchange water to the two management areas is projected to increase from 8 to 10% to the MC-GRF and decrease from 92 to 90% to the WWR-GRF by 2050. Urban growth and associated water demand in the MCSB will result in slightly more SWP exchange water being delivered to that subbasin over time. This 2027 MCSB Update is coordinated with the 2027 Indio Subbasin Alternative Plan Update to establish production estimates and associated SWP delivery estimates for the two management areas through the 2050 planning horizon.

[3] The Indio Subbasin is also identified as the Whitewater River Subbasin by the United States Geological Survey (USGS, 1980). The USGS name is the basis for the names for the Whitewater River AOB.

### 4.2.8 Use of SWP Exchange Water

This 2027 MCSB Update accounts for all anticipated SWP exchange water to be recharged at the WWR-GRF and MC-GRF (as described in Section 1.2.9) to ensure that all available supply is used. In order to fully use available SWP exchange supplies, the GSAs will continue to replenish groundwater at maximum delivery levels and pursue additional SWP supplies as they become available.

### 4.2.9 SWP Forecast

SWP deliveries under future climate conditions were evaluated using the USGS BCM, which simulates watershed hydrologic response to projected changes in precipitation and temperature under two RCP climate scenarios. SWP delivery variability was developed using empirical relationships between Feather River watershed (source waters for the SWP) hydrologic conditions and historical Table A allocations. Delivery variability was then applied to BCM-simulated precipitation and snowpack outputs under RCP 4.5 and RCP 8.5 scenarios to generate time series of Table A allocation percentages. Baseline SWP supply was defined using delivery reliability estimates derived from DWR's 2025 DCR (DWR, 2025), where higher LOC percentages correspond to more conservative assumptions about system conditions, and therefore lower expected deliveries. This 2027 MCSB Update recognizes the increasing uncertainty and potential reductions in SWP delivery reliability associated with climate change and regulatory constraints, and conservatively assumes a reliability of 46 percent under moderate climate conditions and 43 percent under more extreme climate conditions through the planning horizon.

This 2027 MCSB Update considers the following two SWP exchange delivery scenarios:

1. **Moderate Climate Change Conditions** – SWP deliveries are based on Table A allocation percentages derived from BCM-informed hydrologic projections using the RCP 4.5 precipitation scenario, which reflects moderate climate change conditions. These allocation percentages are translated into annual delivery variability and applied to an assumed SWP reliability of 46 percent (75% LOC).
2. **Severe Climate Change Conditions** – SWP deliveries are based on Table A allocation percentages derived from BCM-informed hydrologic projections using the RCP 8.5 precipitation scenario, which reflects more severe climate change conditions. These allocation percentages are translated into annual delivery variability and applied to an assumed SWP reliability of 43 percent (95% LOC).

Chapter 7, Water Management Forecasting, provides a detailed description of the climate scenarios and supply forecast methodology. The scenario modeling assumes annual variability of Table A deliveries associated with different projected climate years. However, Yuba Accord, Sites Reservoir, and DCP supplies are assumed at their full anticipated amounts each year. The projected estimates for all potential SWP exchange water are shown in **Table 4-7.**

**Table 4-7: Forecast of SWP Table A Supplies to WWR-GRF and MC-GRF Under Moderate Climate Change Conditions**

| | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|
| **Existing SWP Supplies** | | | | | | |
| Table A Amount | 194,100 | 194,100 | 194,100 | 194,100 | 194,100 | 194,100 |
| Assumed SWP Reliability | 46% | 46% | 46% | 46% | 46% | 46% |
| Average Table A Deliveries w/Assumed SWP Reliability | 89,286 | 89,286 | 89,286 | 89,286 | 89,286 | 89,286 |
| Yuba Accord | 780 | 780 | 780 | 780 | 780 | 780 |
| Rosedale-Rio Bravo[b] | - | 13,050 | 13,050 | - | - | - |
| Sum of Existing SWP Supplies | 90,066 | 103,116 | 103,116 | 90,066 | 90,066 | 90,066 |
| **Estimated Replenishment (AFY)[a]** | | | | | | |
| WWR-GRF Replenishment | 82,858 | 95,639 | 95,309 | 82,066 | 81,871 | 81,679 |
| MC-GRF Replenishment | 7,208 | 7,477 | 7,807 | 8,000 | 8,195 | 8,387 |
| **Future SWP Supplies** | | | | | | |
| Sites Reservoir | - | - | 11,500 | 11,500 | 11,500 | 11,500 |
| Delta Conveyance Project[c] (Additional SWP Table A/Article 21) | - | - | - | - | - | 20,800 |
| Sum of Existing + Future SWP Supplies | 90,066 | 103,116 | 114,616 | 101,566 | 101,566 | 122,366 |
| **Estimated Replenishment (AFY)[a]** | | | | | | |
| WWR-GRF Replenishment | 82,858 | 95,639 | 105,813 | 92,544 | 92,324 | 110,972 |
| MC-GRF Replenishment | 7,208 | 7,477 | 8,803 | 9,022 | 9,242 | 11,394 |

[a] Additional 35,000 AFY MWD/SWP Transfer under the QSA is accounted for and replenished at WWR-GRF. However, that CVWD supply is not included in replenishment volumes in this table.

[b] Rosedale-Rio Bravo supplies are a 252,500 AF transfer to CVWD from Rosedale Rio-Bravo from 2012-2035. All Rosedale-Rio Bravo water is delivered via the MWD exchange agreement to WWR-GRF. While not a SWP supply, Rosedale-Rio Bravo deliveries are accounted for here due to their use for replenishment at WWR-GRF. No Rosedale-Rio Bravo supplies were delivered in WY 2025.

[c] Delta Conveyance Project supply made of additional Table A and Article 21 water made available through infrastructure modernization.

## 4.3 Wastewater/Recycled Water

The Planning Area includes areas connected to the MSWD wastewater treatment system through sewer connections (sewered areas) and areas on septic systems (unsewered areas). All of the CVWD portion of the Planning Area (**Figure 4-3**) that overlies the DHSSB and MCSB is unsewered and there is currently no Master Plan to convert this area to sewer. Septic to sewer conversions will be driven by future development in this area. Most of the denser population areas in the MSWD/DWA Area (primarily within the City of Desert Hot Springs) in the DHSSB and MCSB are sewered, under conversion to sewer, or have plans for initial conversion to sewer through 2035 (estimated by MSWD, based on previous septic to sewer conversions). The less densely populated areas of the DHSSB and MCSB, and all of the GHSA, are unsewered.

Municipal wastewater from the sewered areas is treated at the Horton and Desert Crest Wastewater Treatment Plants (WWTPs) and, beginning in WY 2024-2025, at the Nancy Wright Regional Water Reclamation Facility (Nancy Wright RWRF).[4] Treated effluent is discharged toevaporation/percolation ponds in the MCSB at the Horton and Desert Crest WWTPs and in the GHSA at the Nancy Wright RWRF.

### 4.3.1 Horton WWTP

The Horton WWTP, located on Verbena Drive approximately one-half mile south of Two Bunch Palms Trail, has a permitted capacity of 2.4 million gallons per day (MGD) and utilizes an extended aeration treatment process. Secondary effluent, which is not disinfected, is discharged to on-site percolation/evaporation ponds. Sludge generated during treatment is dewatered using a filter press and transported offsite for disposal. For WY 2023-2024, the Horton WWTP averaged approximately 1.9 MGD (2,304 AF) of wastewater treatment and disposal. With the opening of the Nancy Wright RWRF in WY 2024-2025, flows to the Horton WWTP decreased compared to prior years.

### 4.3.2 Desert Crest WWTP

The Desert Crest WWTP, located approximately one-half mile southeast of the intersection of Dillon Road and Long Canyon Road, has a capacity of 0.18 MGD and serves the Desert Crest Country Club development and associated mobile home park. The facility utilizes an extended aeration process and disposes of secondary effluent, which is not disinfected, in on-site percolation/evaporation ponds. Sludge is dried in on-site beds and transported offsite for disposal. For WY 2023-2024, the Desert Crest WWTP averaged approximately 0.04 MGD (48 AFY) of wastewater treatment and disposal, consistent with historical service levels.

[4] The Nancy Wright RWRF began operation in WY 2024-2025, outside of the historical review period for this 2027 MCSB Update. Operation of this facility impacts future groundwater levels and is included here for completeness of the wastewater/recycled water operations in Planning Area.

### 4.3.3 Nancy Wright RWRF

In late 2024, MSWD completed construction of the Nancy Wright RWRF in the GHSA near I-10 and North Indian Canyon Drive to increase wastewater treatment capacity regionally. The Nancy Wright RWRF treats wastewater flows to secondary levels including nitrification and denitrification. The Nancy Wright RWRF helps divert wastewater flows from the existing Horton WWTP that is at capacity. After start-up in 2025, the Nancy Wright RWRF is projected to reach 1.5 MGD (1,680 AFY) treatment capacity by approximately 2030 as influent volumes continue to increase from septic-to-sewer conversions in the DHSSB, MCSB, and GHSA. For calendar year 2025, the Nancy Wright RWRF averaged approximately 0.18 MGD as flows began to gradually transition to the facility following start up.

Treated wastewater is discharged from the Sequence Batch Reactors (SBR) to evaporation/percolation ponds in the GHSA. Growth projected by 2050 is expected to provide wastewater flows to a buildout capacity of 3 MGD (3,360 AFY) available for recycling. However, future use of recycled water from the Nancy Wright RWRF is expected to occur in the MCSB, where projected recycled water production is anticipated to offset groundwater pumping and support groundwater sustainability goals. Recycled water use is expected to increase over time with population growth and expansion of the Nancy Wright RWRF, providing an additional local water supply that improves drought resilience and reduces demand on imported replenishment supplies.

### 4.3.4 Wastewater Summary

Disposal volumes for each wastewater treatment plant are listed in **Table 4-8**. In WY 2020-2024, an average of 2,288 AF of wastewater was treated, all of which was disposed through percolation and evaporation (**Table 4-9**).

**Table 4-8: Wastewater Treatment and Disposal in the Mission Creek Subbasin - WY 2020 to 2024**

| Wastewater Treatment Plant | WY2020 (AF) | WY 2021 (AF) | WY2022 (AF) | WY 2023 (AF) | WY 2024 (AF) | Average (AF) |
|---|---|---|---|---|---|---|
| MSWD – Horton WWTP | 2,257 | 2,167 | 2,257 | 2,204 | 2,304 | 2,238 |
| MSWD – Desert Crest WWTP | 53 | 49 | 49 | 50 | 48 | 50 |
| MSWD – Nancy Wright RWRF[1] | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **2,310** | **2,216** | **2,306** | **2,254** | **2,353** | **2,288** |

1 MSWD completed construction of the Nancy Wright RWRF and began receiving flows in early 2025, diverting wastewater from the Horton WWTP. The Nancy Wright RWRF began operation in WY 2024-2025 and is outside of the historical review period for this Alternative Update.

Currently, there is no recycled water produced or used in the MCSB; however, there are plans to do so once MSWD constructs new treatment processes and distribution mains. MSWD plans to add tertiary treatment at the Nancy Wright RWRF with off-site spreading facilities, as well as tertiary treatment and conveyance for non-potable irrigation reuse at the Horton WWTP.

### 4.3.5 Recycled Water Forecast

While recycled wastewater has not historically been used in the MCSB, MSWD is planning tertiary treatment and conveyance improvements at the Horton WWTP to provide recycled water for non-potable irrigation, as described in Section 8.5.3. Additionally, MSWD's long-term plans are to construct advanced treatment at the Nancy Wright RWRF for conveyance north to MCSB for groundwater replenishment. The amount of potential recycled water available for reuse in the future primarily depends on growth, along with MSWD's success in securing grant funding for construction of tertiary treatment and conveyance. **Table 4-9** shows the estimated future wastewater produced in the MCSB through 2050, based on estimations of indoor demand and conservation per Sections 3.3.6.3 and 3.3.9.1. The decrease in production at the Horton WWTP and Desert Crest WWTP is due to conveyance of the flow to the Nancy Wright RWRF over time.

**Table 4-9: Estimated Wastewater Production in the Planning Area (WY2024-2025 to 2049-2050)**

| Wastewater Treatment Plant | WY 2025 (AF) | WY 2030 (AF) | WY 2035 (AF) | WY 2040 (AF) | WY 2045 (AF) | WY 2050 (AF) |
|---|---|---|---|---|---|---|
| MSWD – Horton WWTP[1] | 2,229 | 2,262 | 1,324 | 195 | 0 | 0 |
| MSWD – Desert Crest WWTP[2] | 50 | 50 | 0 | 0 | 0 | 0 |
| MSWD – Nancy Wright RWRF[1] | 150 | 150 | 1,120 | 2,200 | 2,353 | 2,288 |
| **Total** | **2,429** | **2,462** | **2,444** | **2,395** | **2,353** | **2,288** |

1 MSWD completed construction of the Nancy Wright RWRF and began receiving flows in early 2025, diverting wastewater from the Horton WWTP. An estimated 150 AFY is assumed until implementation of the wastewater conveyance improvements anticipated in 2035.

2 Desert Crest WWTP is slated for discontinuance in 2035.

Future waste discharge requirements will also dictate the level of treatment, and potentially volume of ongoing discharge, that would be required at the wastewater treatment plants. Thus, future growth, conservation, funding availability, and water quality regulations will all contribute to the amount of recycled water supply produced in the MCSB. **Table 4-10** shows the estimated total recycled water production in the MCSB based on these constraints.

**Table 4-10: Estimated Recycled Water Production in the Mission Creek Subbasin (WY 2025 to 2050)**

| Constraint | WY 2025 (AF) | WY 2030 (AF) | WY 2035 (AF) | WY 2040 (AF) | WY 2045 (AF) | WY 2050 (AF) |
|---|---|---|---|---|---|---|
| Wastewater Volume | 2,429 | 2,462 | 2,444 | 2,395 | 2,353 | 2,288 |
| Plant Capacity[1] | 1,120 | 1,120 | 1,120 | 2,200 | 3,600 | 5,000 |
| Treatment Capacity[2] | 0 | 0 | 1,120 | 2,200 | 3,600 | 5,000 |
| Estimated Recycled Water | 0 | 0 | 1,120 | 2,200 | 2,353 | 2,288 |

1 Plant Capacity is based on the estimated capacity of the Nancy Wright RWRF

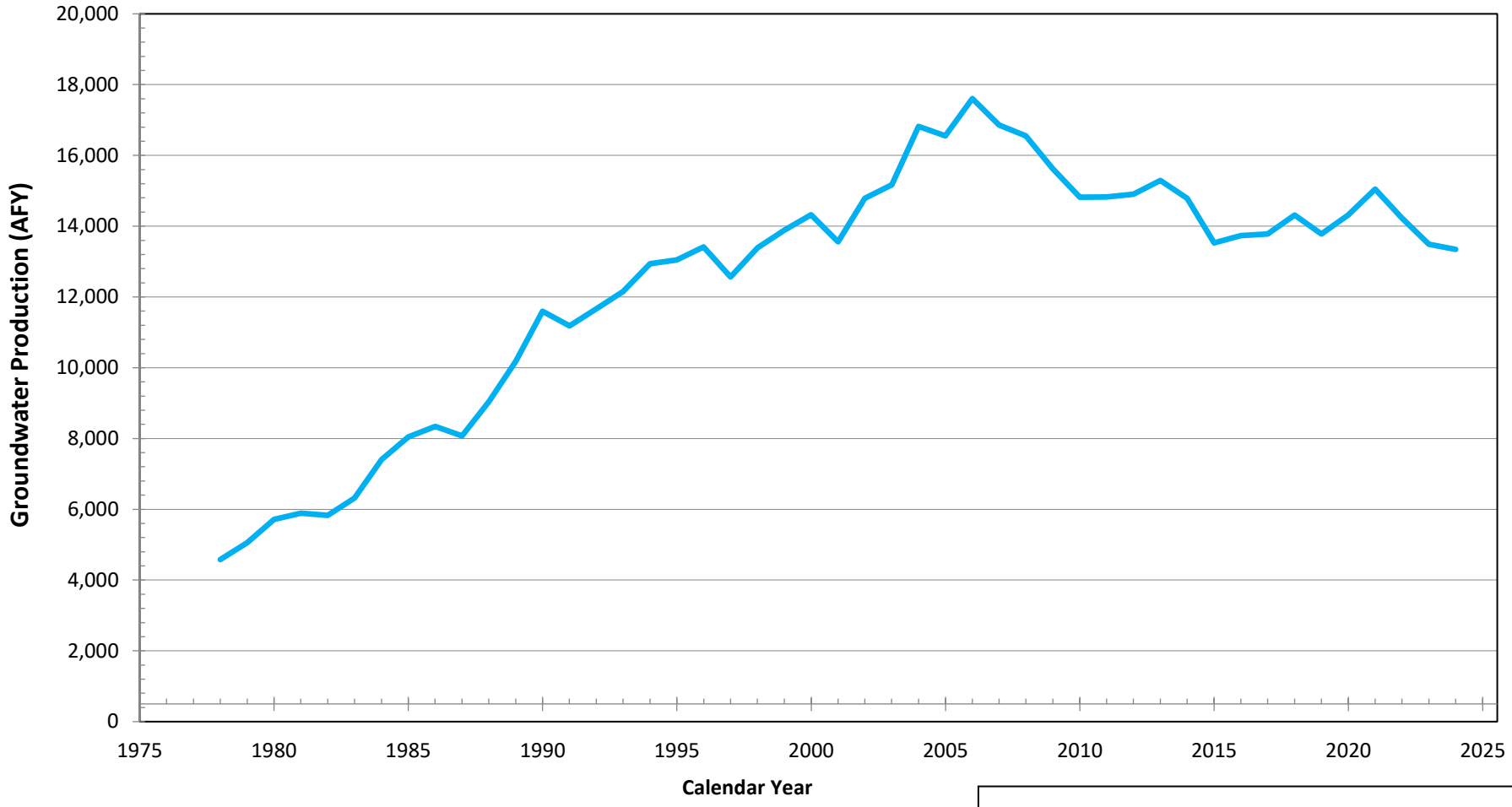
2 Treatment Capacity is based on the tertiary treatment capability of the Nancy Wright RWRF

## 4.4 Groundwater Use

Groundwater is the only current source of water available for direct municipal supply and private pumpers in the Planning Area, and most of the groundwater production used in the Planning Area is pumped from the MCSB. This section provides information on the long-term historical groundwater pumping in the MCSB because of the reliance of the Planning Area on groundwater from this subbasin. Recent extractions in the MCSB and GHSA are summarized for WY 2019-2020 through WY 2023-2024 to document groundwater use in the Planning Area that overlies the MCSB, and GHSA, as reported in the SGMA annual reports. More detailed information regarding groundwater production, including the period prior to WY 2020, is presented in Section 5, **Appendix A**, and in the 2022 MCSB Alternative Plan Update. This section also summarizes the limited available information on DHSSB groundwater production.

### 4.4.1 Long-term Groundwater Extraction in the MCSB

The long-term groundwater extraction in the MCSB is shown on **Figure 4-7**. Groundwater production increased from approximately 4,580 AFY in 1979 and peaked at approximately 17,010 AFY in 2006. Groundwater production has declined since 2006 with total production below 14,000 AF from WY2021-2022 to WY 2023-2024. The declines are attributed primarily to conservation efforts.




GROUNDWATER PRODUCTION IN THE MCSB
Mission Creek Alternative Update
Coachella Valley, California

| By: | dmf | Date: | 04/13/2026 | Project No.: | US0043968.2616 |
|---|---|---|---|---|---|

wsp

Figure 4-7

Abbreviations:
AFY = acre feet per year

## 4.4.2 Recent Groundwater Extraction in the MCSB

Approximately 93% of metered groundwater production in the MCSB is for urban water use (urban use is comprised of municipal and recreational - including golf course irrigation). The remaining approximately 7% of metered groundwater production is for agricultural or industrial purposes (WSP, 2025).

All production wells that participate in the replenishment assessment programs are metered. However, previous estimates indicate that there could be about 500 AFY of unreported pumping of groundwater for unknown uses by minimal pumpers (defined as extracting less than 25 AFY and 10 AFY within the CVWD and DWA AOBs, respectively). Estimated groundwater production by minimal pumpers was previously discussed in Section 3.4.2. As indicated in **Table 4-11**, an average of 14,086 AFY of groundwater was extracted from the MCSB from WY 2019-2020 through WY 2023-2024. Groundwater was extracted for agriculture, industrial, and urban use and included the estimated 500 AFY of groundwater extracted by minimal pumpers. Analyses of water use in the MCSB suggests recent minimal pumper production, which is believed to occur almost exclusively within the CVWD service area, is closer to 540 AFY as described in Section 3.4.2. Given the uncertainty in this estimated value, and that it does not include some minimal pumper production outside of the CVWD planning area, it is rounded to 500 AFY for reporting purposes.

**Table 4-11: Groundwater Extractions by Water Use Sector in the MCSB (WY 2020 to 2024)**

| Water Use Sector | Average Annual Groundwater Extractions (AFY) | Method of Measurement | Measurement Accuracy[4] |
|---|---|---|---|
| Agriculture[1] | 670 | 100% metered | ±1% |
| Industrial | 304 | 100% metered | ±1% |
| Urban[2] | 12,612 | 100% metered | ±1% |
| Environmental | 0 | Not applicable | Not applicable |
| Undetermined[3] | 500 | 100% estimated | ±25% |
| Total Average Annual Production | 14,086 | -- | -- |

**Notes:** Source: MCSB Annual Reports (WSP [formerly Wood Environment & Infrastructure Solutions, Inc.] 2020, 2021, 2022, 2023, and 2024).

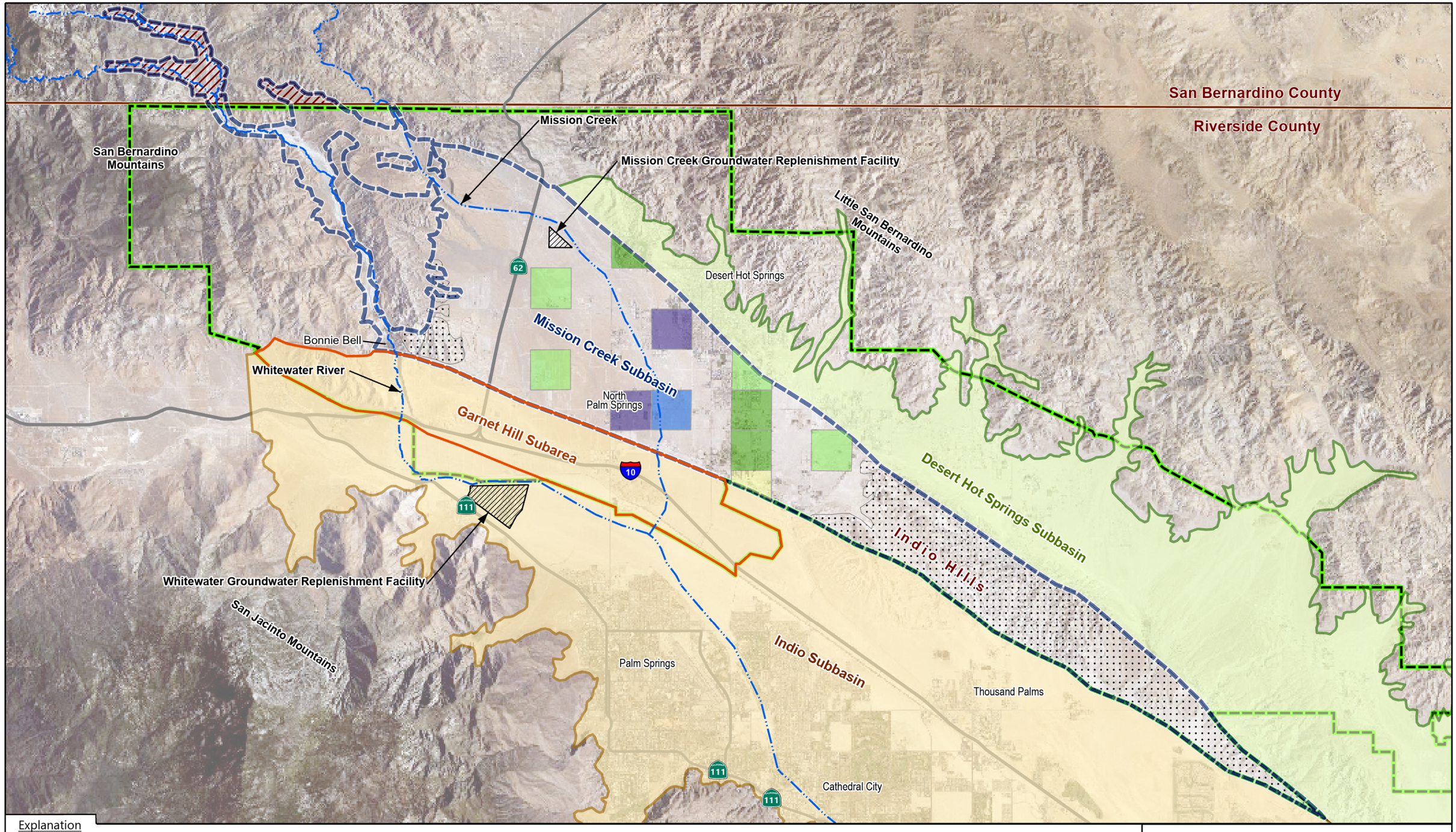
[1]Includes fish farms.

[2]Includes municipal and recreational use (e.g., golf course irrigation).

[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.

**Figure 4-8** shows the general location of groundwater production (excluding minimal pumpers) in the MCSB and summarizes the annual average production for WY 2020 through WY 2024 within Public Land Survey System sections (i.e., township sections).




Explanation

- Facility
- Streams
- Highway/road
- Planning Area
- Mission Creek Subbasin fringe area
- Garnet Hill Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin

Groundwater Production by Area (Acre-Feet per Year)

- 1 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 3,000
- 3,001 - 4,500

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 National Agricultural Program (NAIP), 2018

N

AVERAGE ANNUAL GROUNDWATER PRODUCTION
MISSION CREEK SUBBASIN
WY 2020-2024
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-8 |

Date: 9/15/2026 Printed by: USMW719917
Path: Y:\CM\19167351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_20264-8_MCSB_GW_Prod_WY_20-24.aprx

Township sections are arranged in a grid and each township section overlies an area of approximately one square mile. Where township sections extend beyond the MCSB boundary, the township sections have been trimmed to show only that part of the township section that overlies the MCSB. Total water year annual average groundwater production for each township section is indicated by a color representing a range of production. Groundwater production, above minimal pumper thresholds, occurs within the main portion of the MCSB. No groundwater pumping is documented in the Indio Hills within the MCSB or in the far northwestern parts of the subbasin (upper Mission Creek and Whitewater River channel).

### 4.4.3 Recent Groundwater Extraction in the GHSA

Groundwater extraction for the GHSA is documented in the annual reports for the Indio Subbasin. One active municipal well is in the GHSA and a portion of the production from this well is exported from the GHSA to the MCSB (WSP, 2025). For WY 2020 to WY 2024, an average of 294 AFY of groundwater was extracted from the GHSA and an average of 188 AFY was exported for use in the MCSB. A private well used for industrial purposes is also active in the GHSA. For WY 2020 to WY 2024, an average of approximately 14 AFY was extracted from this private well.

### 4.4.4 Estimated Groundwater Extraction in the DHSSB

Historically, groundwater resources in the DHSSB have remained relatively undeveloped primarily due to elevated dissolved mineral content in the groundwater. The Agencies do not operate any production wells in this subbasin. Current understanding and historical data indicate that there is much less groundwater pumping in the DHSSB than in the MCSB, though the mineralized groundwater is used at spas and resorts overlying the DHSSB. Historical pumping data are estimated based on a groundwater modeling study for the area (Mayer, 2007). Information from the study indicated relatively stable groundwater pumping of approximately 1,700 AFY in the subbasin from the early 1970s to the late 1990s. It is assumed that recent and future groundwater use in the DHSSB is and will be similar to the long-term historical use.

## 4.5 MCSB Net Groundwater Extraction and Groundwater Levels

Groundwater levels in the MCSB began to decline prior to the 1970s with increasing groundwater production. In the 1990s, the Agencies recognized that continued lowering of groundwater levels in the MCSB 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, the Agencies developed and implemented plans to recharge imported water into the aquifer underlying the MCSB. Groundwater levels in the MCSB began to increase after an imported water recharge program began in 2002 at the MC-GRF. **Figure 4-9** shows groundwater recharge to the MC-GRF since the commencement of recharge

activities in 2002. From calendar year 2002 through 2024, a total of 177,751 AF was delivered to the MC-GRF for direct replenishment. The average recharge for this period was approximately 7,728 AFY, with recharge volumes ranging from 0 to 33,210 AFY.[5]

It is conservatively estimated that 2% of the water delivered for recharge is evaporated from the spreading facilities and 98% of the water reaches the underlying groundwater basin (WSP, 2025). **Figure 4-9** includes a plot of groundwater levels in a monitoring well located at the south end of the MC-GRF. The plot shows that recharge efforts resulted in groundwater elevations rising near the recharge facility by more than 250 feet between 2005 and 2012 as a result of multiple years of high-volume recharge. Since this period of high-volume recharge, groundwater levels have come down by approximately 180 feet, which is still more than 40 feet higher than 2002 groundwater levels.

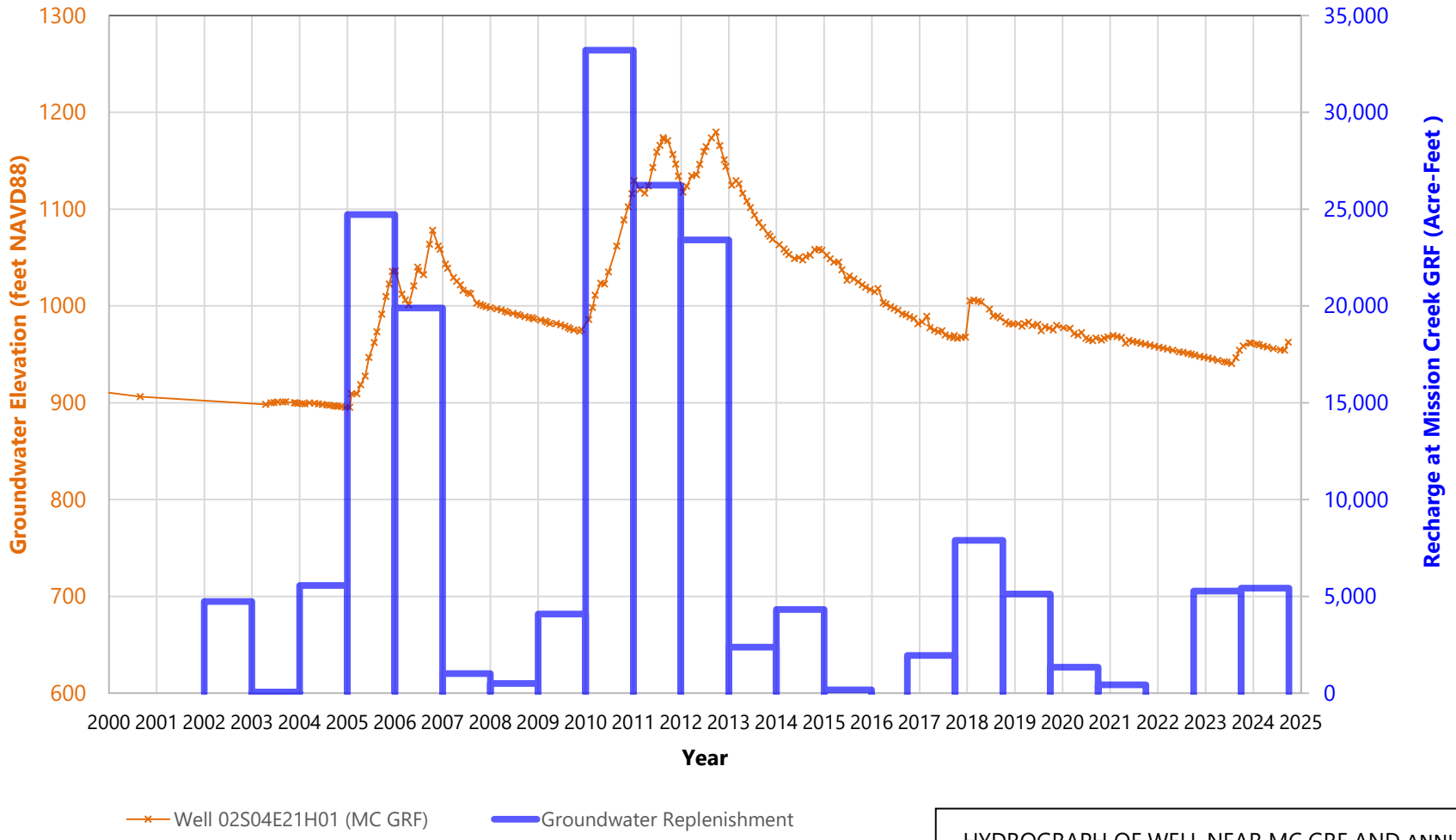
**Figure 4-10** shows groundwater elevations for wells farther downgradient from the MC-GRF with water level measurements extending back to 1978. Groundwater recharge at the MC-GRF is also shown on this plot. A downward trend in groundwater elevations in the MCSB is evident from 1978 through at least 2007. Following the initiation of groundwater recharge, groundwater levels stabilized and then began to rebound. For wells located at a distance from the MC-GRF, there is a time delay before the wells responded to recharge. **Figure 4-11** shows the location of the wells represented by hydrographs on **Figure 4-9** and **Figure 4-10** at a different scale to compare all wells on the same plot.

All three of these figures show the positive impact of groundwater recharge on reversing the downward trend and eventual stabilization of groundwater levels above 2009 levels.

Based on historical groundwater levels, the Agencies established the goal of managing the MCSB such that long-term average groundwater levels do not significantly decline to below 2009 conditions. The groundwater replenishment program successfully achieved this goal prior to the SGMA legislation.

**Figure 4-11** shows groundwater level changes in the MCSB over the fifteen-year period from WY 2008-2009 to WY 2023-2024 (WSP, 2025). The figure is titled “Change In Groundwater Storage” because the change in groundwater levels across the MCSB represented by the monitoring wells is considered equivalent to the change in groundwater storage for the area represented by the monitoring wells. Groundwater level changes ranged from approximately 27.5 feet of decrease in the MC-GRF area to approximately 15.7 feet of increase in the north-central part of the MCSB (WSP, 2025). The figure shows that the 2013 Mission Creek/Garnet Hill Water Management Plan (MWH, 2013 [2013 MC/GH WMP]) and subsequent MCSB Alternative Plan(s) have successfully achieved the goal of maintaining average groundwater levels above 2009 levels; modeled groundwater-storage changes are evaluated in Section 5.7.3.1.

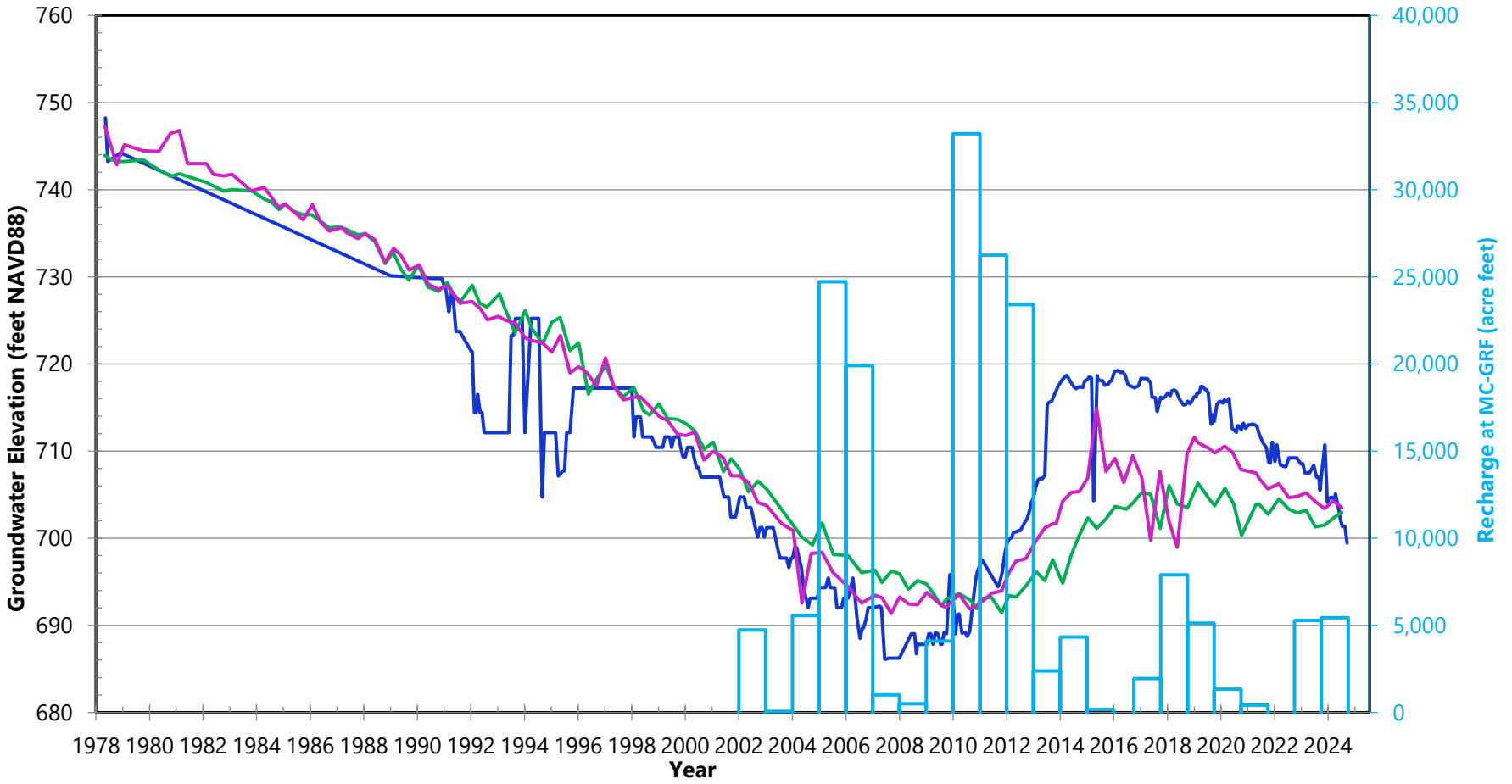
[5] In WY 2024–2025, 10,204 AF was delivered to the MC-GRF for groundwater replenishment. WY2024-2025 groundwater replenishment is outside of the review period for this 2027 MCSB Update but is included for completeness and is accurately reflected in the forecast groundwater modeling.




**Notes:**
Replenishment by calendar year through 2015 and water year thereafter
No recharge occurred from January 2016 to October 2016
No recharge occured in water year 2021-2022
MC GRF = Mission Creek Groundwater Replenishment Facility
NGVD88 = National Geodetic Vertical Datum 1988

HYDROGRAPH OF WELL NEAR MC GRF AND ANNUAL GROUNDWATER REPLENISHMENT AT THE MC GRF
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 4/13/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-9 |




**Notes:**

Replenishment by calendar year through 2015 and water year thereafter

No recharge occurred from January 2016 to October 2016 nor during water year 2021-2022

MC-GRF = Mission Creek Groundwater Replenishment Facility

NGVD88 = National Geodetic Vertical Datum 1988

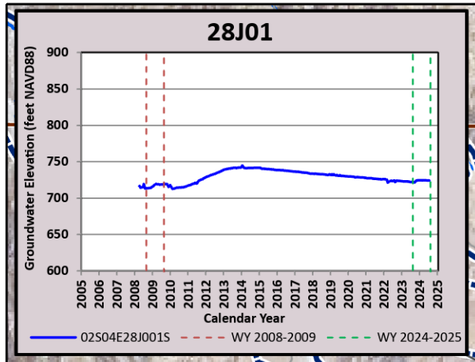
HYDROGRAPHS OF WELLS WITH GROUNDWATER REPLENISHMENT AT THE MC-GRF

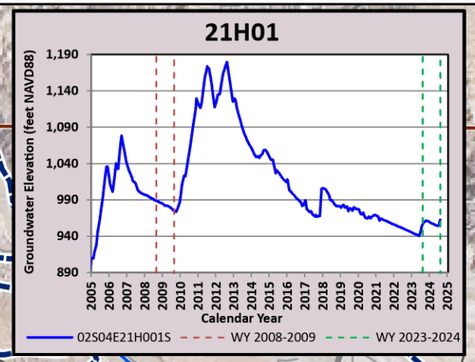
Mission Creek Alternative Update

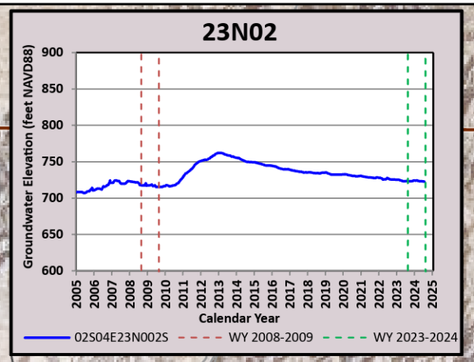
Coachella Valley, California

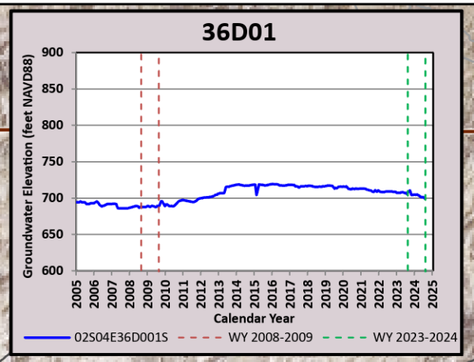
| By: | dmf | Date: | 04/13/2026 | Project No.: | US0043968.2616 |
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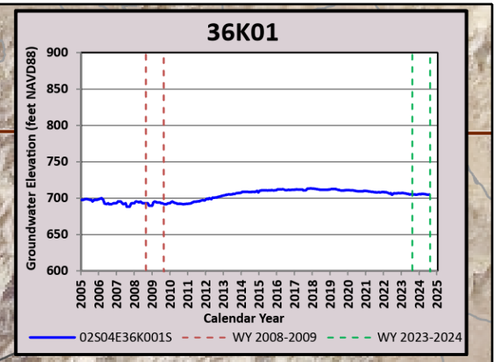
Figure 4-10

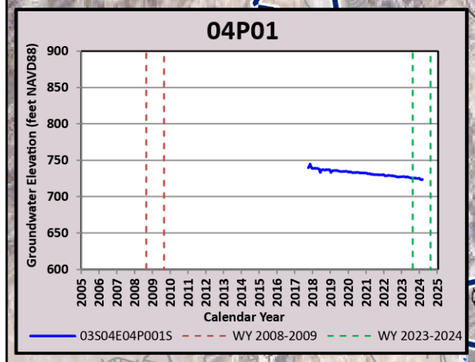


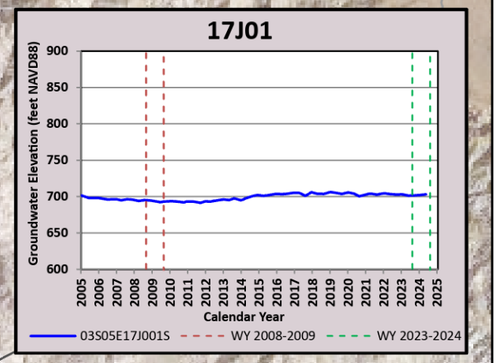



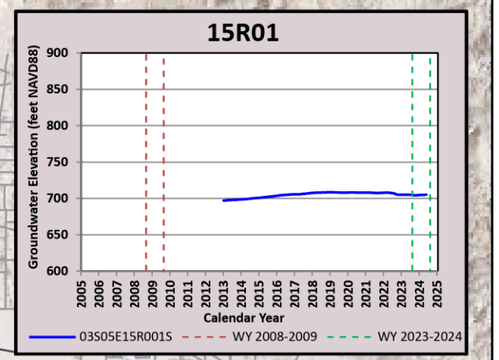



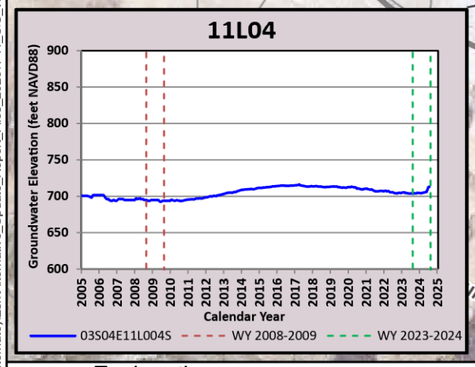



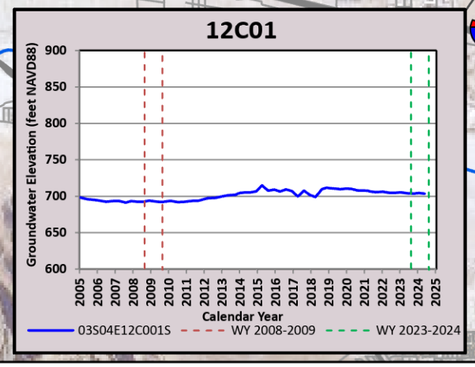




Mission Creek

Mission Creek Groundwater Replenishment Facility

Desert Hot Springs

Little San Bernardino Mountains

62

10

-24.1
-27.5
6.1
9.6
5.7
15.7
12.5
NA
11
12
15.6
12
9.8
NA
8.9
NA
1.6
-20
-10
0
10
5
15
10
5

## 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.

0 4,000 8,000
Feet

## Explanation

- Groundwater Replenishment Facility
- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Other - Non Key Well
- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Change in average water level (feet)
- Stream
- Highway/road
- >15 foot increase
- >10 to 15 foot increase
- >5 to 10 foot increase
- 0 to 5 foot increase
- 0 to 10 foot decrease
- >10 to 20 foot decrease
- > 20 foot decrease
- Water Level hydrograph for well indicated
- Water year (WY) 2023-2024
- Water year (WY) 2008-2009
- * Water level data not available

Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018.

# CHANGE IN GROUNDWATER STORAGE WY 2008-2009 TO WY 2023-2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 6/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-11 |

Date: 9/15/2026 Printed by: USMW719917
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# 4.6 Groundwater Quality

This report section updates the water quality evaluation presented in the 2022 Alternative Plan Update and includes a review of regional groundwater quality and known contaminant plumes in the Planning Area. The regional water quality review is based on the State Water Resources Control Board (SWRCB) database for water supply (SWRCB, 2025) and on information provided by the Agencies. For known contaminant plumes, the California Groundwater Ambient Monitoring and Assessment Program (GAMA),[6] and the SWRCB and California Department of Toxic Substances Control's databases of contaminated sites (GeoTracker[7] and EnviroStor[8], respectively), were reviewed for sites with contaminants that have impacted groundwater. The regional groundwater quality review and contaminated sites review are summarized below.

## 4.6.1 Regional Groundwater Quality

Water quality is summarized for selected parameters considered potential constituents of concern based on current or historical concentrations approaching or exceeding SWRCB Division of Drinking Water (SWRCB-DDW) primary California drinking water standards or maximum contaminant levels (MCLs) for drinking water in the Coachella Valley Groundwater Basin. These constituents include arsenic, fluoride, uranium, and nitrate. The SWRCB-DDW promulgated a 10 micrograms per liter (10 µg/L) MCL for hexavalent chromium (also known as Cr-6) effective October 1, 2024 (SWRCB, 2024a). Although the new MCL became effective at the beginning of WY 2024-2025, it is included in this 2027 MCSB Update because it applies to all future drinking water quality compliance thresholds. Total dissolved solids (TDS) were also considered a constituent of concern as described in greater detail below.

For regional groundwater quality, data used were from wells listed in the SWRCB drinking water database (SWRCB, 2025) for active and inactive permitted water sources that report to the state. This eliminates water quality data from environmental sites (discussed in Section 4.6.2) and non-drinking water monitoring wells. These data provide the best representation of the general water quality of the main aquifers used for drinking water supply. Data were from wells in the MCSB and one well located in the GHSA. The only wells identified in the Indio Hills portion of the MCSB were monitoring wells associated with the former Edom Hill Landfill[9] (discussed further in Section 4.6.2).

### Total Dissolved Solids

TDS are a measure of the combined amount of inorganic salts dissolved in water. No fixed Consumer Acceptance Contaminant Level has been established for TDS. Instead, TDS is regulated by Secondary Maximum Contaminant Levels (SMCLs), or Consumer Acceptance Contaminant Level Ranges for TDS, set by the SWRCB: a recommended 500 milligrams per

[6] https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/Default.asp
[7] https://geotracker.waterboards.ca.gov/
[8] https://www.envirostor.dtsc.ca.gov/public/
[9] Data for these monitoring wells were obtained from the GAMA, GeoTracker, and EnviroStor databases.

liter (mg/L) level, an upper 1,000 mg/L level, and a short-term 1,500 mg/L limit (SWRCB, 2024c). While primary MCLs are health-based standards, SMCLs, such as those for TDS, are based on aesthetic concerns (e.g., taste, color, and odor).

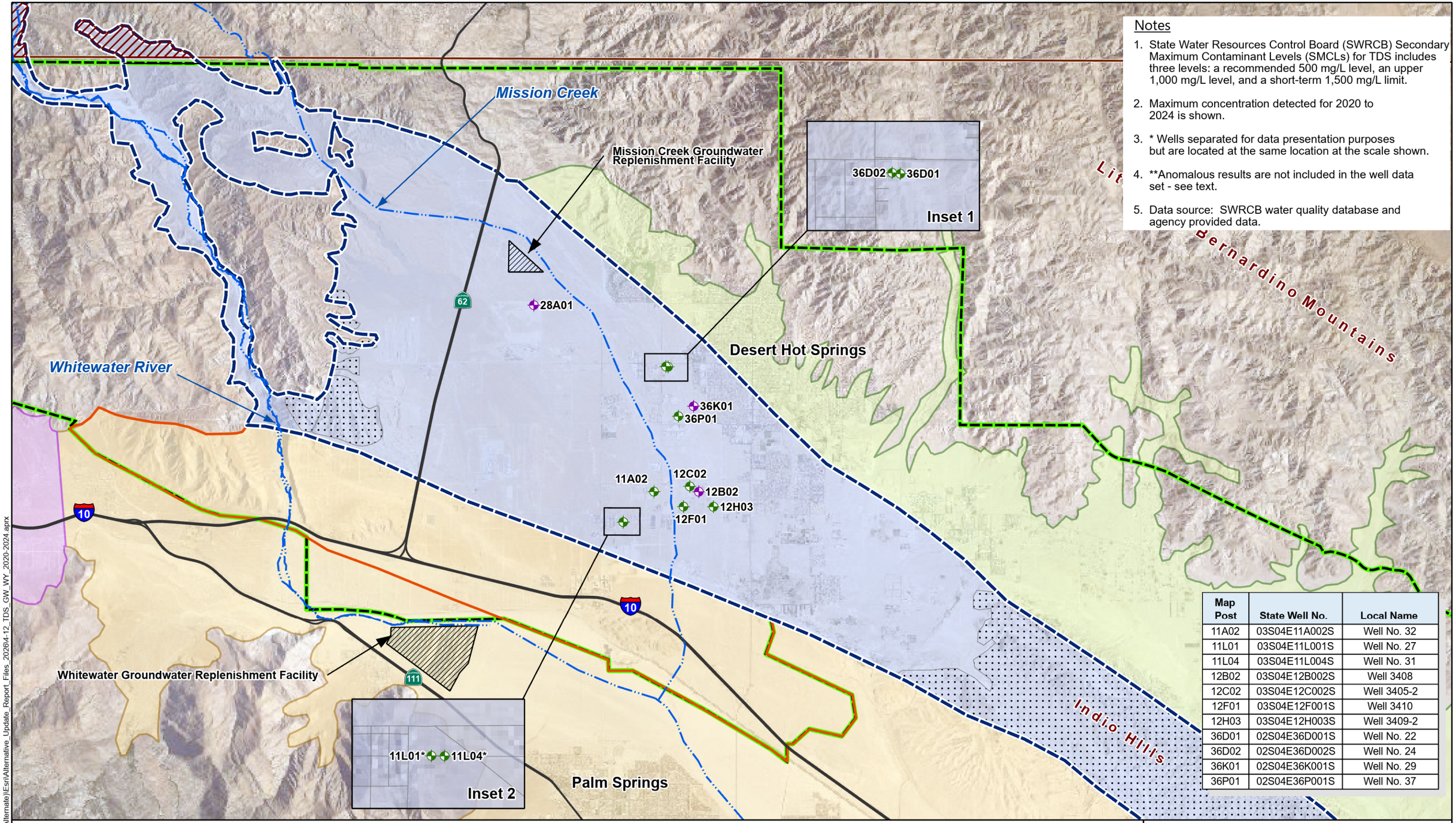
Sources of TDS in the Planning Area include return flows from agricultural and landscape irrigation, recharge of imported water, percolation of wastewater from septic systems and wastewater treatment plants, and underflow of groundwater with elevated TDS from the DHSSB. The locations of municipal supply production wells in the MCSB with TDS data reported in the SWRCB drinking water database between WY 2019-2020 and WY 2023-2024 are shown on **Figure 4-12**. TDS concentrations ranged from 270 mg/L to 690 mg/L.[10] Data indicate that groundwater from wells 03S04E12B002S (12B02), 02S04E28A001S (28A01), and 02S04E36K01S (36K01), have TDS concentration between 500 mg/L and 1,000 mg/L. Except for well 12B02 and 12F01, these wells are located in the northern part of the MCSB and closer to the Mission Creek Fault than the other wells with TDS data above 500 mg/L. Well 28A01 is located hydraulically downgradient of the MC-GRF at a distance of approximately 0.5 miles.

**Figure 4-13** shows TDS concentration trends for selected wells during the period of 1995 to 2024. Wells in the central part of the MCSB, including 03S04E11A002S (11A02), 03S04E11L001S (11L01), 03S04E11L004S (11L04), 03S04E12F001S (12F01), 03S04E12H003S (12H03), generally indicate lower and more stable TDS concentrations in the range of 270 mg/L to 390 mg/L (excluding one result each of elevated TDS for 11L04 in February 2005 and 12H03 in October 2017). Well 03S04E12B002S (12B02) is an exception to lower TDS concentrations in the central part of the MCSB. TDS in well 12B02 has exceeded 500 mg/L since 2007. Wells in the northern part of the MCSB and closer to the Mission Creek Fault (28A01, and 36K01) generally indicate higher TDS concentrations with increasing concentration trends over time. Well 28A01 is located hydraulically downgradient of the MC-GRF. **Figure 4-13** also shows MWD annual average TDS concentrations in CRA water, the source of groundwater replenishment water to MC-GRF, at the nearest sample location (San Jacinto Tunnel West) derived from selected MWD annual reports (MWD, 2010, 2014, 2017, and 2020) or provided by MWD (MWD, 2022a, 2022b, 2023, and 2024).

The average TDS for CRA water was 670 mg/L in 2000 (MWD, 2000), but has decreased in more recent years to as low as 570 mg/L.

As shown on **Figure 4-13**, CRA water used for recharge in the MCSB generally has higher TDS concentrations than local groundwater. Use of CRA water involves salt loading to the MCSB and local increases in TDS concentrations. CVWD and DWA have investigated alternatives including direct importation and recharge of lower TDS SWP water at the MC-GRF. Direct importation of SWP, however, would require extensive construction for a conveyance pipeline from western Riverside County. The project would involve significant cost, technical constraints, environmental constraints/impacts, and would result in only limited benefits.

[10] Two results were removed from the data set based on clear inconsistency with historical trends and the most recent analyses conducted in 2020. These results include 570 mg/L for well 03S04E12F001 (12F01) in October 2019 and 670 mg/L for well 03S04E12B002S (12B02) in December 2019.




## Notes

1. State Water Resources Control Board (SWRCB) Secondary Maximum Contaminant Levels (SMCLs) for TDS includes three levels: a recommended 500 mg/L level, an upper 1,000 mg/L level, and a short-term 1,500 mg/L limit.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. **Anomalous results are not included in the well data set - see text.
5. Data source: SWRCB water quality database and agency provided data.

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

## Explanation

- Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Total Dissolved Solids (TDS), in milligrams per liter (mg/L)

- 200.0 - 500.0
- 500.1 - 700.0

0 4,000 8,000 Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA. Water.CA.gov.

N

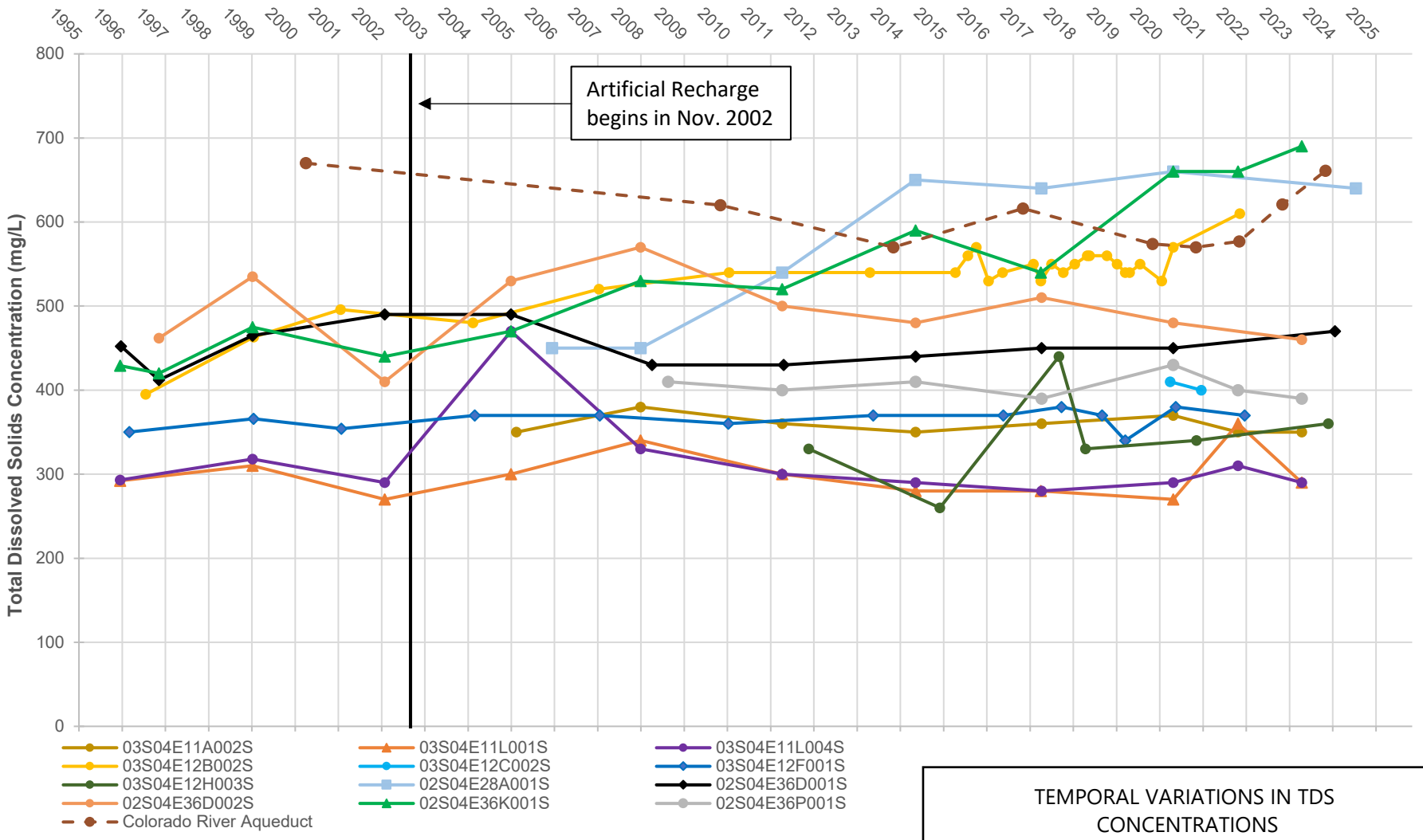
# TDS CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

wsp

Figure 4-12

Date: 9/15/2026 Printed by: USMW719917
Path: Y:\CM\19167351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_2026\4-12_TDS_GW_WY_2020-2024.aprx




Abbreviations:
mg/L = milligrams per liter; TDS = Total Dissolved Solids

Note:
Plot does not show anomalous TDS results of 570 mg/L for well 03S04E12F001 in October 2019 and 670 mg/L for well 03S04E12B002S in December 2019.

TEMPORAL VARIATIONS IN TDS CONCENTRATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf/grr | Date: 07/21/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-13 |

In addition, direct importation of SWP water would most likely result in the loss of approximately 100,000 AFY of CRA water that results from the exchange of SWP water for CRA water from MWD. Another alternative considered involves salt removal prior to recharge using reverse osmosis. This alternative has its own constraints including permitting, environmental, technical, and financial feasibility issues. TDS (salinity) management of the Colorado River is ongoing through the Colorado River Basin Salinity Control Program (Program), a cooperative watershed effort among several federal agencies and seven states. The Program has established numeric criteria for salinity, adopted by the seven basin states and approved by the United States Environmental Protection Agency. **Figure 4-14** which was reproduced from the Colorado River Basin Salinity Control Forum (2023), shows the numeric criteria and the flow-weighted average annual TDS concentrations at three numeric criteria stations: Below Hoover, Below Parker, and at Imperial. Below Hoover is the farthest upstream of the stations and has the lowest average TDS. Imperial is the farthest downstream of the stations and has the highest average TDS. Below Parker station is the station most representative of CRA water quality as the intake to the CRA is located at Lake Havasu, created by the construction of Parker Dam. **Figure 4-14** shows that the flow weighted Average Annual TDS concentrations at the numeric criteria stations have decreased since the 1970s with increasing and decreasing trends occurring on a roughly 12- to 14-year cycle. TDS concentrations have been well below their numeric criteria for salinity since the mid-1980s as shown on **Figure 4-14**. The overall decreasing TDS concentrations reflect work accomplished by the Program, which has included construction of salinity control measures (e.g., preventing inflow to the river from saline springs and plugging of abandoned, flowing oil and gas wells), advancement of policies for effluent limitation (e.g., policies addressing discharges from fish hatcheries), and implementation of non-point source management plans (e.g., improved irrigation practices). Through these efforts, the Program has successfully controlled over 1.3 million tons of salt annually (Colorado River Basin Salinity Control Forum, 2023).

Beginning in 2002 (the first year of recharge at MC-GRF), Below Parker station has shown average TDS concentrations ranging from about 570 mg/L to about 670 mg/L. From 2015 through the end of 2018, the average TDS concentration at Below Parker station was on a downward trend. Average TDS concentrations have been relatively stable at approximately 580 mg/L from the beginning of 2019 through the end of 2021. The overall decreasing concentration trend for average TDS concentrations is consistent with concentrations shown for the CRA on **Figure 4-13** (note that data shown on **Figure 4-13** was based on sampling from the San Jacinto Tunnel West and **Figure 4-14** is from Below Parker station; variability is expected).

TDS loading throughout the Coachella Valley region is being addressed in the Coachella Valley Salt & Nutrient Management Plan process currently underway.

### Nitrate as N

Nitrate in groundwater is usually associated with wastewater from septic tanks, disposal from wastewater treatment plants, or fertilizer application. The SWRCB MCL for nitrate is 10 mg/L when measured as nitrogen (N) and 45 mg/L when measured as nitrate. Nitrate as N is used for nitrate concentrations in this report. The locations of wells with nitrate data reported in the SWRCB drinking water database between 2015 and 2024 are shown on **Figure 4-15**. Concentrations ranged from 0.44 mg/L to 2.5 mg/L (Nitrate as N) over this period, indicating that available results from the wells were all significantly below the MCL for nitrate. Data from one well (03S04E11A02) was reported as non-detect for Nitrate as N at a reporting limit of 0.4 mg/L. These wells are qualified with non-detect (ND) on **Figure 4-15**.

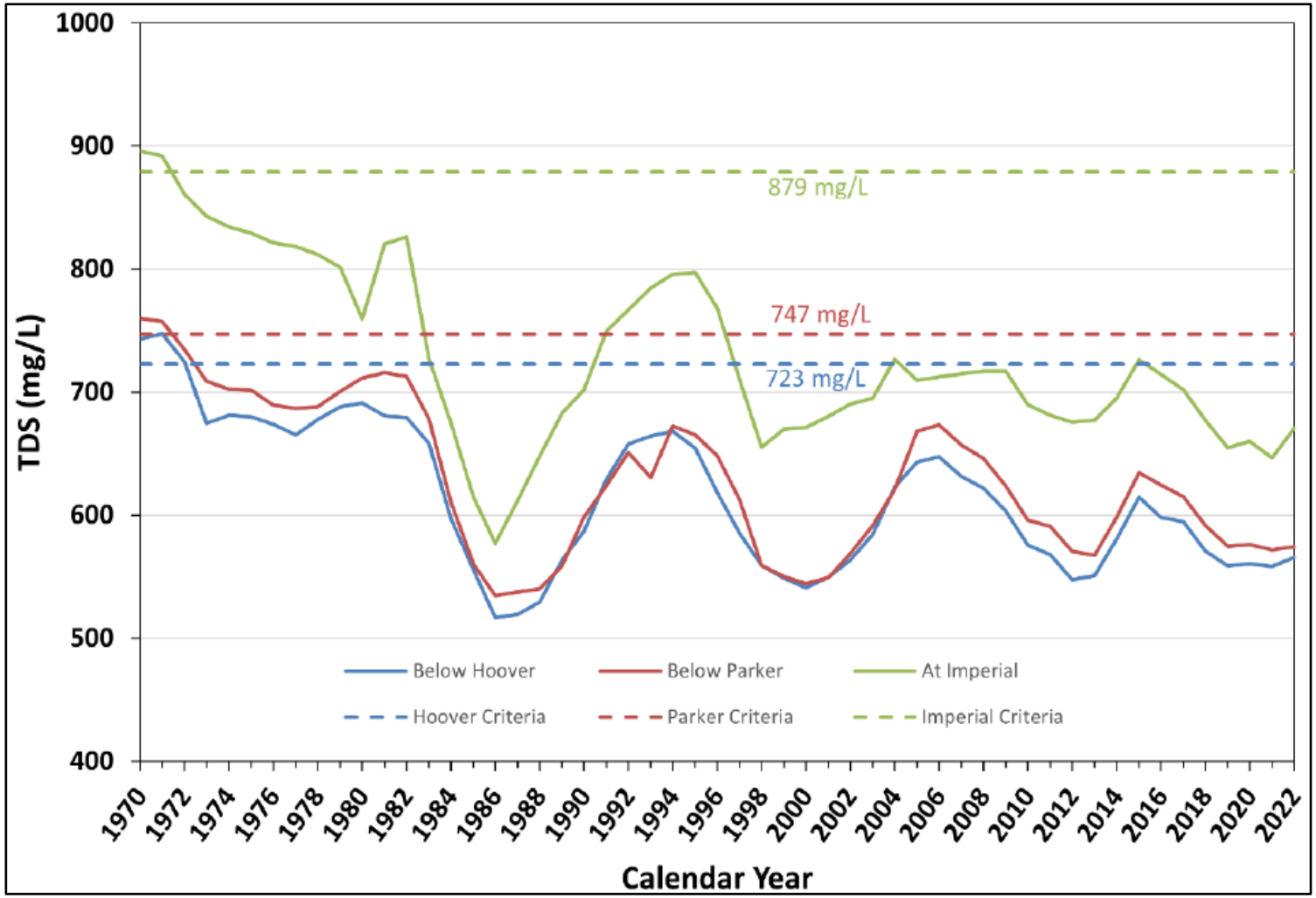
**Figure 4-16** shows nitrate concentration temporal variation plots for selected wells for the period 1995 to 2024. In general, nitrate concentrations appear to be relatively stable in the range of approximately 0.5 to 1.5 mg/L Nitrate as N, with a few exceptions for 11L01 and one anomalous value of 2.5 mg/L for well 12B02. All results are well below the MCL. The concentrations of Nitrate as N in CRA water ranged from 0.23 mg/L to 0.47 mg/L from 2010 to 2024 (MWD, 2010, 2014, 2017, 2020, 2022a, 2022b, 2023, and 2024).

Nitrate loading throughout the Coachella Valley region is being addressed in the Coachella Valley Salt & Nutrient Management Plan process currently underway.

### Arsenic

Arsenic is a naturally occurring groundwater quality constituent in the Planning Area with a SWRCB MCL of 10 µg/L. The locations of wells with arsenic data reported in the SWRCB drinking water database between 2020 and 2024 are shown on **Figure 4-17**. All wells indicated non-detect for arsenic at the laboratory reporting limit of 2 µg/L.

**Figure 4-18** is a temporal variation plot of arsenic concentrations for wells with laboratory analyses from 2011 to 2024. Arsenic was not detected in any of the wells over this period (reporting limits ranged from 1 µg/L to 2 µg/L). Note that with the exception of 12C02, individual wells are not distinguishable on **Figure 4-18** because all of the data are non-detect and fall on the 2 µg/L line. The figure is still useful to show the temporal distribution of non-detect results. It is also useful to show the downward trend of arsenic concentrations in CRA water for the period of 2010 to 2020, which ranged from 2.3 µg/L to 3.0 µg/L (MWD, 2010, 2014, 2017, and 2020; MWD, 2026).

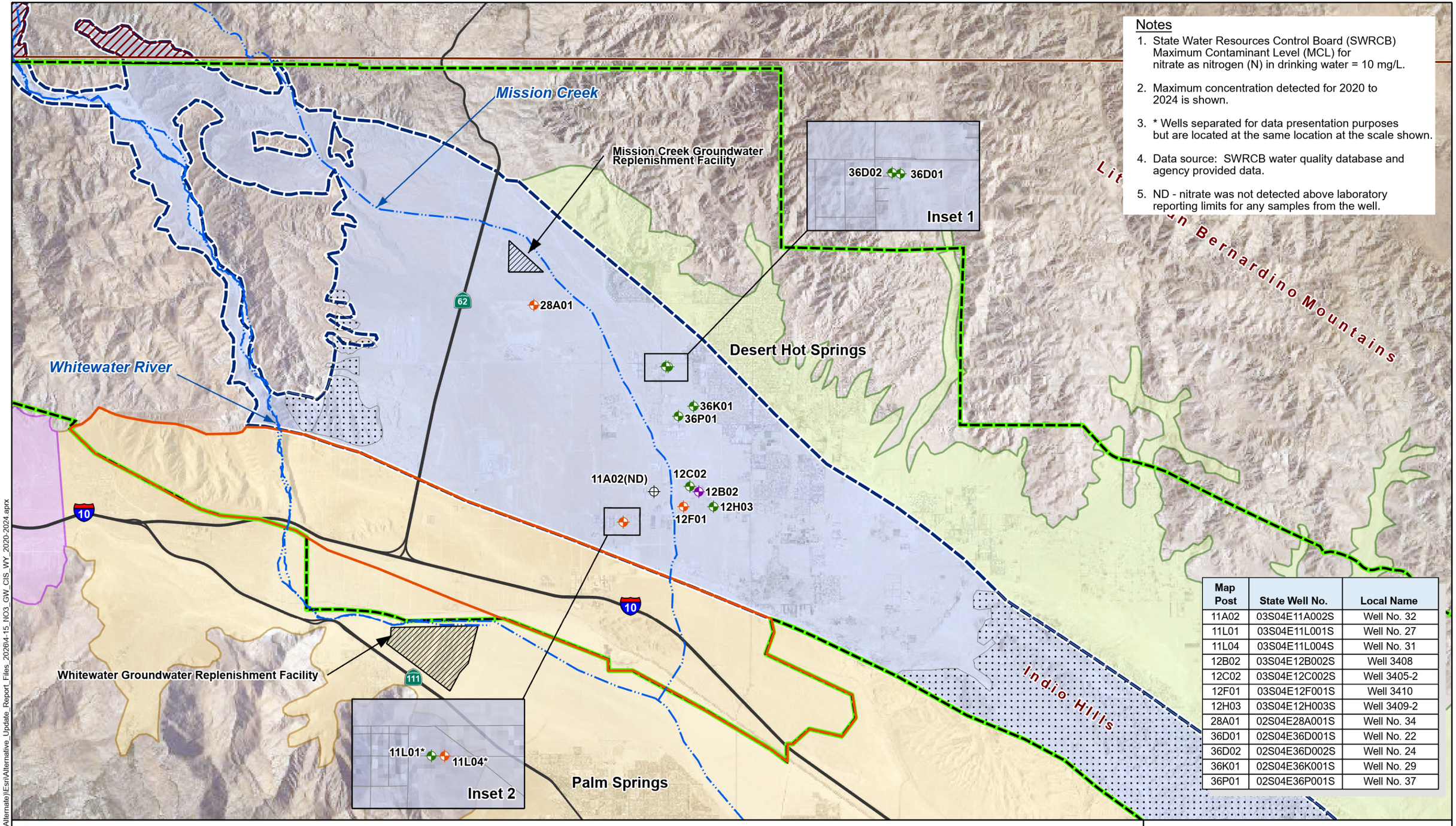



Abbreviations:
mg/L = milligrams per liter
TDS = Total Dissolved Solids

Source: Colorado River Basin Salinity Control Forum, 2023.

FLOW WEIGHTED AVERAGE ANNUAL TDS CONCENTRATIONS AT COLORADO RIVER NUMERIC CRITERA STATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: grr | Date: 05/18/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-14 |




## Notes

1. State Water Resources Control Board (SWRCB) Maximum Contaminant Level (MCL) for nitrate as nitrogen (N) in drinking water = 10 mg/L.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. Data source: SWRCB water quality database and agency provided data.
5. ND - nitrate was not detected above laboratory reporting limits for any samples from the well.

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

## Explanation

- Facility Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Nitrate (N), in milligrams per liter (mg/L)

- Non detect (ND)
- <= 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0

0 4,000 8,000
Feet

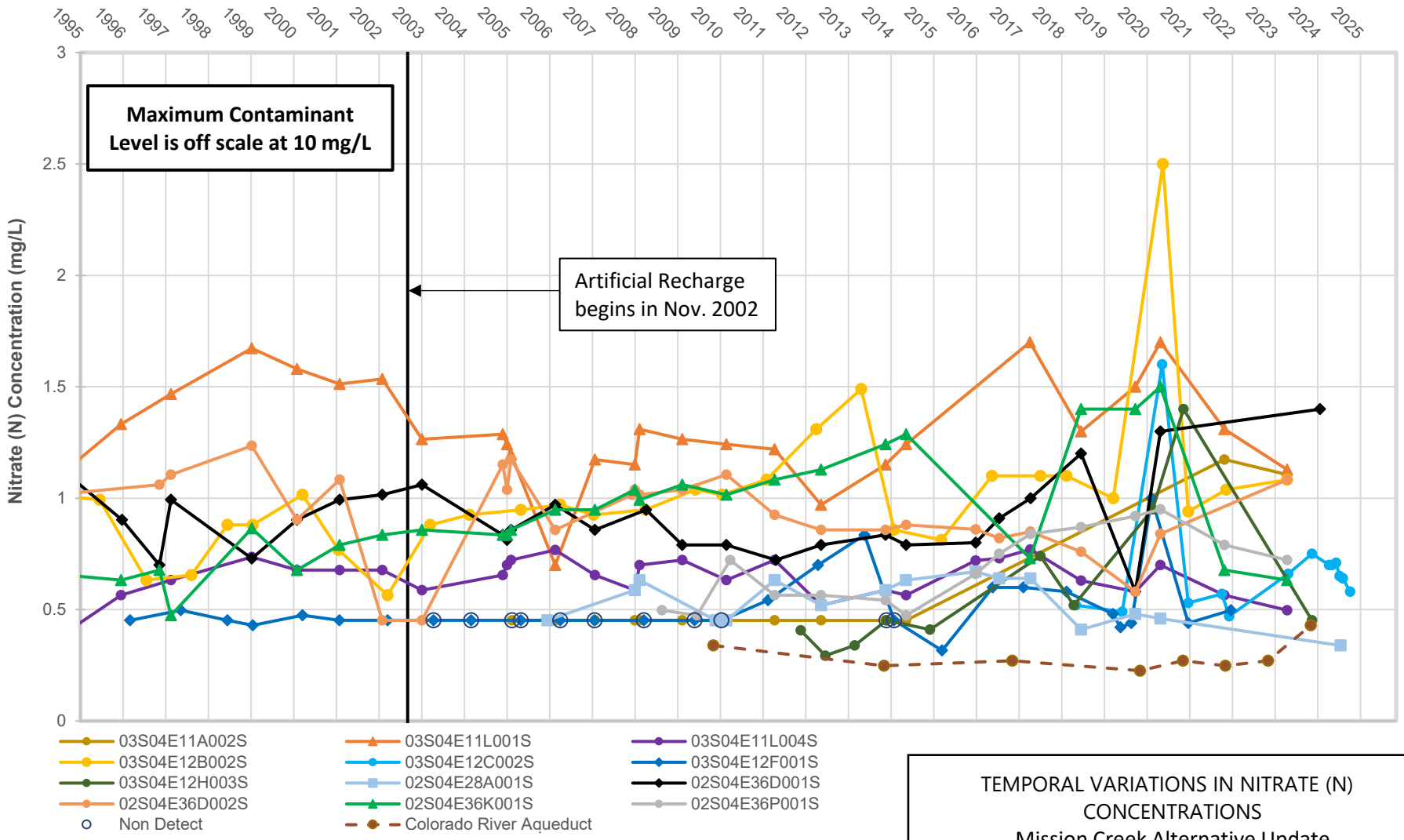
Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA: Water.CA.gov.

N

# NITRATE (N) CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | Figure | 4-15 |

Date: 9/15/2026 Printed by: USMW719917
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Abbreviations:
mg/L = milligrams per liter
Nitrate (N) = Nitrate as Nitrogen

Note:
Open circles over a data point indicate not detected at the laboratory reporting limit. Elevated non-detections of 5 mg/L are not shown.

TEMPORAL VARIATIONS IN NITRATE (N) CONCENTRATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf/grr | Date: 07/21/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-16 |

## Notes

1. State Water Resources Control Board (SWRCB) Maximum Contaminant Level (MCL) for arsenic in drinking water = 10 µg/L.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. Data source: SWRCB water quality database and agency provided data.
5. ND - Arsenic was not detected above laboratory reporting limits for any samples from the well.

Mission Creek

Mission Creek Groundwater Replenishment Facility

Whitewater River

Whitewater Groundwater Replenishment Facility

28A01(ND)

36D02 (ND) 36D01 (ND)

Inset 1

Desert Hot Springs

36K01(ND)
36P01(ND)

11A02(ND)
12C02
12B02(ND)
12H03(ND)
12F01(ND)

11L01 (ND)* 11L04 (ND)*

Inset 2

Palm Springs

Indio Hills

San Bernardino Mountains

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

Explanation

- Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Arsenic in micrograms per liter (µg/L)

- Non detect (ND)

0 4,000 8,000
Feet

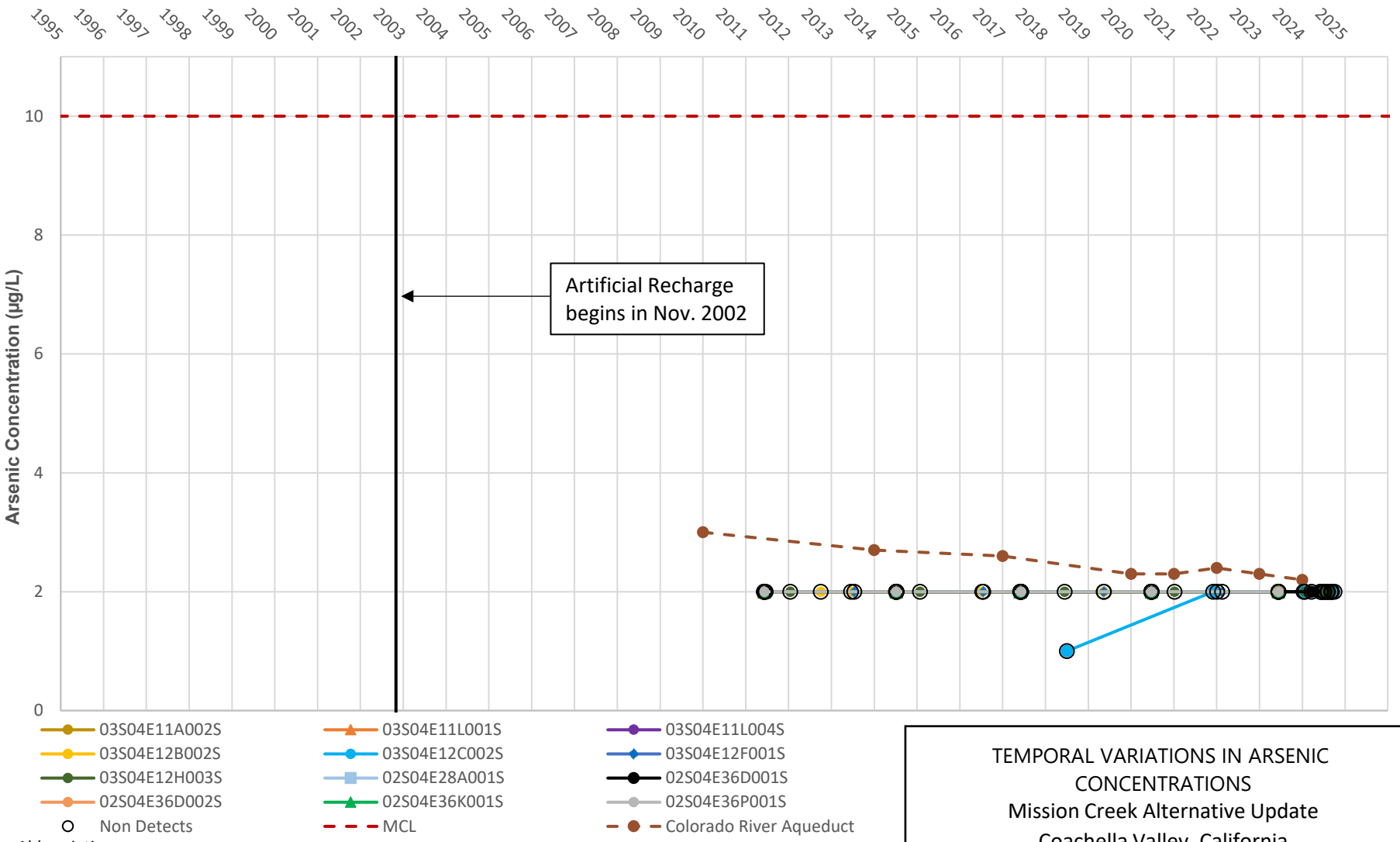
Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA: Water.CA.gov.

N

# ARSENIC CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | Figure | 4-17 |

Date: 9/15/2026 Printed by: USMW719917
Path: Y:\CM\19167351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_2026\4-17_Arsenic_GW_CIS_WY_2020-2024.aprx




Abbreviation:
µg/L = micrograms per liter; MCL= Drinking water maxium contaminant level

Note:
Open circles over a data point indicate not detected at the laboratory reporting limit.

TEMPORAL VARIATIONS IN ARSENIC CONCENTRATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf/grr | Date: 07/01/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-18 |

## Fluoride

Fluoride is a naturally occurring groundwater quality constituent in the Planning Area with a SWRCB MCL of 2 mg/L (SWRCB 2024b). The locations of wells with fluoride data reported in the SWRCB drinking water database between 2020 and 2024 are shown on **Figure 4-19**. Concentrations ranged from 0.26 mg/L to 0.71 mg/L over this period.

**Figure 4-20** is a temporal variation plot of fluoride concentrations for the period 1995 to 2024 for selected wells. Concentrations of fluoride have remained fairly stable over time. Fluoride concentrations in CRA water over the period of 2010 to 2024 were consistently 0.3 mg/L (MWD, 2010, 2014, 2017, 2020, 2022a, 2022b, 2023, and 2024), which is lower than the concentrations in the wells in the area.

## Hexavalent Chromium

Chromium is a metal that occurs in the environment as soluble hexavalent chromium (chromium VI or Cr-6) and the less soluble trivalent chromium (chromium III or Cr-3). Statewide and regional studies of chromium speciation in domestic and public-supply wells show that in alluvial aquifers of southern California deserts, most dissolved chromium in groundwater is present as hexavalent chromium derived from oxidation of chromium-bearing minerals in aquifer sediments with long groundwater residence times (Izbicki and others, 2015; MWH, 2013). Although these statewide and regional studies are not limited to the MCSB, they indicate that in desert alluvial basins like the MCSB, elevated hexavalent chromium is expected where groundwater has interacted for long periods with chromium-bearing minerals derived from the surrounding bedrock.

Prior to October 1, 2024, the SWRCB set an MCL for total chromium (combined hexavalent chromium and trivalent chromium) at 50 µg/L. As of October 1, 2024, the SWRCB also established a separate MCL for hexavalent chromium of 10 µg/L (SWRCB 2024a). The locations of wells with hexavalent chromium concentration data reported in the SWRCB drinking water database between 2020 and 2024 are shown on **Figure 4-21.** Hexavalent chromium concentrations ranged from 1.2 µg/L to 23 µg/L over this period.

**Figure 4-22** shows temporal variation plots of hexavalent chromium concentrations for the period of 1995 to 2024 for selected wells, although the data only extends back to 2000. The available data suggest that hexavalent chromium concentrations are variable over the short-term, but relatively stable over time, that is no clear increasing or decreasing trend in concentrations. The approach for evaluating Cr(VI) under this Alternative is described in Section 6.6. Cr(VI) was not detected in CRA water at a laboratory reporting limit of 0.03 µg/L for the period of 2010 to 2023 and a detection limit of 0.04 µg/L in 2024 (MWD, 2010, 2014, 2017, and 2020; MWD, 2026).

## Uranium

Uranium is a naturally occurring radionuclide in the Planning Area with a SWRCB MCL of 20 picocuries per liter (pCi/L). GSi/water conducted an initial investigation of uranium sources in MSWD wells and observed that based on geomorphology, potential sources of uranium may include the Dry Morongo Creek and Big Morongo Creek watersheds, and the southern base of the San Bernardino Mountains (GSi/water, 2011). The locations of wells with uranium activity data reported in the SWRCB drinking water database between 2020 and 2024 are shown on **Figure 4-23**. Uranium activity ranged from 2.08 pCi/L to 15 pCi/L for this period; all below the MCL.

**Figure 4-24** shows temporal variation plots of uranium activity from 1995 to 2024 for selected wells. In general, uranium activity appears to be stable over the long-term with the exception of well 28A01, which indicates a clear decreasing trend of uranium activity beginning about 2012 and stabilizing shortly thereafter. Well 28A01 is located hydraulically downgradient of the MC-GRF (**Figure 4-24**). The concentration decrease may be related to groundwater replenishment through recharge of imported water beginning in 2002. Uranium activity in CRA water for the period of 2010 to 2023 ranged from 1.8 pCi/L to 3 pCi/L (MWD, 2010, 2014, 2017, 2020, 2021, and 2024b). Uranium activity for 2020 and 2023 is based on the average of quarterly sample results collected from Lake Havasu.

Notes

1. State Water Resources Control Board (SWRCB) Maximum Contaminant Level (MCL) for fluoride in drinking water = 2.0 mg/L.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. Data source: SWRCB water quality database and agency provided data.

Mission Creek

Mission Creek Groundwater Replenishment Facility

Whitewater River

Whitewater Groundwater Replenishment Facility

Desert Hot Springs

Palm Springs

Little San Bernardino Mountains

Indio Hills

36D02(ND) 36D01

Inset 1

11L01* 11L04*

Inset 2

28A01

36K01

36P01

11A02

12C02

12B02

12H03

12F01

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

Explanation

- Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Flouride, in milligrams per liter (mg/L)

- <=0 .5
- 0.5 - 0.75

0 4,000 8,000 Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA: Water.CA.gov.

N

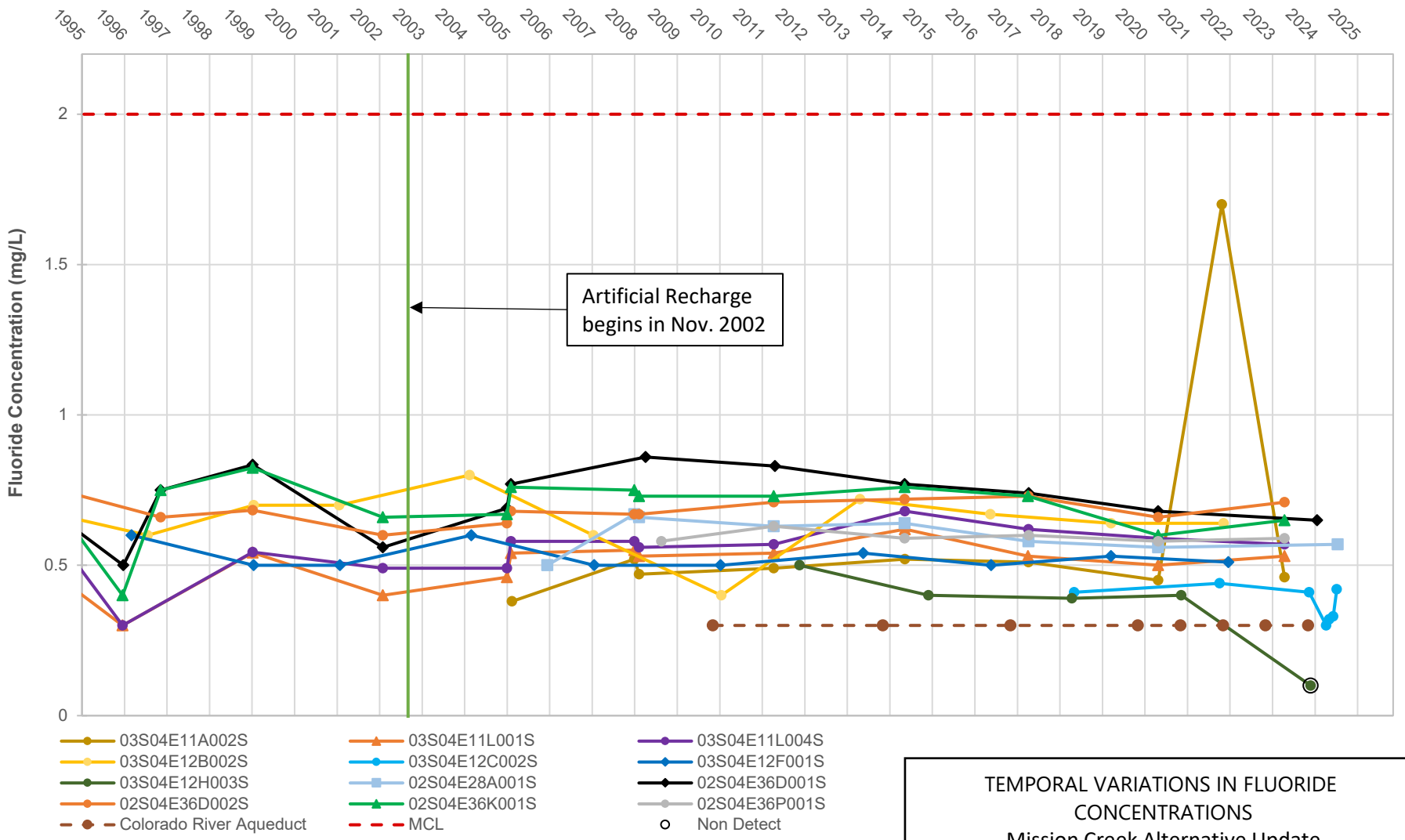
# FLUORIDE CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

wsp

Figure 4-19

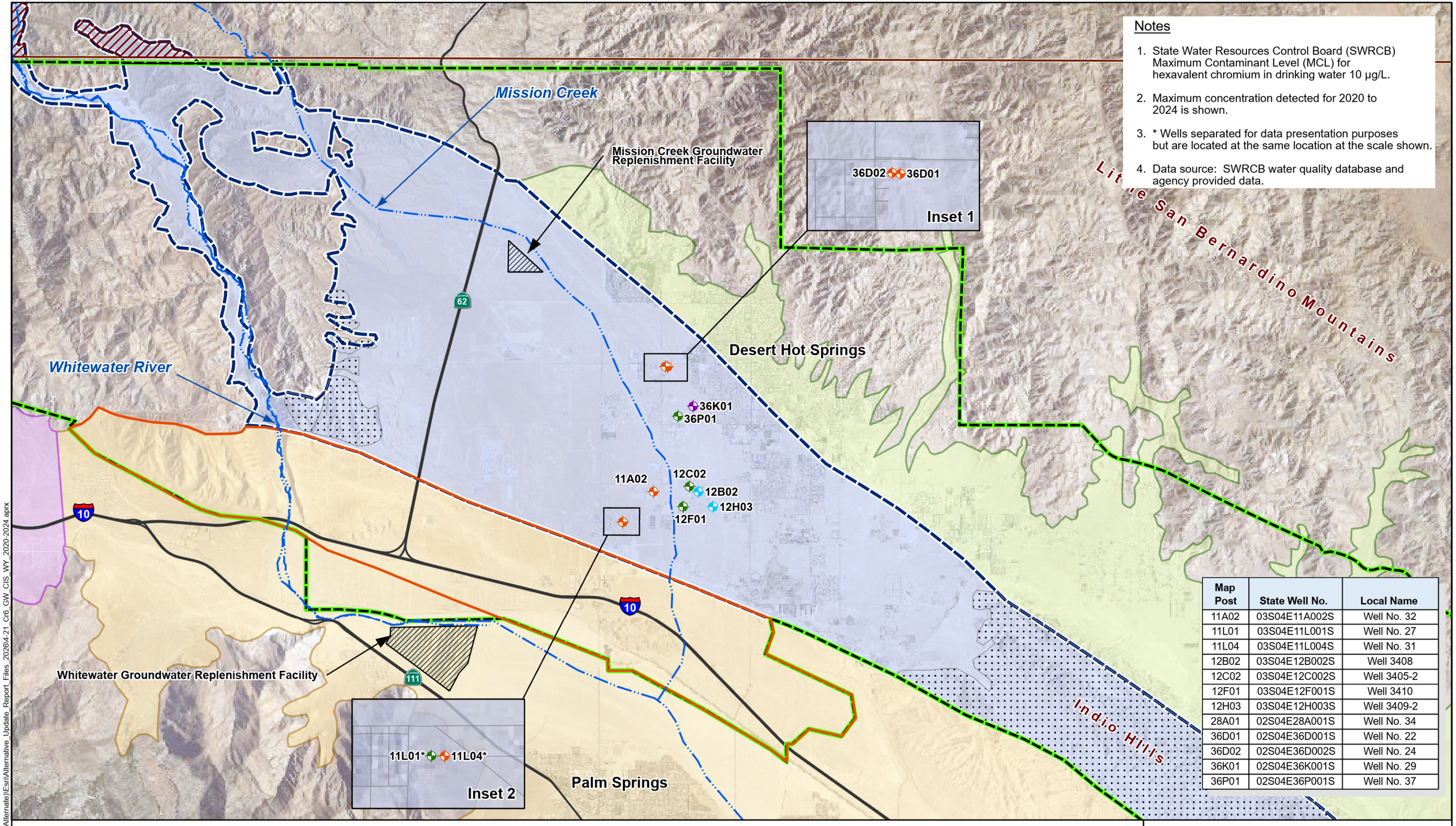
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Path: Y:\CM\19167351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_20264-19_Fluoride_GW_CIS_WY_2020-2024.aprx




Abbreviation:
mg/L = milligrams per liter; MCL = maximum contaminant level in drinking water

TEMPORAL VARIATIONS IN FLUORIDE CONCENTRATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf | Date: 07/21/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 4-20 |




Notes

1. State Water Resources Control Board (SWRCB) Maximum Contaminant Level (MCL) for hexavalent chromium in drinking water 10 µg/L.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. Data source: SWRCB water quality database and agency provided data.

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

Explanation

- Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Hexavalent Chromium, in micrograms per liter (µg/L)

- <= 5.0
- 5.0 - 10
- 10 - 15
- 15 - 20
- 20 - 25

0 4,000 8,000
Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA: Water.CA.gov.

N

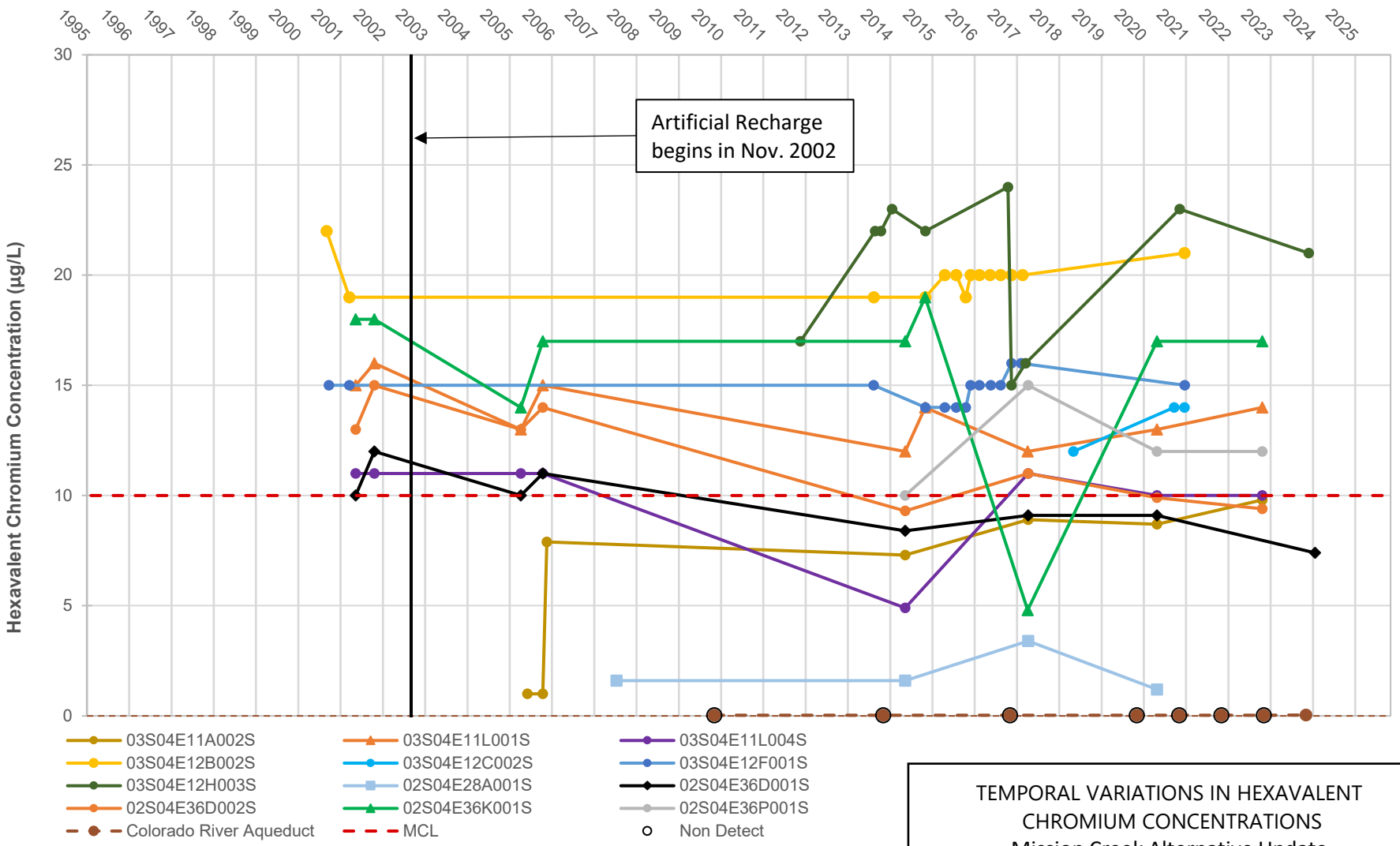
# HEXAVALENT CHROMIUM CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

wsp

Figure 4-21

Date: 9/15/2026 Printed by: USMW719917
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Abbreviation:
µg/L = micrograms per liter
Note: MCL = maximum contaminant level in drinking water
Concentrations for Colorado River Aqueduct reported as zero assumed to be detection limit of 0.03 ug/L

TEMPORAL VARIATIONS IN HEXAVALENT CHROMIUM CONCENTRATIONS
Mission Creek Alternative Update
Coachella Valley, California

| By: dmf/grr | Date: 07/21/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 4-22 |

Notes

1. State Water Resources Control Board (SWRCB) Maximum Contaminant Level (MCL) for uranium in drinking water = 20 pCi/L.
2. Maximum concentration detected for 2020 to 2024 is shown.
3. * Wells separated for data presentation purposes but are located at the same location at the scale shown.
4. Data source: SWRCB water quality database and agency provided data.

Mission Creek

Mission Creek Groundwater Replenishment Facility

Whitewater River

Whitewater Groundwater Replenishment Facility

Little San Bernardino Mountains

Indio Hills

Desert Hot Springs

Palm Springs

28A01

36D02 36D01

Inset 1

36K01 36P01

12C02 12F01 12B02 12H03

11L01* 11L04*

Inset 2

| Map Post | State Well No. | Local Name |
|---|---|---|
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L01 | 03S04E11L001S | Well No. 27 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C02 | 03S04E12C002S | Well 3405-2 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36D02 | 02S04E36D002S | Well No. 24 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 36P01 | 02S04E36P001S | Well No. 37 |

Explanation

- Facility
- Planning Area
- River/stream
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

Uranium, in picocurie per liter (pCi/L)

- <= 2.0
- 2.0 - 8.0
- 8.0 - 15
- 15 - 20

0 4,000 8,000 Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA: Water.CA.gov.

N

# URANIUM CONCENTRATIONS IN GROUNDWATER 2020 - 2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

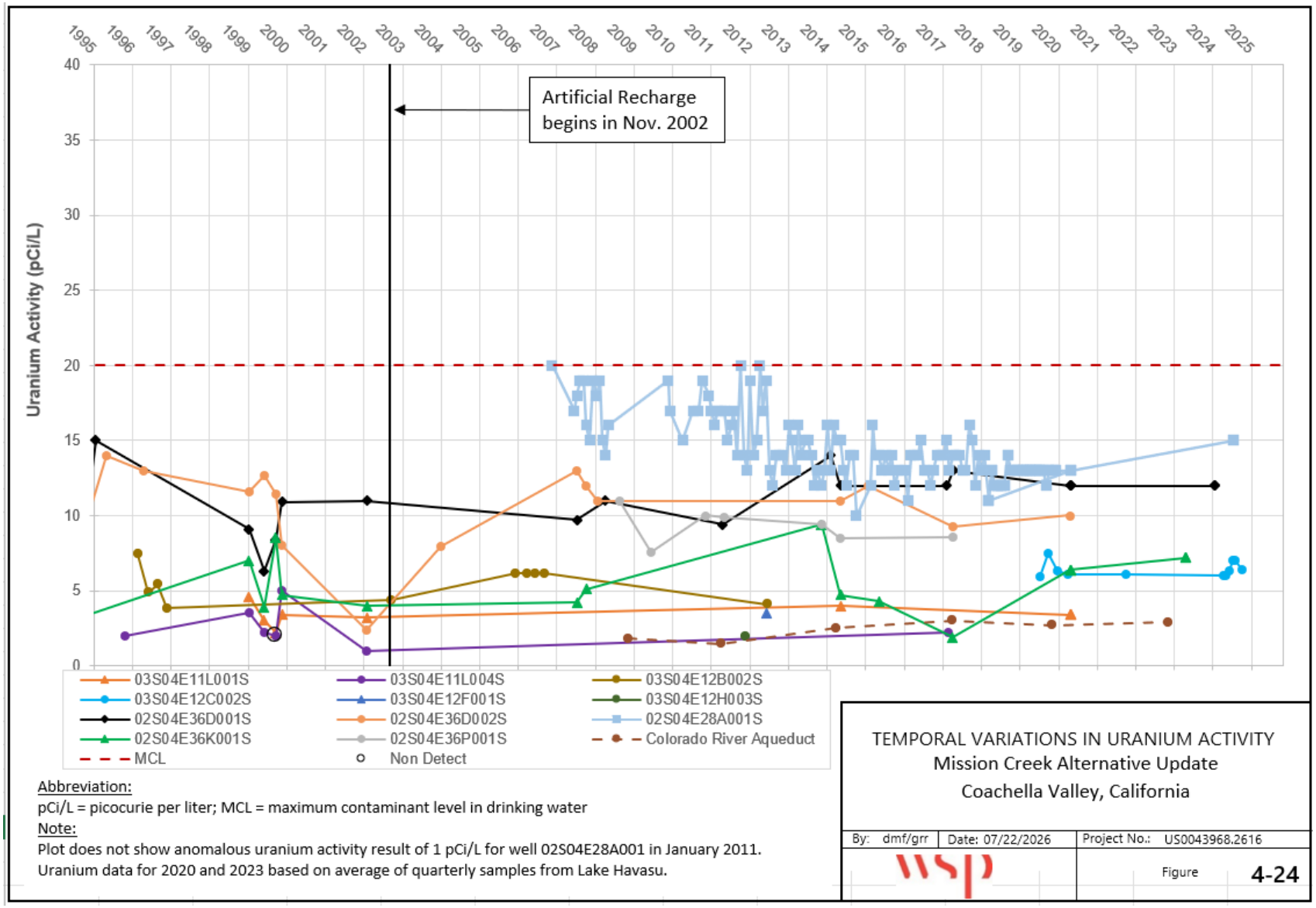
By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

wsp

Figure 4-23

Date: 9/15/2026 Printed by: USMW719917
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**Figure 4-24: Temporal Variations in Uranium Activity**



### 4.6.2 Known Environmental Sites with Groundwater Impacts

Within the study area, only one site is identified on the GeoTracker or EnviroStor websites as an open regulatory site with environmental impacts to groundwater. This site is the former Edom Hill Class III landfill (GeoTracker Global ID L10009373801),[11] located in the Indio Hills within the MCSB. Groundwater monitoring at this former facility has indicated the presence of volatile organic compounds and has also shown TDS concentrations exceeding 1,000 mg/L. The most recent monitoring of this facility for the 2027 MCSB Update review period (WY 2019-2020 through WY 2023-2024) indicated no constituents exceeding MCLs (Riverside County Department of Waste Resources [RCDWR], 2025). The former landfill is in the lower permeability sediments of the Indio Hills where no groundwater production wells are known to exist. In addition to being located outside of the main alluvial aquifer of the MCSB, the site is also located hydraulically downgradient from any drinking water production wells in the main alluvial aquifer of the MCSB. Therefore, groundwater impacts at the former landfill do not appear to be a threat to groundwater quality in the main MCSB. For these reasons, groundwater quality results from the former landfill monitoring are not included in this summary of water quality.

## 4.7 Supply Risks and Uncertainties

The existing water supplies used in the Planning Area face risks and uncertainties that could affect long-term supply reliability. These risks and uncertainties include the extended drought in the southwestern United States and legal/regulatory decisions affecting vital contracts and water deliveries. In addition, climate change could impact both supplies and demands. Climate change is discussed in Section 7, Water Management Forecasting.

### 4.7.1 SWP Water

As described in Section 4.2.4, DWR estimates the long-term average reliability of the SWP to be 54% under existing conditions and declining to about 46% by 2043 (DWR, 2025); while SWP final allocations have averaged 45% annually since the 2007 Wanger decision. This recent period of SWP allocation has included five critically dry years. Implementation of the DCP, described in Section 4.2.5, is likely to increase SWP supply reliability by addressing climate resiliency, environmental and habitat protection, and seismic risk. At this time, CVWD and DWA will continue participating in the DCP to minimize this supply risk.

[11] https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=L10009373801

### 4.7.2 Recycled Water

MSWD has completed preliminary planning and feasibility analysis for construction of a recycled water system at the Horton WWTP and future advanced treatment at the Nancy Wright RWRF for groundwater replenishment and reuse (Hazen, 2018; MSWD, 2020). The amount of potential recycled water available for reuse in the future primarily depends on growth, along with MSWD's plans for construction of tertiary treatment and conveyance. Additionally, the level of water conservation implemented in the future, particularly under the long-term conservation regulations anticipated from Assembly Bill 1668 (Friedman) and Senate Bill 606 (Hertzberg), could reduce the amount of wastewater generated and available for reuse.

This 2027 MCSB Update recognizes the financial challenges associated with the development of non-potable water treatment and distribution systems. Recycled water system construction in the MCSB is primarily dependent on availability of grant and loan funding for capital improvements. Despite this challenge, the GSAs will continue to pursue water reuse projects that reduce groundwater pumping and maximize use of local water.

## 4.8 Summary

The MCSB has both local groundwater (recharged by local surface water) and imported water (used for groundwater replenishment) in its current water supply portfolio. This available water supply portfolio will be used to meet growing demands: municipal, agriculture, golf, and others as described in Section 3, Demand Projections, and to achieve groundwater sustainability. The water budgets described in Section 7, Water Management Forecasting, provide a deeper understanding of some of the demand and supply uncertainties and associated management actions that will help to meet growing demand and achieve groundwater sustainability. Section 8, Projects and Management Actions, summarizes the management actions and capital projects that are planned to maintain subbasin sustainability and meet future demands.

# 5. Groundwater Model Update

This section describes the update of the three-dimensional numerical groundwater flow model developed by WSP (formerly Wood) and documented in the Mission Creek Subbasin Alternative Plan Update, dated November 23, 2021 (2022 MCSB Update). The Mission Creek Subbasin (MCSB) three-dimensional groundwater flow model (MCSB Model) was developed to evaluate existing groundwater conditions in the MCSB and to support forecast scenarios for future water conditions. This section summarizes the MCSB Model updates and calibration evaluation results, while Section 7.0 summarizes the updated forecast scenarios. Additional details on the MCSB Model are provided in **Appendix A**.

## 5.1 Previous Modeling Efforts

Several analog and numerical groundwater flow models of the MCSB have been developed between 1974 and the present. These models were developed by the United States Geological Survey (USGS) and other parties to evaluate and quantify hydrogeologic conditions in the MCSB and surrounding area. These models include:

- Analog Model Study of the Ground-Water Basin of the Upper Coachella Valley, California (Tyley, 1974).
- Predicted Water-Level and Water-Quality Effects of Artificial Recharge in the Upper Coachella Valley, California, Using a Finite-Element Digital Model (Swain, 1978).
- Evaluation of a Ground-Water Flow and Transport Model of the Upper Coachella Valley, (Reichard, 1992).
- Groundwater Flow Model of Coachella Valley, California: An Overview (Fogg, 2000).
- Technical Memorandum: Conceptual Groundwater Model of the Mission Creek and Garnet Hill Subbasins, Riverside County, California – DRAFT (PSOMAS, 2010).
- Groundwater Flow Model of the Mission Creek and Garnet Hill Subbasins and Palm Springs Subarea, Riverside County, California (PSOMAS, 2013).
- Mission Creek Subbasin Groundwater Flow Model, Mission Creek Subbasin Alternative Plan Update, (Wood and Kennedy Jenks, 2021).

The 2022 MCSB Model expanded the 2013 PSOMAS MCSB Model by extending the model domain to the north to encompass the entire MCSB alluvial valley floor, and to the east to encompass the northern Desert Hot Springs Subbasin (DHSSB) that is adjacent to the MCSB. The MCSB Model was also updated to extend the duration of the model (1936 through 2019). In addition, the updated MCSB Model incorporated natural mountain front recharge (MFR) based upon the USGS Basin Characterization Model (BCM), recharge of precipitation and return flows, groundwater replenishment recharge potential, declining groundwater levels, and inter-subbasin

flows across faults. The 2022 MCSB Model, which was well calibrated to observed groundwater levels from 1936 through 2019, was then used to evaluate three potential future groundwater management alternatives under two climate change scenarios (e.g. six forecasts) to maintain and stabilize groundwater levels in the MCSB as described in the 2022 MCSB Update.

**Appendix A** includes a summary of the specific modeling efforts and their role in developing the MCSB model.

## 5.2 Modeling Objectives

The objectives of the current modeling effort are to:

- Extend the MCSB Model simulation period from January 1936 through December 2019 (calendar year basis) to January 1936 through September 2024 (water year basis where discernable based on the historical record).
- Incorporate estimates of the MFR from October 2019 through September 2024 as MFR continues to be an important component in the hydrogeology of the area.
- Recalibrate the updated MCSB model to available groundwater elevation observations.
- Evaluate the inter-subbasin flows across faults.
- Coordinate with the Indio Subbasin modeling team (Todd Groundwater) regarding model domain, stress periods, and the amount of underflow across the Garnet Hill Fault. Periodic meetings were held with the Todd Groundwater modeling group to coordinate modeling where the two models overlapped.
- Develop 50-year forecast models to estimate future groundwater conditions using various groundwater management and project scenarios under two global climate change models (CNRM CM-5 RCP 4.5 and MIROC5 RCP 8.5) to attain sustainable groundwater management.

## 5.3 Data Sources for the Model Update

Data from the 2022 MCSB Model were retained for the 2027 MCSB Model update and are documented in the 2022 MCSB Update. Additional data used to update the model and extend the simulation period through 2024 were developed from the following sources and processes.

- In June 2025, Mission Springs Water District (MSWD), Coachella Valley Water District (CVWD), and Desert Water Agency (DWA) [Agencies] provided extensive data sets available between 2020 and 2024. Each Agency's contribution is briefly summarized below.
- MSWD provided data that included septic field information; land use and water management data, including annual and monthly production reports; MSWD parcel, sewer, and water shapefiles; wastewater treatment plant (WWTP) and customer meter data; aquifer testing results and well condition reports; municipal demand data; water levels; well pumping data; and boring logs, well construction, and maintenance information.

- CVWD provided data that included demand data, water levels, Mission Creek surface water measurements, replenishment volumes, and well construction and boring log data.
- DWA provided data that included DWA water levels and production data, as well as private well production and water level data.
- DWA provided data that included Mission Creek Groundwater Replenishment Facility (MC-GRF) surface water deliveries, water levels, and pumping.
- In July 2025, estimates of MFR for the MCSB and DHSSB watersheds were extracted from the USGS BCM data sets for October 2019 through September 2024.
- In December 2025, MSWD provided updated survey data for eight MSWD wells.
- MCSB Annual Reports for Water Years (WY) 2019-2020 through WY 2023-2024 were also used to support the 2027 MCSB Model update. The reports were prepared on behalf of the Agencies using Agency-provided data, and the data presented in each report were incorporated into the MCSB Model update.
- In June 2026, Todd Groundwater provided an updated Garnet Hill Sub-Area of the Indio Subbasin (GHSA) data set for quarterly stress periods from January 2010 through September 2024. The data set included GHSA interzonal flows, represented as modeled fault fluxes along the Garnet Hill fault, and Whitewater River recharge values from the Indio Subbasin 2027 calibrated model.
- Airborne electromagnetic (AEM) data collected by the California Department of Water Resources (DWR) in 2023 (DWR, 2024b) for the Salton Sea Area groundwater subbasins has been incorporated to support evaluation and refinement of the hydrogeologic conceptual model and are discussed in Section 5.4.3.

Collectively, these data supported the model update and extended the simulation period through September 2024.

## 5.4 Hydrogeologic Conceptual Model

A hydrogeologic conceptual model (conceptual model) is a simplified representation of the groundwater flow system, frequently in the form of a block diagram or cross section (Anderson & Woessner, 1992). The nature of the conceptual model determines the dimensions of the numerical model and the design of the model grid that is used to divide the groundwater system into discrete areas (nodes) for calculation purposes. The purpose of the conceptual model is to establish an initial understanding of the groundwater system and organize the associated field data so that the system can be analyzed more effectively. Conceptual models were developed for the previous modeling efforts (Fogg, 2000, PSOMAS 2010, 2013, and Wood and Kennedy Jenks, 2021) and formed the basis of the conceptual model presented here.

Four steps were completed in developing the conceptual model for the study area: (1) description of the hydrogeologic setting, (2) delineation of the model domain and layering, (3) estimation of the water budget, and (4) approximation of the flow system. The following paragraphs summarize this work.

**Figure 5-1** is a representation of the conceptual model for the MCSB and shows the main components of the groundwater and hydrologic system for the MCSB.

## 5.4.1 Geologic Setting

The Coachella Valley is in the northwestern portion of a broad, tectonic depression known as the Salton Trough, which extends from the Gulf of California to the San Gorgonio Pass. The bedrock that is exposed on mountain ranges that flank and underlie the Salton Trough is largely composed of crystalline (igneous and metamorphic) rocks (DWR, 1964).

The valley floor consists of much younger fine- and medium-grained alluvial sediments derived from the surrounding mountains that have filled the basin over millions of years. These sediments vary and range from well-indurated conglomerate, sandstones, shales, and siltstones to loose gravels, sands, silts, and interbedded clays.

## 5.4.2 Structural Geology and Faults

The Coachella Valley has been subdivided by faulting into multiple subbasins and subareas. **Figure 5-2** shows the major fault zones in the area. The major fault zones include:

- The Garnet Hill Fault, which separates the GHSA from the main Indio Subbasin.
- The Banning (San Andreas) Fault, which separates the MCSB from the GHSA.
- The Mission Creek Fault, which separates the MCSB from the DHSSB.

These fault zones are primarily southeast to northwest trending. The fault zones that cross the valley form partial barriers to groundwater flow and interrupt the overall flow of groundwater in the valley.

In addition to the major faults as described above, older unnamed faults have resulted in the apparent uplift of older semi-consolidated sediments and bedrock at the northern part of the GHSA and MCSB that effectively separates the active Whitewater River channel from the main part of the MCSB (WSP, 2025). This also potentially limits the hydraulic connection of the Whitewater River channel deposits and sediments in the GHSA.

## 5.4.3 Stratigraphy

The formations in the study area range in age from pre-Cambrian to Recent (actively being deposited). The geologic units or formations have been grouped in terms of their water-bearing capacity (DWR, 1964). **Figure 5-2** shows the formations exposed in the MCSB, GHSA, and DHSSB.

The oldest formations in the area, which range from pre-Cambrian to Tertiary, are considered non-water bearing. They yield little or no water to wells and occur primarily as bedrock exposed in the mountains surrounding the MCSB and Coachella Valley, and as bedrock underlying the alluvial sediments exposed on the valley floor and in some of the hills in and around the MCSB. The semi-water bearing formations range in age from Tertiary to Quaternary, have low permeability and low water-yielding capabilities, and yield moderate quantities of water to wells. As shown on **Figure 5-3**, these formations are exposed in the hills in the southwest portion of the MCSB and underlie the relatively thin alluvial sediments in the Indio Hills. They are also mapped as exposed in some parts of the Indio Hills on larger scale geologic maps (e.g., DWR, 1964).

The water-bearing formations are of Quaternary (including Recent) age and comprise the main unconfined aquifer in the study area. These formations yield water readily to wells. The Quaternary deposits consist of active channel deposits, alluvial fan deposits, stream wash deposits, alluvial plain, lake deposits (Q), and dune sand deposits (Qs). **Figure 5-2** shows that these units make up the majority of the formations exposed in the MCSB, GHSA, and DHSSB. Cross sections A-A' and C-C' from Figure 5-2 are included in Appendix A as Figures A6a and A6b, respectively. As described above, the Quaternary deposits in the Indio Hills are thin and not of sufficient thickness to be part of the regional unconsolidated alluvial aquifer of main MCSB. The water bearing sediments in the Coachella Valley are very thick (up to 12,000 feet). Beneath the study area, the upper approximately 2,000 feet constitute the potable aquifer that is used as a water source (Sneed et al., 2014 and DWR, 1964).

As part of DWR's statewide AEM Survey Project, AEM data were collected in the Salton Sea Survey Area, including the MCSB, to provide high-resolution geophysical information supporting groundwater basin characterization and Sustainable Groundwater Management Act (SGMA)-related groundwater management. Representative AEM-derived products for the MCSB, including inverted resistivity profiles, depth-slice resistivity maps, and interpreted cross sections showing subsurface heterogeneity, are provided in Appendix A, Attachment A1, and documented in DWR's Salton Sea Survey Area Data Report (DWR, 2024b). In general, higher resistivity values are interpreted as relatively coarser grained materials, such as sands and gravels, and lower resistivity values as finer grained materials, such as silts and clays, recognizing that resistivity is influenced by multiple factors including lithology, saturation, and groundwater salinity. Overall, the AEM results are consistent with the existing MCSB conceptual model and support the presence of laterally variable and discontinuous coarse-grained water-bearing deposits within a finer-grained alluvial matrix.

### 5.4.4 Hydrogeology

The main aquifers in the MCSB, DHSSB, and GHSA are heterogenous alluvial deposits with sparse, discontinuous lenticular clays. The aquifer in the western Coachella Valley, where the Planning Area is located, is predominantly under unconfined conditions (DWR, 1964, Tyley, 1974).

#### 5.4.4.1 Groundwater Elevations

Historically, groundwater levels in the MCSB aquifer decreased significantly as the overlying communities developed. Groundwater levels in portions of the MCSB declined almost 100 feet between 1936 and 2006. Between 2006 and 2019, however, groundwater levels stabilized and then recovered almost 20 feet as a result of conservation efforts and recharge of imported water at the Mission Creek Groundwater Replenishment Facility (MC-GRF). Since 2019, groundwater levels have declined as groundwater replenishment recharge from imported water at the MC-GRF has decreased, but they remain above 2009 groundwater levels. Between 2002 and 2012, water levels increased as much as 275 feet near the MC-GRF. **Figure 5-3** presents groundwater contours for the MCSB, DHSSB, and GHSA for WY 2023-2024. Groundwater contours for the MCSB, DHSSB, and GHSA for 1936, 1993, 2009, and 2019 are included and can be reviewed in the 2022 MCSB Update.

The DHSSB aquifer has remained relatively undeveloped primarily due to elevated dissolved mineral content in the groundwater. As a result, groundwater levels in the subbasin have also remained relatively stable. Spatially sparse water level availability has made it difficult to estimate groundwater level changes over the DHSSB. This was not considered a data gap because the DHSSB was not the focus of the modeling effort, and the available information was adequate for the modeling objectives.

The GHSA aquifer also experienced some decline in groundwater levels prior to initiation of groundwater recharge activities. Groundwater levels in the GHSA declined about 20 feet between 1950 and 1965. Groundwater levels stabilized in the early 1970s with the start of recharge operation at the Whitewater River Groundwater Replenishment Facility (WWR-GRF) in the main Indio Subbasin. Since the mid-1980s, groundwater levels in the GHSA have recovered over 60 feet.

Precipitation on Basin
Mountain Front Recharge
Stream
Whitewater River
Bedrock and Semi Permeable Sediments
Fault
Mission Creek Subbasin
Desert Hot Springs Subbasin
Mission Creek Fault
Recharge Facility
Indio Subbasin
(Garnet Hill Subarea)
Garnet Hill Fault
Garnet Wash
Banning Fault
Wastewater Treatment Plant
Industrial Supply Well
Mission Creek Wash
Morongo Wash
Agricultural Irrigation Well
Fish Farm (Agriculture)
Septic Tank
Inflow
Golf Course
Phreatophytes
Private Well
Recharge Mound
Municipal Supply Well
Municipal Supply Well
Golf Course Well
Municipal Supply Well
Outflow
1970 Water Level
1,000
0
-1,000
-2,000
Feet Mean Sea Level

Basemap modified from an aerial photo from Google Earth Pro, dated 2-19-2018.

## Explanation

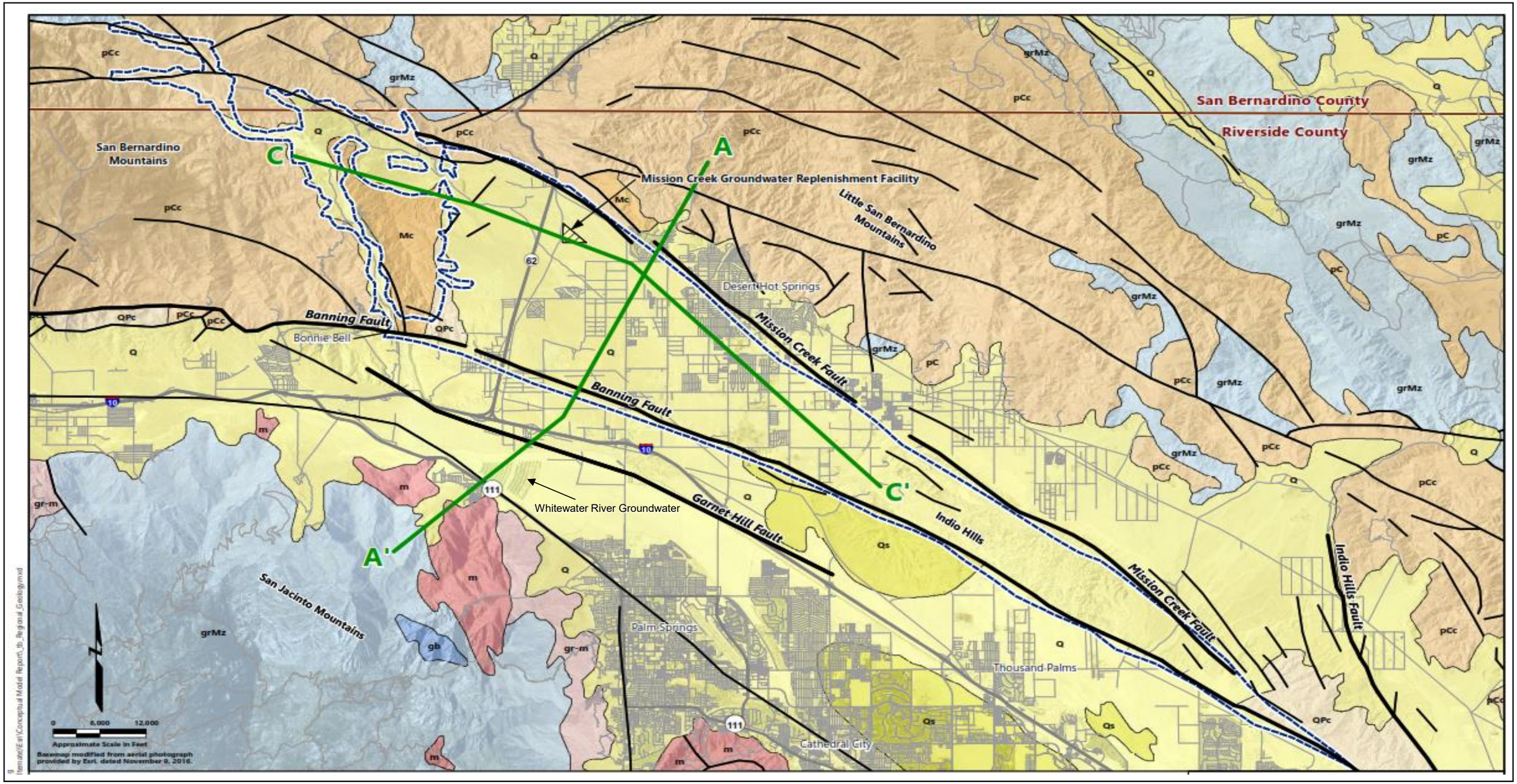
- Subsurface flow
- Return flow
- Recharge
- Discharge
- Import/ Export
- Groundwater surface
- Sand
- Semi-permeable Sediments
- Bedrock

## 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 Alternative Update
Coachella Valley, California

| By: pah | Date: 04/24/2021 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 5-1 |




Explanation

Fault

Site Features

Mission Creek Subbasin

Highway/road

Cross section location

Geology

Qs: dune sand (Quaternary)

Q: alluvium (Quaternary)

QPc: sandstone (Tertiary-Quaternary)

Mc: granitic and metamorphic (Miocene)

gb: gabbro (Triassic)

grMz: diorite (Permian)

pC/pCc: gneiss (Paleozoic)

gr-m: plutonic rock (Early Proterozoic to Late Cretaceous)

m: schist (Early Proterozoic to Cretaceous)

Source:

USGS Open File Report 2005-1305, 2007.

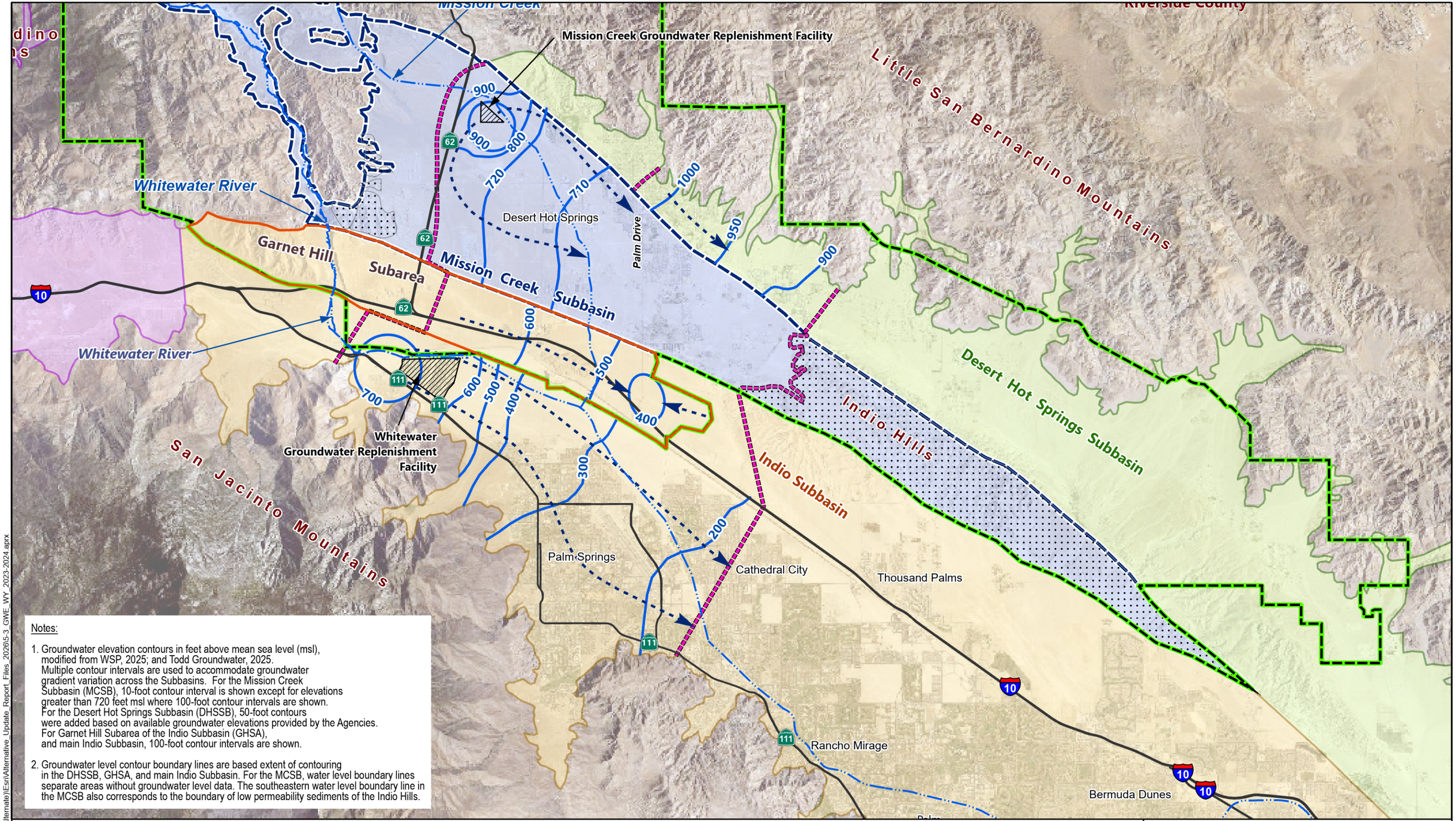
Note:

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

**Geology Map**

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 08/02/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 5-2 |




Notes:

1. Groundwater elevation contours in feet above mean sea level (msl), modified from WSP, 2025; and Todd Groundwater, 2025. Multiple contour intervals are used to accommodate groundwater gradient variation across the Subbasins. For the Mission Creek Subbasin (MCSB), 10-foot contour interval is shown except for elevations greater than 720 feet msl where 100-foot contour intervals are shown. For the Desert Hot Springs Subbasin (DHSSB), 50-foot contours were added based on available groundwater elevations provided by the Agencies. For Garnet Hill Subarea of the Indio Subbasin (GHSA), and main Indio Subbasin, 100-foot contour intervals are shown.

2. Groundwater level contour boundary lines are based extent of contouring in the DHSSB, GHSA, and main Indio Subbasin. For the MCSB, water level boundary lines separate areas without groundwater level data. The southeastern water level boundary line in the MCSB also corresponds to the boundary of low permeability sediments of the Indio Hills.

Explanation

- Groundwater elevation contour (modified from West Yost, 2020)
- Groundwater flow direction
- Groundwater level contour boundary
- Facility
- Planning Area
- River/stream
- Highway/road
- Garnet HIll Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin

0 4,000 8,000
Feet

Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA. Water.CA.gov.

N

GROUNDWATER ELEVATION CONTOURS
WATER YEAR 2023-2024
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 5-3 |

Date: 9/15/2026 Printed by: USMW719917
Path: Y:\CM19167351 (Mission Creek Alternate)\Esri\Alternative_Update_Report_Files_2026\5-3_GWE_WY_2023-2024.aprx

#### 5.4.4.2 Groundwater Flow Direction

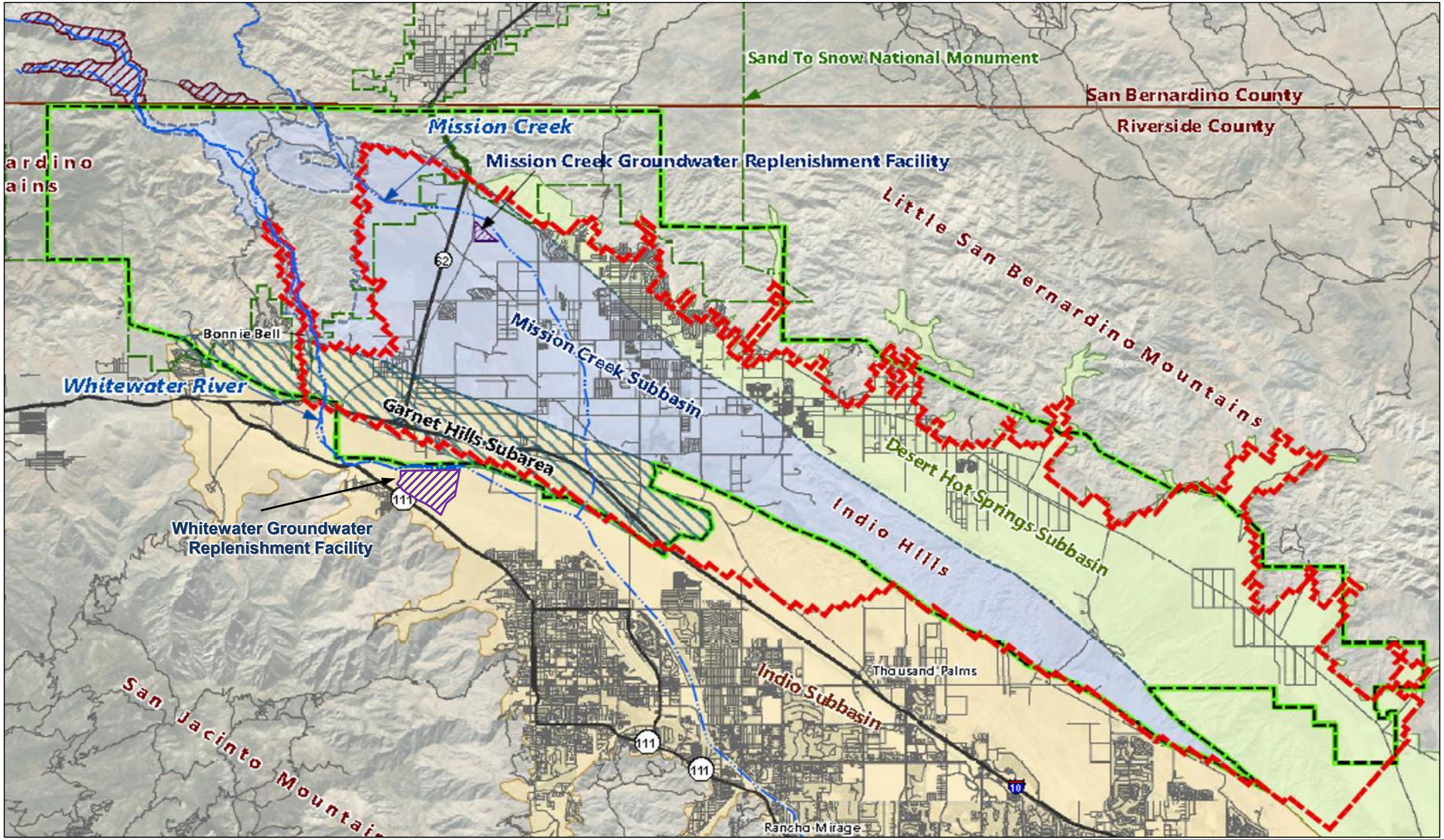
As shown on **Figure 5-3**, the general direction of groundwater flow in the MCSB and surrounding Coachella Valley is from northwest to southeast and is consistent in all subbasins. A series of fault zones constitute partial barriers to groundwater flow between subbasins. The Mission Creek Fault, which separates the MCSB from the DHSSB, is an effective flow barrier with a groundwater level differential across the fault of 150 to 200 feet (Swain, 1978). The Banning (San Andreas) Fault, which separates the MCSB from the GHSA, exhibits a groundwater level differential across the fault of 100 to 300 feet. Additionally, the Garnet Hill Fault, which separates the GHSA from the main Indio Subbasin, is an effective groundwater flow barrier, with a groundwater level differential across the fault of 100 to 200 feet.

### 5.4.5 Model Domain

The model domain remains unchanged from the extent established for the 2022 MCSB Model Update. That model update was based, in part, on the original model domain developed to evaluate groundwater flow beneath the entire Indio Subbasin (including the GHSA), extending from the San Bernardino Mountains to the Salton Sea (Fogg, 2000). This 2027 modeling effort remains focused on the Upper Coachella Valley, specifically the GHSA, MCSB, and DHSSB, and extends from the San Bernardino Mountains to the southern end of the Indio Hills **Figure 5-4**. The original 2000 model domain was retained, with the lower Coachella Valley deactivated, to maintain compatibility with related modeling efforts supporting the SGMA Alternative Plan Update as part of the Indio Subbasin Water Management Plan Update.

### 5.4.6 Water Budget

The water budget describes the inflow and outflow to and from the hydrogeologic system. Inflow and outflow can occur from the hydraulic boundaries of the system, from various sources such as precipitation or recharge areas, and from exit points or sinks such as wells or drainage systems. The boundaries, sources, and sinks identified within the model domain are discussed below. Additional information regarding water budget components, including ranges in flows, is presented in the groundwater modeling summary report in **Appendix B**.




Explanation

- Planning Area
- Mission Creek Subbasin fringe area
- Highway/road
- Mission Creek Subbasin
- Approximate Active Model Boundary
- Garnet Hills Subarea of Indio Subbasin
- Indio Subbasin
- Desert Hot Springs Subbasin

**Groundwater Model Active Domain**

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 08/02/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure **5-4** |

### 5.4.6.1 Inflows

Several sources of water influence groundwater levels in the study area. They are described below.

- **Precipitation:** Long-term (1936-2024) average precipitation on the western Coachella Valley floor, as measured at the Palm Springs International Airport (WRCC, 2026), is only about 5.19 inches per year and occurs primarily between November and May with occasional monsoonal rains in the summer months. Due to the high evaporation rate and low precipitation rate, direct groundwater recharge from precipitation is usually negligible on the valley floor.
- **Mountain Front Recharge (MFR):** MFR typically occurs where precipitation (including snow melt) on steep-sided bedrock mountains such as the San Jacinto, San Bernardino, and Little San Bernardino Mountains surrounding the MCSB area runs off, collects, and flows down intermittent streams, and ultimately disgorges into alluvium at the base of the mountains. Although the MFR runoff flow can be highly variable and intermittent based on precipitation intensity and duration, it can be a significant source of groundwater recharge to mountain-bounded valleys like the Coachella Valley. However, there may be a significant time lag between recharge at the mountain front and response in groundwater levels in the areas where pumping occurs.

  The USGS Basin Characterization Model (BCM) was used to estimate MFR (see Section 5.6.5.5 and Appendix A). Based on the BCM, the GHSA, MCSB, and DHSSB in the upper portion of the Coachella Valley receive MFR from 13 mountain watersheds in the San Bernardino and Little San Bernardino Mountains including the South Fork Whitewater River, Mission Creek, Chino Canyon, Garnet Wash, Big Morongo Creek, Little Morongo Creek, Morongo Wash, Long Canyon, East Wide Canyon, Thousand Palms Canyon, Fan Canyon, Pushawalla Canyon, and Berdoo Canyon (Appendix A, Figure A11). Annual MFR into the study area, depending on the year, has been estimated to range from 39 to as much as 126,680 acre-feet per year (AFY) (Appendix A, Table A1).
- **Groundwater Replenishment:** Groundwater replenishment has taken place at the MC-GRF since its construction in 2002. Recharge volumes were calculated based on measured Colorado River Aqueduct (CRA) deliveries from the MC-GRF turnout, and assuming a 2 percent (%) evaporative loss.[1] Recharge amounts have ranged from 0.0 acre-feet (AF) in 2021 and 2022 to 33,544 AF in 2010.
- **Return Flows:** Return flow consists of the proportion of applied water that returns to the water cycle as recharge to groundwater after it has been used for its intended purpose (municipal, agricultural, industrial, and golf course). The types of return flows considered are:

[1] Return flow calculations and evaporative loss estimates 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).

- **Applied Water Return Flow:** Applied water return flow includes return flow from municipal outdoor, agricultural, industrial, and golf course use.
- **Septic Systems:** The number of septic systems was calculated from the difference between the total residences with municipal water accounts and the number of residences with municipal sewer accounts. Septic system return flow (i.e., percolation) has been decreasing since approximately 2005 because of ongoing water agency efforts to convert existing septic systems to sewer connections.
- **Wastewater Treatment Plants (WWTPs):** The Horton and Desert Crest WWTPs and the Nancy Wright Regional Water Reclamation Facility (Nancy Wright RWRF) are located within the model domain. WWTP return flows were calculated based on daily flows reported by the treatment plants and assuming a 3% evaporative loss (K&SEC and Stantec, 2018). WWTP return flows have increased steadily since 2010 due to the conversion of septic systems to the regional sanitary sewer system and additional development in the subbasin. The Wright RWRF was built after the 2022 MCSB Update but did not begin operating until early 2025.
- **Local Streams:** There are two streams that occasionally discharge into the study area at volumes significant enough to have warranted the placement and monitoring of stream gauges by the USGS: (1) the Whitewater River, which flows out of the San Bernardino Mountains through the northwestern portion of the GHSA; and (2) Mission Creek, which flows out of the San Bernardino Mountains into the northern portion of MCSB.
- **Inter-Subbasin Groundwater Underflow:** Groundwater elevation differences between the various subbasins in the study area result in groundwater underflow across the faults separating the subbasins. Depending on the perspective, these can be inflows or outflows. From the perspective of the MCSB, groundwater underflow is inflow from DHSSB to the MCSB. Long-term average annual underflow has been estimated by several authors.

  Resistivity patterns observed in the AEM dataset are also consistent with coarse-grained alluvial fan deposits extending from mountain-front areas, supporting the conceptualization of these areas as primary recharge pathways.

### 5.4.6.2 Outflows

Several groundwater sinks or outflows influence groundwater levels in the study area. These are described below.

- **Transpiration:** In the MCSB, approximately 1,120 acres of phreatophytes have been identified along the Banning Fault and Indio Hills. Phreatophytes are deep rooted plants that obtain significant portions of their water needs near the groundwater surface (mostly mesquite and tamarisk trees, also known as salt cedar, in the Planning Area). These phreatophytes consume shallow groundwater upwelling along the fault. Transpiration losses of applied water utilized for irrigation are accounted for as a reduction of return flow of pumped groundwater.

- **Evapotranspiration:** In the MCSB, evapotranspiration losses of applied water utilized for irrigation have been estimated to be approximately 75 percent of applied water. Evapotranspiration of applied water is not directly simulated in the groundwater model. Instead, the evapotranspiration losses of applied water for irrigation are indirectly accounted for as part of the local pumping demand.
- **Local Pumping:** Groundwater pumping is the primary outflow from the study area. Groundwater pumping is primarily within the MCSB and GHSA, with lesser amounts within the DHSSB because of highly mineralized groundwater quality. Groundwater pumping has increased significantly over time, resulting in declining groundwater levels in the MCSB and GHSA. Pumping was determined from records provided by the Agencies. MCSB annual groundwater pumping ranged from 4,578 AFY in 1978 to 17,605 AFY in 2006. In recent years (2020 to 2024), groundwater pumping ranged from 13,212 AFY in 2024 to 14,745 AFY in 2020. In addition, there is an estimated 500 AFY of unreported pumping by minimal pumpers that are not required to report production to the Agencies (WSP, 2025).

  No pumping information was provided by the Agencies for the DHSSB as the Agencies do not operate any production wells or groundwater replenishment programs in this subbasin. Pumping locations and volumes were based on a groundwater modeling study for the area (Mayer et al., 2007). Information from the study indicated relatively stable groundwater pumping in the subbasin from the early 1970s to the late 1990s (approximately 1,700 AFY). It is assumed that recent and future groundwater use will be similar to this long-term historical use.

  In the GHSA, pumping has historically been limited to just a few wells with metered pumping. Since 1990, metered pumping has been limited to two or fewer wells. Since 2008, metered pumping has been limited to one municipal production well and one private well.
- **Inter-Subbasin Groundwater Underflow:** Groundwater elevation differences between the various subbasins in the study area result in some groundwater underflow across the faults separating the subbasins. From the perspective of the MCSB, groundwater underflow that is outflow is from MCSB to the GHSA either directly across the Banning Fault separating the two unconsolidated alluvial sediments in the subbasins, or from the MCSB alluvial sediments into the consolidated sediments of the Indio Hills on the GHSA side of the Banning Fault (designated the Indio Hills West for the purposes of the MCSB Model). Groundwater underflow also flows out of the unconsolidated sediments of the main MCSB through the consolidated sediments of the Indio Hills (designated the Indio Hills East for the purpose of the MCSB Model). Although the Indio Hills East is part of the MCSB, groundwater that flows into the Indio Hills East is considered outflow from the modeled main alluvial area, rather than export across the MCSB boundary, because it is no longer available as a groundwater resource for the main MCSB and groundwater is not extracted from the Indio Hills in the MCSB.

### 5.4.6.3 Water Balance

The net water balance for a subbasin equals the subbasin groundwater inflows minus the subbasin groundwater outflows for a given period of time. A positive water balance results in an increase in groundwater in storage and rising groundwater levels. A negative water balance results in a decrease in groundwater in storage and declining groundwater levels.

The subbasin water balance is a key component in developing the groundwater flow model for the MCSB and evaluating the sustainability of groundwater resources. The guidelines for numerical modeling for the SGMA compliance (DWR, 2016) recommend that the model be capable of meeting several objectives, including:

- Assessing how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability to operate the basin within sustainable yield.
- Assessing how annual changes in historical inflows, outflows, and changes in basin storage vary by WY type (hydrology) and water supply reliability.
- Evaluating how the surface and groundwater systems respond to the annual changes in the water budget inflows and outflows.
- Facilitating the estimate of sustainable yield for the basin.
- Evaluating future scenarios of water demand uncertainty associated with projected changes in local land use planning, population growth, and climate change.
- Informing development and quantification of sustainable management criteria, such as the sustainability goal, undesirable results, Minimum Thresholds, and Measurable Objectives.
- Optimizing proposed projects and management actions and evaluating the potential effects those activities have on achieving the sustainability goal for the basin during the 50-year planning and implementation horizon required under the SGMA.

To meet these objectives, quarterly estimates of components of the water balance that are directly measured (imported surface water, pumping, groundwater replenishment, etc.) and quarterly numerical model estimates of components of the water balance that are not directly measured (natural MFR, transpiration, return flows, and inter-subbasin underflow) were summed by WY. This approach attenuates wide fluctuations in water balance resulting from very wet or dry quarters. Although this makes the simulated change in storage less representative of the natural variation of flows into and out of the groundwater basin based on short-term hydrologic conditions, it makes it much easier to visualize how the annual (WY) change in storage, and cumulative change in storage, varies over time.

### 5.4.7 Flow System

The hydrogeologic and water budget information described above have been used to conceptualize the movement of groundwater through the model domain. The conceptual groundwater flow system has been described in several previous reports (DWR, 1964; Tyley, 1974; Swain, 1978; GTI, 1979; Reichard, 1992; Fogg, 2000; GSi/water, 2005; Mayer, 2007; Catchings et al., 2009; PSOMAS, 2010 and 2013; MWH, 2013, and Wood and Kennedy Jenks, 2021).

Potentiometric surface maps based on water levels measured in 1936, 1992, 2009, and 2019 were included and can be reviewed in the 2022 MCSB Update Appendix A. The 2027 MCSB Update includes the potentiometric surface map based on water levels measured in WY 2023-2024 (**Figure 5-3**), which indicates that the general direction of groundwater flow beneath the western Coachella Valley has consistently been down the valley from northwest to southeast. In addition, there is a small component of inter-basin underflow from northeast to southwest across the faults, described above, which divide the Coachella Valley into multiple subbasins and subareas.

## 5.5 Numerical Model Code Selection

To meet the modeling objectives outlined in Section 5.2, the numerical groundwater flow model code used for the 2027 MCSB Model must meet the following criteria:

- Be able to simulate three-dimensional groundwater flow within the model domain,
- Be well documented and verified against analytical solutions for specific flow scenarios,
- Be accepted by regulatory agencies,
- Be readily understandable and usable by others for simulation of future groundwater conditions, and
- Have a readily available technical support structure.

The USGS model code MODFLOW2005-NWT continues to meet these criteria and is used for the 2027 MCSB Model. The model calculates values of potentiometric head (groundwater levels) and groundwater flow velocity at specific locations and at specific points in time. The calculated groundwater levels were compared to historical water level data in the model calibration process.

### 5.5.1 Code Assumptions and Limitations

There are certain model code assumptions and limitations that constrain the accuracy of the model simulations. The assumptions and limitations that may affect the modeling simulations are summarized in the groundwater modeling report in **Appendix B**. Key assumptions relate to unsaturated water flow in the vadose zone above the water table, groundwater flow in fractured

bedrock surrounding the valley fill materials (alluvial units), and the use of a structured rectangular model grid to divide the model domain into nodes of various sizes and layers.

### 5.5.2 Graphic Pre/Post-Processor

To facilitate the preparation and evaluation of each model simulation, the graphics pre/post processor GWVistas™ Version 9 (GWV) by Environmental Simulations, Inc. was used. GWV is a Windows® program that utilizes a graphic user interface (GUI) to build and modify a database of model parameters. GWV was also utilized to post-process the model simulations and to create the figures presented in the modeling report (**Appendix A**). WSP also utilized some in-house utilities and Microsoft Excel spreadsheets for pre-processing and post-processing simulation results.

## 5.6 Model Design

The following sections describe the numerical groundwater flow model for the study area.

### 5.6.1 Model Simulation Period and Stress Periods

MODFLOW simulates transient groundwater flow using multiple stress periods of variable duration. A stress period is defined as a period of time during which hydraulic stresses (groundwater pumping, for example) are held constant. The model was designed to simulate the 89-year period from pre-development (1936) conditions in the Coachella Valley area to present (September 2024).

Due to a lack of data, the periods 1936 to 1940 and 1941 to 1944 were simulated using two five-year stress periods representing long-term average conditions. The period from 1946 to 1948 was simulated with a single three-year stress period based on 1945 estimated conditions. Stress-period lengths decreased in subsequent years as more data became available for estimating pumping rates, recharge, and groundwater elevations. The model uses 41 annual stress periods for 1949 through 1989, and 139 quarterly stress periods for 1990 through 2024, allowing more recent seasonal pumping and recharge patterns in the study area to be represented more accurately.

### 5.6.2 Model Grid

The model domain is centered on the Coachella Valley from the San Bernardino Mountains to the Salton Sea. Since the study area of this modeling effort is focused on the MCSB, GHSA, and DHSSB in the northeastern portion of the Coachella Valley, the model domain extending beyond this study area was deactivated. The model domain and grid are shown in Figure A9 of Appendix A.

The model grid consists of 280 rows, 113 columns, and 4 layers for a total of 126,560 model cells. The model grid was rotated 50.4 degrees clockwise to align the model grid with the predominant direction of groundwater flow from northwest to southeast. The active study area consists of 18,172 model cells or less than 15% of the total number of model cells. The remaining 85% of the model cells were deactivated as they represent bedrock or the southwestern portion of Coachella Valley area outside of this study area. The model has a uniform cell size of 1,000 feet by 1,000 feet. The active model area covers approximately 104,293 acres, or about 163 square miles.

The MCSB Model domain and grid were unchanged from the model developed for the 2022 MCSB Update.

### 5.6.3 Model Layers

To represent the various hydrogeologic units in the area that affect groundwater flow, the model was divided into four layers. The layers were selected based on hydrostratigraphic information (well logs, geologic cross sections, etc.) and to make the model compatible with modeling efforts by others for the adjacent Indio Subbasin. The MCSB Model layers are unchanged from the model developed for the 2022 MCSB Update.

Previous modeling efforts subdivided the alluvial sediments in the southwestern portion of the Coachella Valley into four layers to represent an unconfined aquifer and confined aquifer separated by an aquitard. The aquitard was represented with two relatively thin layers. Due to layering constraints of earlier versions of MODFLOW, this four-layer scheme was extended into the northeastern portion of the Coachella Valley even though there is no aquitard present. For consistency with previous modeling efforts, and compatibility with modeling efforts by others for the Indio Subbasin, the four-layer scheme was maintained through the northeastern portion of the Coachella Valley. Because the northeastern Coachella Valley has unconfined groundwater conditions, it was assumed the initial hydraulic property distributions were the same in all model layers.

### 5.6.4 Hydraulic Parameters

The MCSB Model hydraulic parameters are unchanged from the model developed for the 2022 MCSB Plan Update. The range of hydraulic parameters, horizontal hydraulic conductivity (Kh), vertical hydraulic conductivity (Kv), storage, specific yield (Sy), and porosity for the MCSB Model are presented in the groundwater modeling report in **Appendix A**.

### 5.6.5 Boundary Conditions

The groundwater flow model must consider flows into and out of the model domain as well as conditions that affect groundwater flow within the model domain. There are several significant hydraulic boundaries (sources and sinks) within the model domain that must be considered in the study area within the numerical model. These boundary conditions are discussed below.

### 5.6.5.1 Initial Head (Groundwater Level) Distribution

The initial head distribution for the model was based on groundwater contour maps prepared in 1936 by the USGS Survey (Tyley, 1974) and others (MWH, 2013). The 1936 potentiometric surface map clearly shows the differences in groundwater level beneath the DHSSB, MCSB, GHSA, and main Indio Subbasin. It was assumed that the 1936 potentiometric surface was uniform across all model layers.

### 5.6.5.2 Flow Barriers (Fault Zones)

The MCSB, GHSA, and DHSSB, and main Indio Subbasin are separated by several faults including the Mission Creek Fault, Banning (San Andreas) Fault, Garnet Hill Fault, and Indio Hills Fault. Groundwater flow across these fault zones was simulated using the Horizontal Flow Barrier (HFB) package of MODFLOW.

### 5.6.5.3 General Head Boundaries

The General Head Boundaries (GHB) package of MODFLOW was utilized to represent groundwater flow to or from aquifer areas outside of the active model domain. GHBs represent a constant water level over time for specific locations.

### 5.6.5.4 Evapotranspiration

Approximately 1,120 acres of phreatophytes (mostly mesquite and salt cedar) have been identified within the MCSB, along the juncture of the Banning Fault and Indio Hills. These phreatophytes consume shallow groundwater upwelling along the fault. Transpiration losses were simulated using the standard Evapotranspiration (ET) package of MODFLOW.

### 5.6.5.5 Mountain Front Recharge

As discussed above, MFR typically occurs where precipitation on steep-sided bedrock mountains runs off, collects, flows down intermittent streams, and ultimately discharges into alluvium at the base of the mountains. MFR for each of the 13 watersheds was estimated using the USGS BCM, which covers the entire state of California (Flint, et al., 2026). The BCM provides estimates of runoff from watershed areas. BCM model estimates were compared with local runoff measured by stream gauges on the Whitewater River and Mission Creek, and the BCM model-estimated runoff from the 13 watersheds were adjusted accordingly. Additional detail regarding the adjustments is presented in the groundwater modeling report in **Appendix A**.

### 5.6.5.6 Return Flow and Groundwater Replenishment

As previously discussed in Section 5.4.6, return flow from applied water for agricultural, industrial, municipal, and golf course uses provides a significant source of recharge to the regional aquifer system. Return flows from septic systems and WWTPs are also a significant source of recharge. The largest single source of recharge is from groundwater replenishment at the MC-GRF. A total of 45 unique return flow zones, including one groundwater replenishment facility, are represented within the model domain. Return flow estimates for these zones from 1936 to 1978 were derived from Tyley (1974) and PSOMAS (2013). Return flow estimates from 1978 to 2024 were calculated from water use data provided by the Agencies. In addition, metered deliveries of imported recharge water from 2002 through 2024 were provided by the Agencies. Aquifer recharge from all these sources was simulated in the model using the standard MODFLOW Recharge package.

### 5.6.5.7 Pumping Wells

As discussed in Section 5.4.6, groundwater pumping for agricultural, industrial, municipal, and golf course uses is one of the largest sinks in the regional aquifer system. A total of 95 wells have been identified within the study area. Most of these wells are located within the MCSB, with fewer wells pumping from the GHSA and DHSSB. Pumping wells were simulated using the Multi-Node Well (MNW) package of MODFLOW. Pumping rates for the period from 1936 to 1978 were based on prior modeling efforts (Tyley, 1974 and PSOMAS, 2013). Pumping rates for 1978 through 2024 are based on estimates and reported pumping by the Agencies or estimated from literature sources.

### 5.6.5.8 Garnet Hill Flux Boundary

The main Indio Subbasin was intentionally not included in this modeling effort because it is being modeled for the 2027 Indio Subbasin Water Management Plan Update (Todd/Rincon, 2026). As discussed in Section 5.3, the MCSB Model was made consistent with the 1997-2024 Indio Subbasin model by adopting the Indio Subbasin hydraulic properties in the GHSA (the overlap area of the two models). Likewise, the boundary flux (underflow) to and from the GHSA to the main Indio Subbasin across the Garnet Hill Fault was also extracted from the Indio Subbasin 1997-2024 model and used for this MCSB Model. In addition, the Whitewater River recharge within the GHSA was also extracted from the 1997-2024 Indio Subbasin model.

To simulate the underflow in the MCSB Model, a flux boundary was set up using the Well package of MODFLOW. The flux boundary was set up immediately southwest of the Garnet Hill Fault using 332 wells in a series of six reaches (consistent with the Garnet Hill Fault reaches) in all model layers. Unlike the MNW package, the Well package does not reallocate pumping when a model layer goes dry; thus, allowing the Garnet Hill Fault flux to decrease as layers go dry. This provides a more realistic representation of flow across a fault. The flux for each Garnet Hill Fault reach from 1936 to 1997 was estimated using the simulated underflow from the PSOMAS

model. The Garnet Hill Fault flux for each reach from 1997 through 2024 was based on underflow values extracted from the 1997-2024 Indio Subbasin model.

## 5.7 Calibration

Calibration of a groundwater flow model is a process through which the model parameters of aquifer hydraulic conductivity, specific storage, specific yield, and other parameters are adjusted so that a suitable match is made between the model-estimated groundwater levels and flows and actual measured water levels and flows (known as model targets).

Calibration is accomplished by selecting a set of model parameters, boundary conditions, and stresses that produce simulated heads and fluxes that match field measurements within a pre-established range of error. Because of the many parameters involved in the calibration process, a unique solution (e.g., one set of parameters) cannot be achieved. A brief discussion of the calibration of the groundwater flow model for the study area is presented below.

### 5.7.1 Calibration Criteria

The quantitative fit of the MCSB Model to observed water level measurements was conducted through statistical analysis of the residuals, meaning the difference between observed and simulated water levels (or heads) at specified observation locations. In the case of transient calibration defined below, analysis of the residuals also includes variations over time. As discussed in the groundwater modeling report in **Appendix A**, there are several statistical values used to evaluate the model calibration and to adjust parameters to improve the model fit to historical data. Of these, the more important values are the residual mean, absolute residual mean, residual standard deviation, and root mean square error. The most used criteria are the normalized root mean square (NRMS), which is the root mean square error divided by the range in observations.

There is no industry standard for determining when a numerical model is “adequately” calibrated. A commonly used “rule of thumb” for acceptable calibration, however, is that the NRMS error should be less than 10% (Zheng and Neville, 1994).

### 5.7.2 Transient Calibration

Transient calibration evaluates simulated model results against observed targets over time. As described in the 2022 MCSB Update and Appendix A, the MCSB Model was previously calibrated for 1936 through 2019 using 7,128 groundwater elevation observations from 58 wells and estimated underflow between subbasins. For this 2027 MCSB Model Update, the simulation period was extended through 2024, and the calibration dataset was expanded to include 8,554 groundwater elevation observations from 64 wells. Manual adjustments were made to pre-1997 boundary flux, or underflow, between the GHSA and the main Indio Subbasin across the Garnet Hill fault to reflect updates to the Indio Fault representation and improve consistency with Todd’s updated calibrated boundary flux values. Boundary flux inputs provided by Todd for 1997

through 2024 were retained for consistency between models (Todd/Rincon, 2026). MFR inputs were also updated from the 2022 MCSB Update. Parameter estimation (PEST) was not re-run for this update and, except for the updates described above, model components established during the 2022 calibration including hydraulic parameters, boundary conditions, fault conductance, general head boundaries, and flux boundaries were unchanged.

#### 5.7.2.1 Calibration Results

As noted above, a model can be considered well calibrated when the NRMS error is 10% or less. Following the calibration process, the resulting NRMS error for the MCSB Model is 3.5%, meeting the calibration criteria. For the MCSB, DHSSB, and GHSA, the NRMS errors are 3.8%, 6.8%, and 9.3%, respectively.

A comparison of observed and simulated heads on hydrographs provides a visual, qualitative measure of how well the model fits observations. A plot of hydrographs for selected wells across the model domain shows reasonably good fit for most wells (**Figure 5-5**). An attachment to the groundwater modeling report (**Appendix A, Attachment A2**) contains hydrographs of observed and simulated heads for all 64 observation wells used in the calibration process.

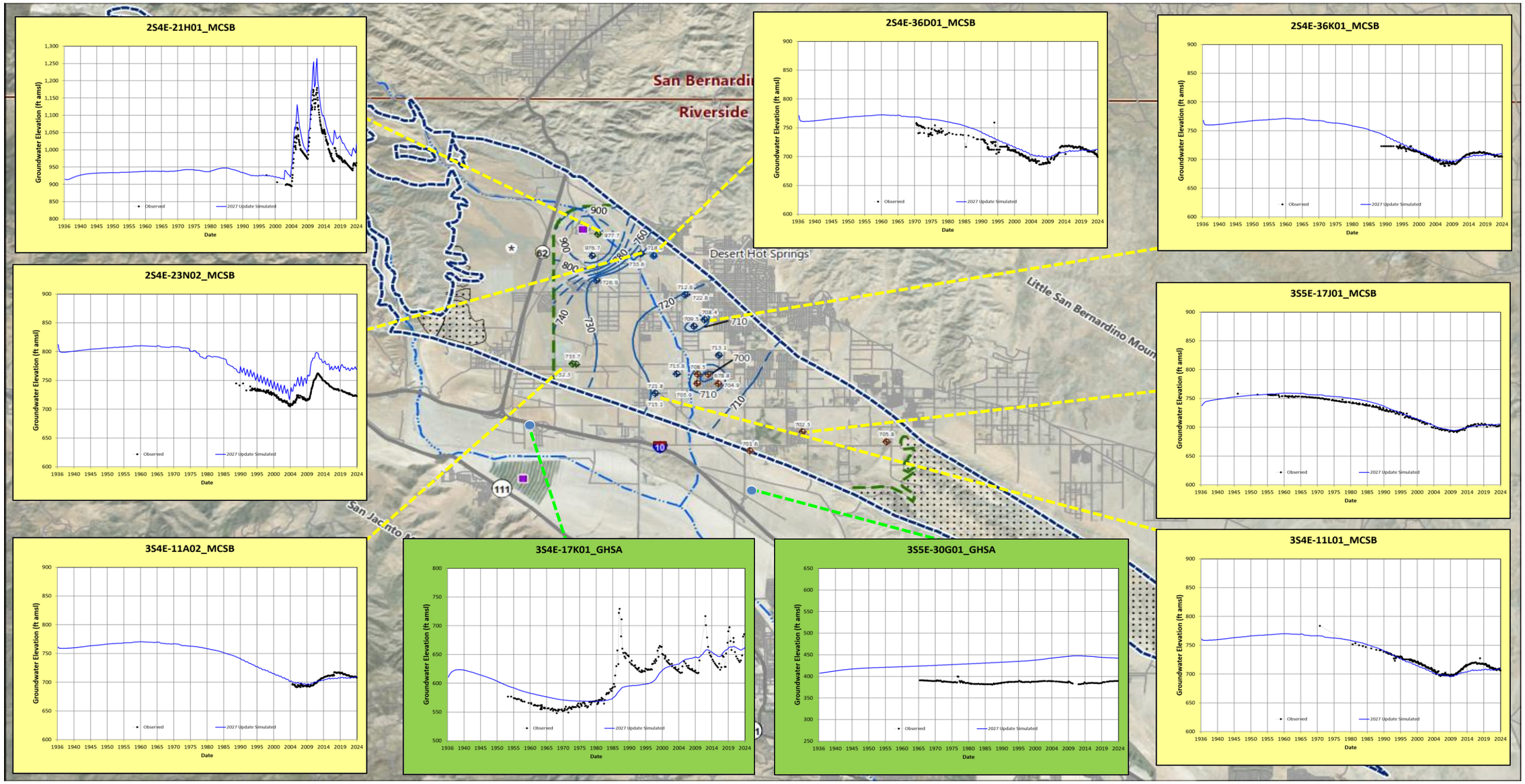
### 5.7.3 Model Calculated Water Balance

In addition to simulating groundwater elevations, the MCSB Model was used to generate a summary of the inflows and outflows for various areas of the active model domain. That flow information was used to approximate the water balance for each subbasin and subarea.

The change in groundwater in storage for each subbasin and subarea can be calculated with Equation 1:

$$Total\ Inflows\ (AF/WY)\ -\ Total\ Outflows\ (AF/WY)\ =\ Change\ in\ Storage\ (AF/WY)$$

The simulated WY balances for the 1978-2024 period for the MCSB, DHSSB, and GHSA are described below. Note that the summary includes minimum, maximum, and average values for the components of inflow and outflow through the simulation period as well as the minimum, maximum, and average of the total annual inflows and outflows. The components are independent of each other, so the minimum (or maximum) for each component may occur in a different WY than the minimum (or maximum) for other components. Consequently, the sum of the minimum (or maximum) values for all components will not equal the minimum (or maximum) value for total inflow in a single WY.




Observed Head
Simulated Head

Abbreviations:
ft amsl = feet above mean sea level
MCSB = Mission Creek Subbasin

**Observed and Simulated Hydrographs of Selected Wells**

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: aah | Date: 08/02/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure **5-5** |

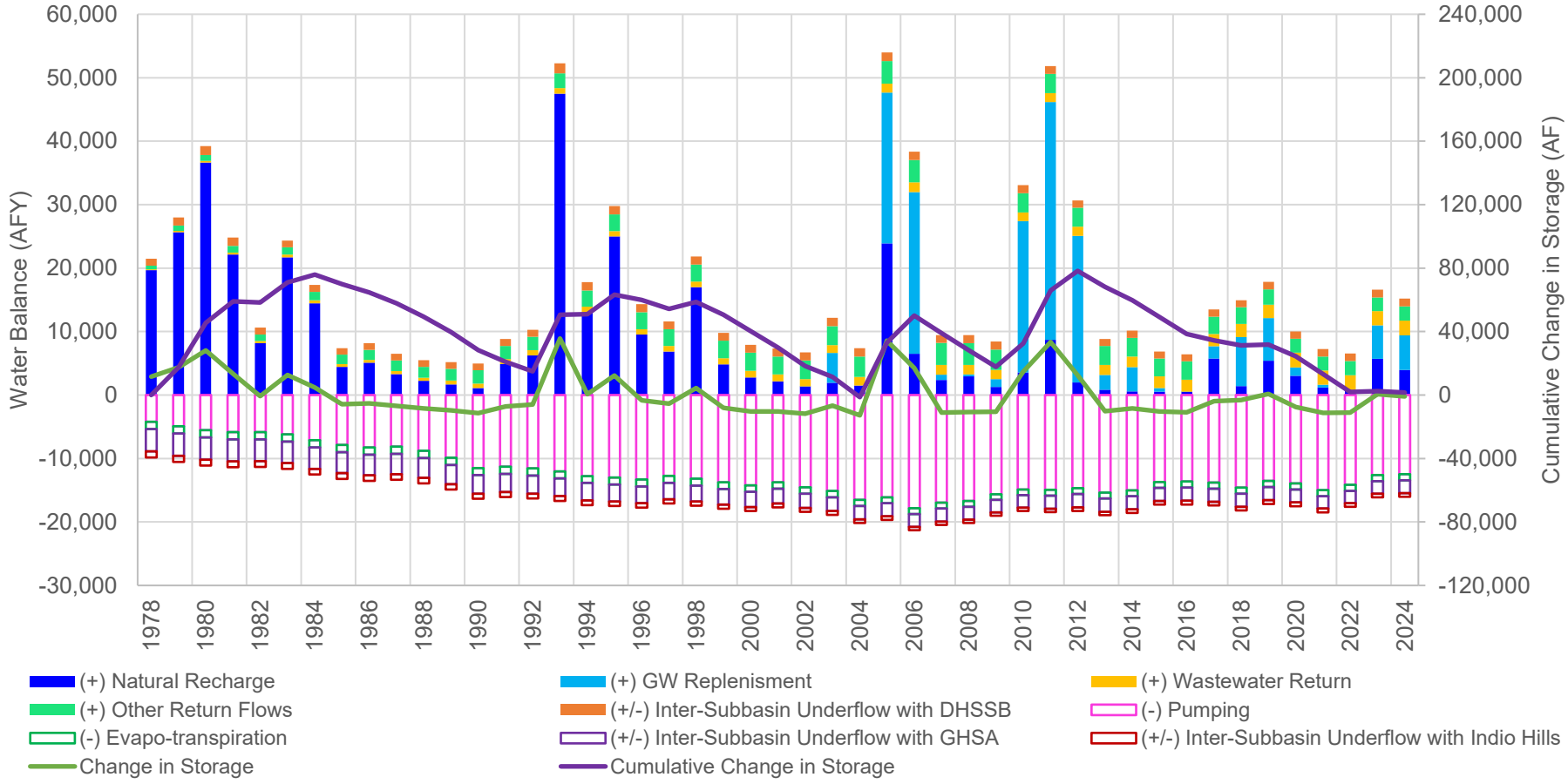
### 5.7.3.1 Mission Creek Subbasin

The 1978 through 2024 simulated WY water balance for the MCSB is briefly discussed below and summarized on **Figure 5-6**. The following ranges and values are derived from **Table A10** (**Appendix A**) and, unless otherwise mentioned, are for the period 1978 through 2024. Summary values shown are rounded to the nearest 10 AF or AFY.

#### Simulated Inflows

- **Natural Recharge** occurs primarily from MFR mostly from the Mission Creek watershed with minor inflows from the Chino Canyon, Garnet Wash, and Big Morongo Creek watersheds. Simulated natural recharge was between 520 and 47,470 AFY and averaged 8,330 AFY.
- **Inter-Subbasin Groundwater Underflow** into the MCSB from DHSSB across the Mission Creek Fault was simulated to range from 1,040 to 1,590 AFY and averaged about 1,200 AFY. This inflow has groundwater quality implications because the DHSSB groundwater quality has higher total dissolved solids (TDS). An expanded evaluation of this groundwater underflow is provided at the end of this water balance summary for the MCSB.
- **Return Flows** are a sum of the applied water and septic return. Applied water was calculated from groundwater production per agency records and subdivided into agricultural, industrial, municipal, and golf course production, each with its own return flow factor. Septic return flow was estimated based on agency estimates of the number of households not connected to municipal sewer systems. Between 1978 and 2024, simulated return flows ranged between 560 and 3,530 AFY and averaged about 2,360 AFY.
- **Wastewater Return Flows** were estimated for the Horton WWTP and Desert Crest WWTP based on agency estimates and records. Simulated wastewater return flow ranged between 160 and 2,360 AFY and averaged about 1,170 AFY.
- **Groundwater Replenishment** was estimated based on agency-provided records of recharge at the MC-GRF. Between 2002 and 2024, simulated groundwater replenishment ranged between 0 and 37,500 AFY and averaged about 7,670 AFY.

**Total Inflows** are the sum of the various inflows described above. Simulated total inflows ranged between 4,970 and 53,990 AFY and averaged about 16,820 AFY.




Notes:
1. Water balance inflows and outflows derived from calibrated model.
2. Water balance is presented by water year (WY) beginning in WY 1991 once quarterly stress periods begin; prior years are annual summaries.
3. (+) - Positive indicates flow into the MCSB
4. (-) - Negative indicates flow out of the MCSB

Abbreviations:
AF = Acre Feet
AFY = Acre Feet per Year
MCSB = Mission Creek Subbasin
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
GW = Groundwater

**1978 - 2024 Simulated Water Balance for Mission Creek Subbasin**

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: aah | 08/02/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 5-6 |

## Simulated Outflows

- **Pumping** was based primarily on agency-provided records. Simulated groundwater pumping ranged between 4,220 and 17,810 AFY and averaged about 12,290 AFY.
- **Evapotranspiration** from phreatophytes was simulated to between 890 and 1,140 AFY and averaged about 1,030 AFY.
- **Inter-Subbasin Groundwater Underflow** from the MCSB to the GHSA across the Banning Fault was simulated as ranging from 1,950 to 3,520 AFY and averaged about 2,530 AFY.
- **Inter-Subbasin Groundwater Underflow** from the MCSB to the Indio Hills East area of the MCSB was simulated as ranging from 290 to 660 AFY and averaged about 430 AFY.
- **Inter-Subbasin Groundwater Underflow** from the MCSB to the Indio Hills West area of the Indio Subbasin was simulated as ranging from 240 to 300 AFY and averaged about 270 AFY.

**Total Outflows** are the sum of the various outflows described above. Simulated total outflows ranged between 9,840 and 21,330 AFY and averaged about 16,540 AFY.

## Simulated Change in Groundwater Storage

The simulated change in groundwater storage in the MCSB can be calculated using Equation 1. For the period of 1978 through 2024, total inflows minus total outflows ranged between negative 12,800 and positive 35,610 AFY and averaged about positive 280 AFY, as shown in **Table A10** (**Appendix A**), and by the green annual Change in Storage line on **Figure 5-6**. The MCSB has had a cumulative change in storage of about negative 16,580 AF since the start of groundwater replenishment in 2002.

The MCSB water budget is primarily dominated by imported water recharge and return flows from water use. As such, the modeled water budgets presented in this section and Section 7, Water Management Forecasting, are a more appropriate tool for determining sustainability in this subbasin under the simulated forecast scenarios, and a sustainable yield was not calculated. Groundwater sustainability with regards to groundwater levels and storage will be evaluated at Key Wells based on the criteria presented in Section 6, Sustainable Management Criteria.

## Inter-Subbasin Groundwater Underflow from Desert Hot Springs Subbasin to Mission Creek Subbasin

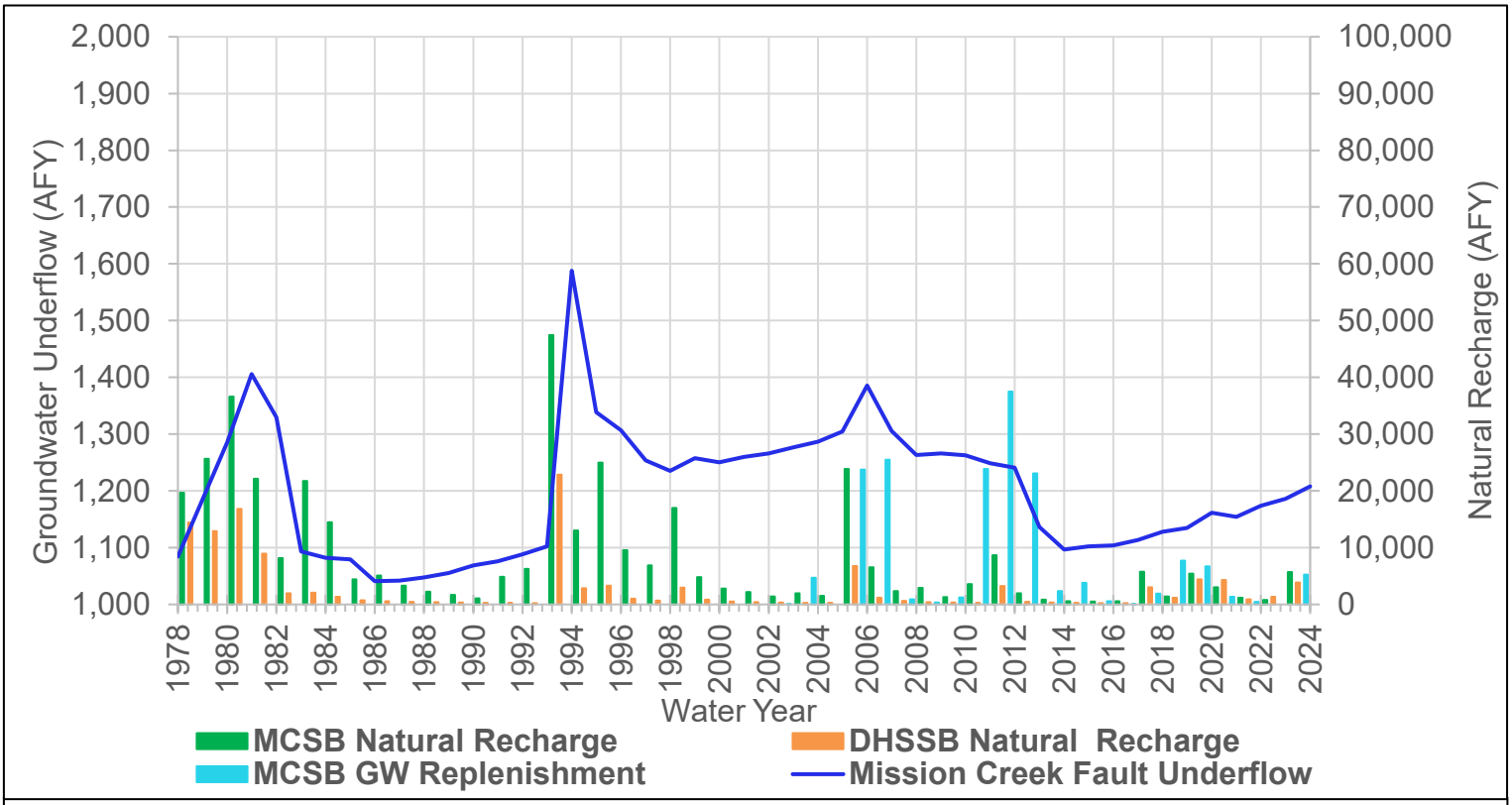
Conceptually, inter-subbasin groundwater underflow from the DHSSB to the MCSB will increase with increasing water level difference across the Mission Creek Fault. The calibrated groundwater model was used to evaluate the relative magnitude of this underflow in comparison to natural and groundwater replenishment to the MCSB, and how this underflow has changed in response to changes in recharge and water levels in both subbasins.

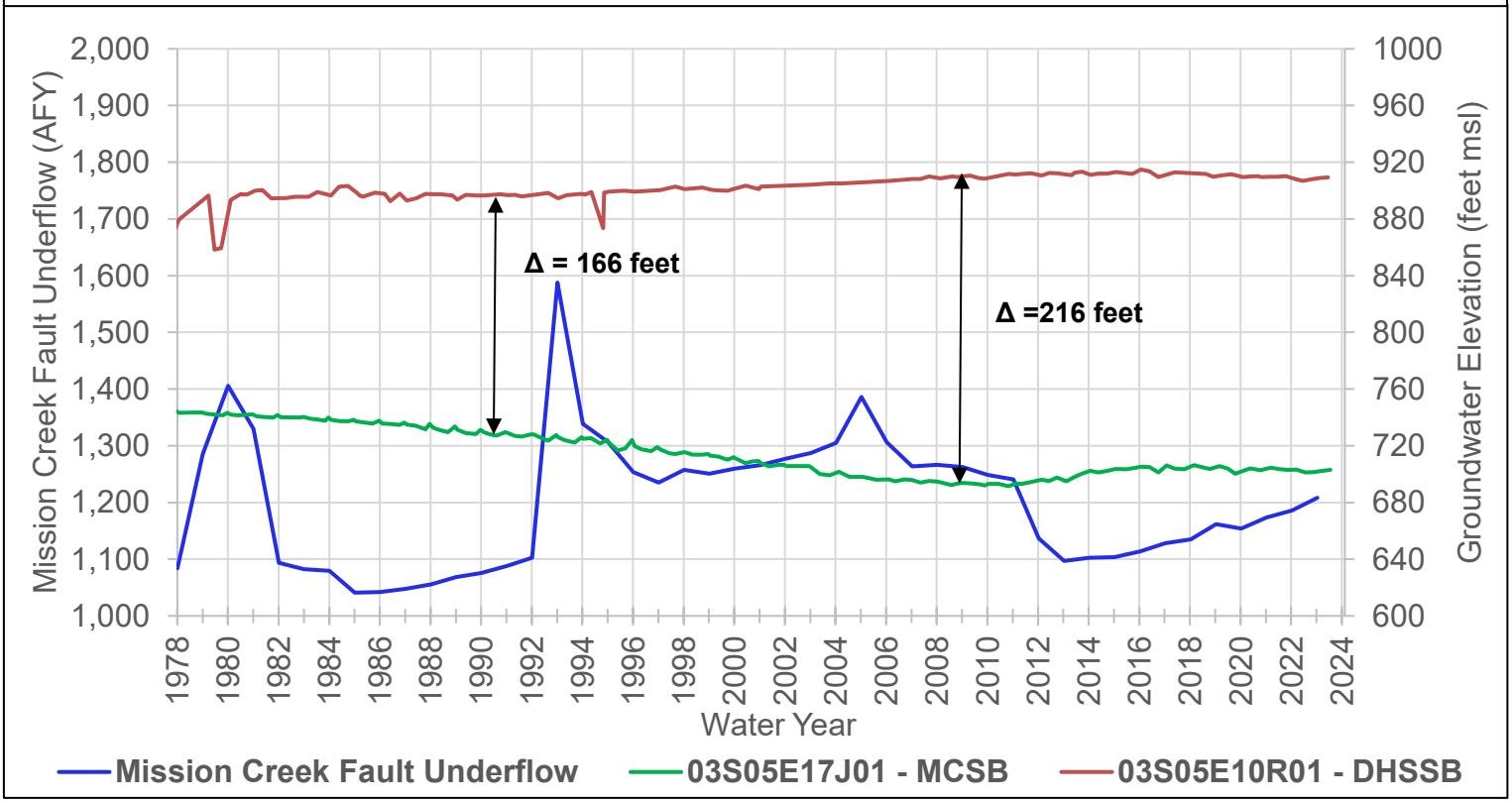
Inter-subbasin groundwater underflow across the Mission Creek Fault is shown in **Table A10 (Appendix A)** and on **Figure 5-7**. The top chart on **Figure 5-7** shows the historical values of

underflow from the DHSSB to the MCSB (shown as the dark blue line extending across the chart), natural recharge to the DHSSB (orange bars on the chart), natural recharge to the MCSB (green bars), and groundwater replenishment into the MCSB at the MC-GRF (blue bars). Note that on this chart, the scale for recharge is 50 times greater than the scale for groundwater underflow, illustrating that underflow from the DHSSB is a very small component of the total inflow to the MCSB. As shown on this chart, underflow across the Mission Creek Fault has been relatively stable except for brief periods when it increased abruptly in response to periods of relatively high natural recharge in both the MCSB and DHSSB. Because the DHSSB is a smaller subbasin with thinner alluvium, years with high natural recharge (e.g., 1980, 1993, and 2005) disproportionally impact groundwater levels in this subbasin and result in higher groundwater underflows across the Mission Creek Fault into the MCSB.

As also shown on the top chart of **Figure 5-7**, groundwater replenishment at the MC-GRF appears to generally reduce inter-subbasin underflow from the DHSSB to the MCSB. MC-GRF groundwater replenishment approaching 23,800 and 25,500 AFY occurs in WY 2004-2005 and WY 2005-2006, respectively. Little to no impact of groundwater replenishment on groundwater underflow across the Mission Creek Fault is apparent for these years; however, the start of this recharge corresponds to a year with high natural recharge that may have offset the potential impact on groundwater underflow. Additional high-volume groundwater replenishment occurred at the MC-GRF over three consecutive WYs: approximately 23,900 AFY in WY 2009-2010, approximately 37,500 AFY in WY 2010-2011, and approximately 23,100 AFY in WY 2011-2012. This period of increased groundwater replenishment corresponds to a steep decline in groundwater underflow across the Mission Creek Fault. The lack of natural recharge in the region during the latter part of this period likely also contributed to the decline in groundwater underflow across the Mission Creek Fault. From WY 2012-2013 through WY 2023-2024, groundwater underflow across the Mission Creek Fault has been relatively stable averaging approximately 1,140 AFY. This underflow is comparable to the average of approximately 1,070 AFY observed from WY 1982-1983 to WY 1992-1993 and is well below the average of approximately 1,280 AFY between WY 1990-2000 and WY 2011-2012.

The lower chart on **Figure 5-7** shows groundwater underflow across the Mission Creek Fault compared with groundwater levels on each side of the fault. Well 03S05E17J01 (17J01), located in the southeastern part of the MCSB, shows declining groundwater levels from 1975 through 2009, stable water levels from 2009 through 2011, and then increasing water levels beginning in 2012 due to groundwater replenishment at the MC-GRF (see the upper chart for groundwater replenishment). Well 03S05E10R01 (10R01), located in the DHSSB across the Mission Creek Fault from the southern MCSB area where 17J01 is located, shows groundwater levels increasing from 1990 to about 2017 and relatively stable water levels since then with a slight decline between 2019 and 2024. The difference in groundwater levels across the fault in 1990 (1990 average) was approximately 166 feet, and the difference across the fault in 2009 (2009 average) was approximately 216 feet. Between rising groundwater levels on the DHSSB side of the fault and declining groundwater levels on the MCSB side of the fault, the net change in groundwater levels between 1990 and 2009 was about 50 feet.




Notes:
1. Water balance and underflow data is presented by water year (WY) beginning in WY 1991 once quarterly stress periods begin; prior years are annual summaries. Groudnwater elevation matches measurement dates.

Abbreviations:
AFY = acre feet per year
DHSSB = Desert Hot Springs Subbasin
MCSB = Mission Creek Subbasin
ft msl = feet mean sea level

**Underflow from Desert Hot Springs Subbasin to Mission Creek Subbasin**
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| WSP | | Figure 5-7 |

Together, the two charts show that even though the southeastern part of the MCSB continues to have a relatively high difference in groundwater levels across the fault, groundwater underflow across the fault declined as a result of lower natural recharge in the region due to recurring below normal precipitation conditions and due to groundwater replenishment at the MC-GRF. A combination of groundwater replenishment efforts in the MCSB and low natural recharge in the DHSSB have significantly reduced groundwater underflow across the fault compared to much of the 1990s and 2000s. The implications of MCSB groundwater management on underflow across the Mission Creek Fault are further discussed in Section 6.

#### 5.7.3.2 Desert Hot Springs Subbasin

The 1978 through 2024 simulated WY water balances for the DHSSB is briefly discussed below and summarized on **Figure 5-8**. The following range and values are derived from **Table A11** (**Appendix A**) and, unless otherwise mentioned, are for the period 1978 through 2024. Summary values shown are rounded to the nearest 10 AF or AFY.

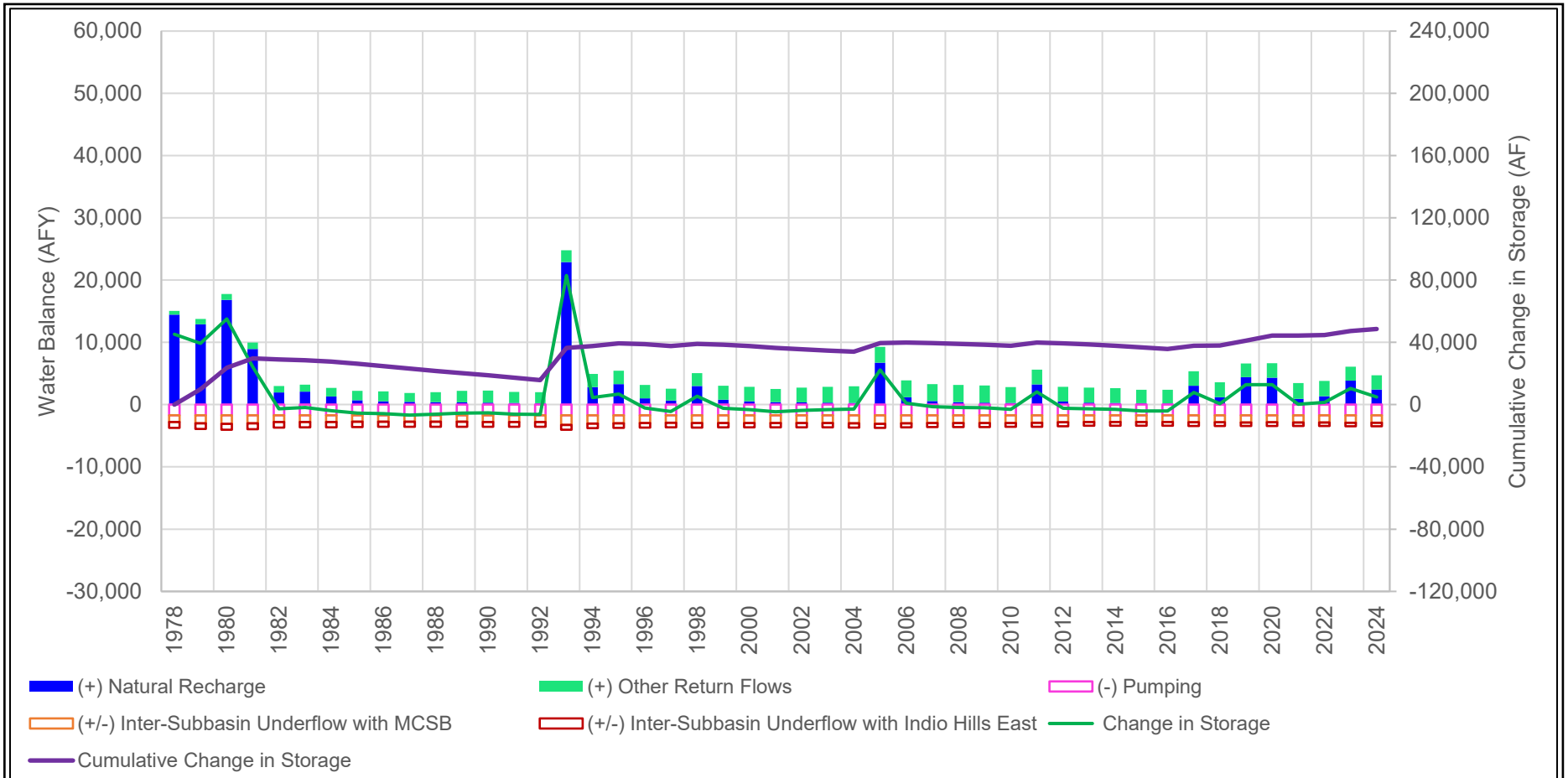
**Simulated Inflows**

- **Natural Recharge** occurs primarily from MFR from several watersheds tributary to the DHSSB. Simulated natural recharge has ranged between near 210 and 22,890 AFY and averaged 2,850 AFY.
- **Return Flows** are a sum of the applied water and septic return. Applied water was calculated from groundwater production per agency records and subdivided into agricultural, industrial, municipal, and golf course production, each with its own return flow factor. Septic return flow was estimated based on agency estimates of the number of households not connected to municipal sewer systems. Between 1978 and 2024, simulated return flows ranged between 590 and 2,760 AFY and averaged about 2,040 AFY.

**Total Inflows** are the summation of the various inflow components described above. Simulated total inflows ranged between 1,890 and 24,790 AFY and averaged about 4,880 AFY.

**Simulated Outflows**

- **Pumping** was based on literature results (Mayer et al., 2007) as pumping in the DHSSB is by private parties and is limited. Simulated pumping was 1,690 AFY for all years except 1978 and 1990 when it was 1,700 and 1710 AFY, respectively. Pumping averaged about 1,690 AFY.
- **Inter-Subbasin Groundwater Underflow** from the DHSSB to the MCSB across the Mission Creek Fault has been simulated as ranging between 1,040 and 1,590 AFY and averaged about 1,200 AFY.
- **Inter-Subbasin Groundwater Underflow** from the DHSSB to the Indio Hills Subarea of the MCSB across the Mission Creek Fault (also referred to as the Indio Hills East) was simulated to range from 560 and 950 AFY and averaged about 720 AFY.




Notes:
1. Water balance inflows and outflows derived from calibrated model.
2. Water balance is presented by water year (WY) beginning in WY 1991 once quarterly stress periods begin; prior years are annual summaries.
3. (+) - Positive indicates flow into the DHSSB
4. (-) - Negative indicates flow out of the DHSSB

Abbreviations:
AF = Acre Feet
AFY = Acre Feet per Year
MCSB = Mission Creek Subbasin
GHSA = Garnet Hill Subarea
GW = Groundwater

**1978 - 2024 Simulated Water Balance for Desert Hot Springs Subbasin**

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Coachella Valley, California

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|---|---|---|
| wsp | | Figure 5-8 |

- **Inter-Subbasin Groundwater Underflow** from the DHSSB to the Indio Subbasin south of the Indio Hills was simulated to range from 40 and 90 AFY and averaged about 60 AFY.

**Total Outflows** are the summation of the various outflows described above. Simulated total outflows ranged between 3,460 and 4,120 AFY and averaged about 3,680 AFY.

### Simulated Change in Groundwater Storage

The simulated change in groundwater storage in the DHSSB can be calculated with Equation 1. Between 1978 and 2024, total inflows minus total outflows ranged between negative 1,770 and positive 20,670 AFY and averaged about positive 1,210 AFY. Since the mid-2000s, the annual change in storage has been relatively stable at the average of positive 674 AFY. The cumulative change in storage from 1978 through 2024 is approximately positive 37,550 AF (**Figure 5-8** and **Appendix A, Table A12**).

## 5.7.3.3 Garnet Hill Subarea

The 1978 through 2024 simulated WY balances for the GHSA is briefly discussed below and summarized on **Figure 5-9**. The following range and values are derived from **Table A12** (**Appendix A**) and, unless otherwise mentioned, are for the period 1978 through 2024. Summary values shown are rounded to the nearest 10 AF or AFY.

### Simulated Inflows

- **Natural Recharge** occurs primarily from MFR from the Whitewater River watershed. Simulated natural recharge has ranged between 1,820 and 16,690 AFY and averaged 8,350 AFY.
- **Inter-Subbasin Groundwater Underflow** into the GHSA from the MCSB across the Banning Fault has been simulated to range from 1,950 to 3,520 AFY and average about 2,530 AFY. These values include the Whitewater River recharge values derived from the 1997-2024 Indio Subbasin model.
- **Return Flows** are a sum of the applied water and septic return. Applied water was calculated from groundwater production per agency records and subdivided into agricultural, industrial, municipal, and golf course production, each with its own return flow factor. Septic return flow was estimated based on agency estimates of the number of households not connected to municipal sewer systems. Between 1978 and 2024, simulated return flows ranged between 20 and 180 AFY and averaged about 90 AFY.

**Total Inflows** are the sum of the various inflows described above. Simulated total inflows ranged between 4,010 and 19,260 AFY and averaged about 10,970 AFY.

### Simulated Outflows

- **Pumping** was based primarily on agency-provided records. Simulated groundwater pumping ranged between 40 and 670 AFY and averaged about 320 AFY.
- **Inter-Subbasin Groundwater Underflow** from the GHSA to the main Indio Subbasin across the Garnet Hill Fault has been estimated to range between negative 11,390 to positive 60 AFY and averaged about negative 5,620 AFY.
- **Inter-Subbasin Groundwater Underflow** from the GHSA to the West Indio Hills has been estimated to range between negative 130 to positive 50 AFY and averaged about negative 80 AFY.
- **Increased recharge** at the WWR-GRF has occasionally reversed the direction of groundwater flow, resulting in flow from the main Indio Subbasin to the GHSA, as reflected by simulated positive and negative inter-subbasin groundwater underflow.

**Total Outflows** are the sum of the various outflows described above. Simulated total outflows ranged between negative 130 to positive 50 AFY and averaged about negative 80 AFY.

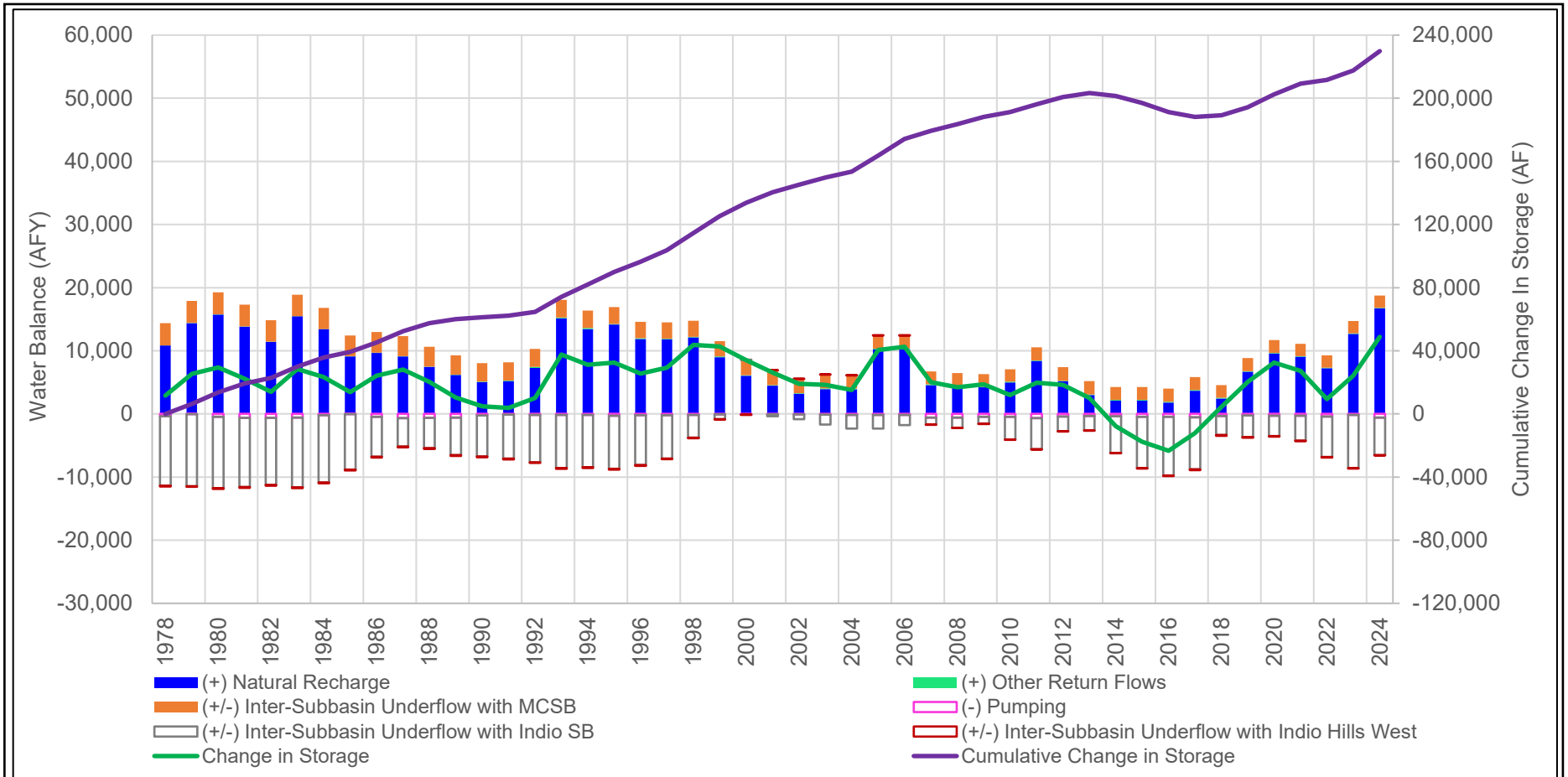
### Simulated Change in Groundwater Storage

The simulated change in groundwater storage in the GHSA can be calculated with Equation 1. Between 1978 and 2024, total inflows minus total outflows ranged between negative 5,830 AFY and positive 12,200 AFY and averaged about positive 4,950 AFY (**Appendix A, Table A12**) as shown by the green annual Change in Storage line on the GHSA chart on **Figure 5-9**.

From 1978 to 2006, GHSA annual storage generally increased due to increases in MFR and inter-subbasin groundwater underflow from the main Indio Subbasin associated with recharge at the WWR-GRF. Annual storage then declined between WY 2006-2007 and WY 2017-2018, before again increasing between WY 2018-2019 and WY 2023-2024. The cumulative change in storage from 1978 to 2024 is approximately positive 242,500 AF, with most of that occurring before 2006 (**Figure 5-9** and **Appendix A, Table A12**).

## 5.8 Sensitivity Analysis

A sensitivity analysis was not conducted for the 2027 MCSB Model Update because hydraulic parameters were unchanged from the original model. The MCSB Model sensitivity run results can be reviewed in the Appendix A of the 2022 MCSB Update.




Notes:
1. Water balance inflows and outflows derived from calibrated model.
2. Water balance is presented by water year (WY) beginning in WY 1991 once quarterly stress periods begin; prior years are annual summaries.
3. (+) - Positive indicates flow into the GHSA
4. (-) - Negative indicates flow out of the GHSA

Abbreviations:
AF = Acre Feet
AFY = Acre Feet per Year
MCSB = Mission Creek Subbasin
GHSA = Garnet Hill Subarea
GW = Groundwater

**1978 - 2024 Simulated Water Balance for Garnet Hill Subarea**

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|---|---|---|
| WSP | | Figure 5-9 |

# 6. 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. Identifying and avoiding undesirable results remains essential to successful implementation of this 2027 Mission Creek Subbasin (MCSB) Alternative Plan Update (2027 MCSB Update) and achievement of the water management objectives established in the 2013 Mission Creek/Garnet Hill Water Management Plan (2013 MC/GH WMP) (MWH, 2013) and summarized in the 2016 Bridge Document. The Coachella Valley Water District (CVWD), Desert Water Agency (DWA, and Mission Springs Water District (MSWD) [Agencies] recognize that establishing metrics to avoid undesirable results and to maintain sustainability is a key component of groundwater management. As such, the Agencies established sustainable management criteria (SMC) in the 2022 MCSB Alternative Plan Update (2022 MCSB Update) (Wood and Kennedy Jenks, 2021). This 2027 MCSB Update continues to incorporate SMC to guide water resources management within the MCSB. SMC for the Garnet Hill Subarea (GHSA) of the Indio Subbasin are being developed separately through the 2027 Indio Subbasin Water Management Plan Update (Todd/Rincon, 2026).

SMC for the MCSB were originally developed based on information supporting the Hydrogeologic Conceptual Model, characterization of groundwater conditions, the groundwater balance (see Section 5), and discussions with the Agencies and stakeholders. These criteria were reviewed through implementation of the 2022 MCSB Update and subsequent annual reporting. This chapter evaluates groundwater conditions through water year (WY) 2023-2024 and incorporates later survey information to improve the accuracy of reported groundwater elevations and associated criteria.

The SGMA includes defined terms related to SMC, which are used throughout this section:

- **Management Area** – an area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on variations in water use sector, source type, or hydrogeologic conditions.
- **Measurable Objective (MO)** – a specific, quantifiable goal for the maintenance or improvement of groundwater conditions that supports achievement of the sustainability goal for the basin.[1]
- **Interim Milestone** – a target value representing measurable groundwater conditions, in increments of five years, established as part of a Plan.

[1] The SGMA uses the term “basin” to refer to a groundwater basin. However, this can also apply to a subbasin such as the MCSB.

- **Minimum Threshold (MT)** – a numeric value for each sustainability indicator used to define undesirable results.
- **Representative Monitoring Site (RMS)** – a site within a monitoring network used to evaluate SMC. The nine groundwater-level RMS used in this Plan are referred to as Key Wells.
- **Sustainability Indicator** – any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results as described in Water Code Section 10721(x).
- **Undesirable Result** – a significant and unreasonable condition related to a sustainability indicator as defined by the Agencies for the MCSB, consistent with SGMA and California Department of Water Resources (DWR) guidance.

Although SGMA allows for establishment of Management Areas within a basin or subbasin to develop area-specific SMC, no Management Areas have been established for the MCSB. Likewise, no interim milestones have been designated, as the MCSB has consistently operated within the goals established by the 2013 MC/GH WMP and reaffirmed through SGMA implementation.

Monitoring results from WY 2019-2020 through WY 2023-2024 are evaluated against the applicable SMC in Sections 6.3 through 6.6. The MCSB remains in long-term balance with stable to slightly positive groundwater storage trends since 2013.

## 6.1 Sustainability Goal

As identified in the 2016 Bridge Document, the sustainability goal for the MCSB was initially based on the mission statement of purpose from the 2013 MC/GH WMP (MWH, 2013):

> *"The purpose of the 2013 Mission Creek and Garnet Hill WMP is to manage the water resources to meet demands reliably and protect water quality in a sustainable and cost-effective manner."*

This foundational goal was reaffirmed and refined through the 2022 MCSB Update to align with the SGMA. The SGMA-specific sustainability goal for the MCSB[2] is:

> *"Maintain sustainable water resources to reliably meet demands for existing and future beneficial use in the Mission Creek Subbasin by managing the water resources cost effectively to avoid undesirable results."*

[2] The SGMA sustainability goal for the GHSA of the Indio Subbasin is included in the Alternative Plan Update for the Indio Subbasin.

## 6.2 Sustainable Management Criteria Overview

In general, the process for developing SMC begins with identifying the sustainability indicators relevant to the MCSB. As defined previously, sustainability indicators are the effects caused by groundwater conditions occurring throughout the subbasin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x). Using this definition, the four sustainability indicators relevant to the MCSB based on historical or current conditions include:

- **Chronic lowering of groundwater levels** – Historically, groundwater levels declined by up to approximately 60 feet between 1970 and 2009, but have since recovered as a result of sustained management actions and groundwater replenishment programs implemented under the 2013 MC/GH WMP and subsequent planning efforts. Groundwater elevations have remained above the MTs in all key wells through WY 2023-2024, with most wells maintaining levels above the MOs.
- **Reduction of groundwater storage** – As described in Section 4, groundwater storage declined between 1970 and 2009 due to historical pumping, but has increased since 2010 as a result of continued imported water recharge and reduced groundwater extractions. The 2022 MCSB Update and subsequent annual reports document stable to positive storage trends in recent years.
- **Degraded water quality** – For purposes of this 2027 MCSB Update, constituents of concern (COCs) refer to chemical constituents that have exceeded or have the potential to exceed applicable California drinking water Maximum Contaminant Levels (MCLs) in groundwater used for municipal supply. As described in Section 4.6, naturally occurring uranium activity historically exceeded drinking water regulatory thresholds in two municipal water supply wells that are no longer in use. In 2024, California adopted a constituent-specific MCL of 10 micrograms per liter (µg/L) for hexavalent chromium (Cr(VI)), effective October 1, 2024. The separate total chromium MCL remains 50 µg/L. The new Cr(VI) MCL prompted additional evaluation of Cr(VI) as part of this 2027 MCSB Update. Concentrations both above and below 10 µg/L have occurred historically in the MCSB groundwater, including concentrations above 10 µg/L before SGMA implementation. Available information indicates that Cr(VI) occurrence in the MCSB is naturally occurring. Therefore, adoption of the new MCL changed the applicable drinking-water regulatory benchmark but did not, by itself, represent a new change in groundwater quality. Municipal water purveyors continue to manage drinking water compliance through existing monitoring and regulatory programs. Total dissolved solids (TDS) have continued to increase gradually over time due to groundwater use and return flow, fertilizer use, wastewater percolation, and recharge of higher-TDS imported water. Nitrate concentrations remain below the MCL, but have the potential to increase locally over time from fertilizer and wastewater percolation in the MCSB.

- **Land subsidence** – No groundwater extraction-related land subsidence has been documented within the MCSB. Although the subbasin contains fine-grained sediments at depth, monitoring through Interferometric Synthetic Aperture Radar (InSAR) data indicates no measurable or significant land subsidence related to groundwater management. The potential for land subsidence cannot be fully eliminated without continued data collection.

Under SGMA, a sustainability indicator may be excluded from consideration if evidence demonstrates that it does not exist and could not occur. In the MCSB, two indicators are therefore excluded from further analysis:

- **Depletion of interconnected surface waters** – 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 MCSB, the surface waters and groundwaters in this area are hydraulically disconnected from the main MCSB and consist almost entirely of publicly managed lands. There are no interconnected surface waters within the MCSB that could be impacted by groundwater management activities; therefore, this sustainability indicator is not considered further.
- **Seawater intrusion** – There are no coastal water bodies or sources of seawater intrusion in the vicinity of the MCSB; therefore, this sustainability indicator is not considered further.

## 6.3 Lowering of Groundwater Levels

The Agencies recognized in the 1990s that continued lowering of groundwater levels in the MCSB was not sustainable and could lead to undesirable results such as increased pumping costs and loss of well capacity. To address this, an imported water recharge program was initiated at the Mission Creek Groundwater Replenishment Facility (MC-GRF) in 2002. Since that time, groundwater levels have generally increased and stabilized across most of the MCSB.

The Agencies further understand that groundwater level declines may occur periodically during below normal precipitation years when imported water deliveries are reduced; however, the Agencies manage the MCSB to maintain long-term average groundwater levels at or above 2009 conditions, which represent the period of historically low groundwater levels throughout much of the MCSB. No dry or failed wells have been reported within the MCSB, and the DWR "Reported Dry Water Sources" database[3] continues to show no entries within the MCSB. Maintaining groundwater levels above 2009 conditions was established as an objective of the 2013 MC/GH WMP, which formed the basis of the Alternative Plan for groundwater sustainability submitted in 2016 and approved by DWR in 2019 (DWR 2019a). DWR recommended that the Agencies provide groundwater-level criteria from specific groundwater monitoring wells that will be used to demonstrate compliance with the 2009 groundwater level standard identified in the Plan or describe in detail how 2009 groundwater levels are determined

[3] https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#currentconditions, site accessed August 28, 2026.

and how the 2009 groundwater levels can be quantitatively compared to on an ongoing basis, in order for the Agencies and DWR to track progress towards sustainability.

The 2022 MCSB Update identified nine Key Wells in the MCSB to monitor groundwater levels for SGMA compliance. The location of the nine Key Wells is shown on **Figure 6-1**. This section provides the background on selection of the nine Key Wells, the original groundwater-level criteria to prevent significant and unreasonable groundwater level conditions (defining the MOs and MTs for each Key Well), and updates to the groundwater level criteria for the Key Wells based on an evaluation of groundwater level data collected since the 2022 MCSB Update was published.

### 6.3.1 Significant and Unreasonable Groundwater Level Conditions

Significant and unreasonable groundwater level conditions for the MCSB were selected based on discussions with the Agencies, review of hydrogeology, well pump settings, and historical records of impacts to beneficial users and neighboring subbasins resulting from lower groundwater levels. Significant and unreasonable groundwater levels in the MCSB are those that:

- Decline significantly below the lowest historically observed groundwater levels for an extended period. In most cases, the lowest historical groundwater levels occurred in or around 2009, which serves as the reference period for establishing MOs and MTs. In the northern portion of the MCSB, groundwater replenishment that began in 2002 produced higher groundwater levels by 2009 relative to the historical lows that preceded recharge activities.
- Decline to levels that substantially impair water supply well performance or reliability.
- Decline to levels that contribute to significant and unreasonable conditions for other sustainability indicators such as groundwater storage reduction or land subsidence.

Groundwater levels across most of the MCSB have either increased or stabilized since initiation of groundwater recharge at the MC-GRF in 2002. The combination of recharge operations and ongoing water management programs continues to prevent chronic groundwater level decline and maintain levels above thresholds throughout the MCSB.

Groundwater levels in the MCSB currently remain above their 2009 levels in nearly all monitoring wells that have available historical groundwater level data for comparison. Exceptions include a monitoring well near the MC-GRF where groundwater level mounding from high recharge volumes in 2005 and 2006 created elevated groundwater levels that were well above historical lows in this area. Mounding has since dissipated with time and lower recharge volumes, while groundwater levels across much of the MCSB remain above historical lows. Groundwater-level conditions through WY 2023-2024 are summarized below.

The WY 2023–2024 MCSB Annual Report reported groundwater levels above the then-applicable MTs at all nine Key Wells, with well 03S04E04P001S (4P01) 0.3 foot above its provisional MT. The reported nine Key Well average was approximately 7.9 feet above the average MO and 16.4 feet above the average MT (WSP, 2025). These comparisons reflect the criteria, groundwater-level statistics, and survey information used in that Annual Report and are presented as historical reporting context. Revisions to the estimated 2009 groundwater elevations at well 4P01 and well 03S05E15R001S (15R01), and the associated criteria, are described in Section 6.3.2.

### 6.3.2 Measurable Objectives and Minimum Thresholds

MOs and MTs for the lowering of groundwater levels were established as described below. The information used for establishing the MOs and MTs for the lowering of groundwater levels includes:

- Input from the Agencies on goals for management and potential issues resulting from declines in groundwater levels, and
- Input on significant and unreasonable conditions received from the Agencies and solicited during public meetings.

The general steps for establishing the MOs and MTs were described in the 2022 MCSB Update. The following describes the process including revisions to the general steps to improve the accuracy of MOs and MTs:

1. Establish RMS (Key Wells) for groundwater level sustainability criteria monitoring. **Table 6-1** provides the rationale for selecting the Key Wells and **Figure 6-1** shows the locations of the nine Key Wells selected for the MCSB. Additional information on the groundwater level network was provided in the 2022 MCSB Update and has not changed.
2. Establish MOs to maintain long-term average groundwater levels at or above calendar year 2009 conditions. For the seven Key Wells with measurements available in 2009, use the lowest groundwater elevation measured during that calendar year. Estimate the 2009 groundwater elevations at well 4P01 and well 15R01 as described in Step 3.
3. For the 2022 MCSB Update, MOs were derived using water level data for seven of the nine Key Wells. The remaining two wells, wells 4P01 and 15R01, were selected to provide spatial coverage within the MCSB. Unlike the other Key Wells, these two wells had limited groundwater monitoring histories that do not extend back to 2009. MOs for these two wells, therefore, were established for the 2022 MCSB Update based on the 2009 groundwater levels estimated by the calibrated groundwater model for the well locations. Both of these MOs were noted as provisional and subject to change in the 2022 MCSB Update. Based on monitoring data collected through WY 2023-2024, the MO for well 4P01 appeared to be anomalous relative to MOs in other Key Wells. Groundwater models are calibrated for the best fit of all data available and areas with more data are typically better represented than

areas with less data as was the case with wells 4P01 and 15R01. **Figure 6-2** presents a groundwater elevation contour map of the lowest (minimum) groundwater elevations in calendar year 2009 in the MCSB using available water level data and the general shape of groundwater contours in the MCSB as they are currently and historically known when water level data are available for wells 4P01 and 15R01. **Figure 6-2** provides a more accurate estimation of the minimum groundwater elevations at wells 4P01 and 15R01 in 2009 than the 2022 MCSB groundwater model estimates. Consequently, estimated groundwater elevations based on the contour map of the 2009 low groundwater elevations will be used as the basis for updated MOs for wells 4P01 and 15R01. Revised MOs, 2022 MOs, and the change in MOs for the Key Wells are presented in **Table 6-2.** Note that the 2022 MOs are not directly comparable to the values presented in the 2022 MCSB Update, or the MCSB annual reports through WY 2023-2024, due to survey datum adjustments and a resurvey for accuracy of Key Wells.[4] The WY 2024-2025 Annual Report (WSP, 2026) incorporates updated North American Vertical Datum of 1988 (NAVD88) survey elevations for all nine Key Wells and provides the reported values used for the previous-criteria comparison in **Table 6-2**.[5] The revisions should be considered an improvement in the accuracy of the MOs rather than a modification because the revisions result from an improvement in the methodology for estimating historical groundwater levels at the two Key Well locations. The two MOs will remain provisional because the water levels at these locations in 2009 are unknown, and additional data collection and evaluation may result in future modifications.

4. Establish a slightly lower groundwater elevation than the MOe (i.e., below the 2009 groundwater levels) to allow for Agency operational flexibility. This value represents the MT for each Key Well. Several potential options were considered for determining the magnitude of this operational flexibility. Groundwater level variability was considered an important factor as discussed in the next step.

5. Use groundwater-level variability at each Key Well to establish its MT below the MO. The 2022 MCSB Update evaluated variability using groundwater-level measurements from calendar years 2002 through 2019. For this 2027 MCSB Update, the evaluation period extends from WY 2001–2002 through WY 2023–2024, using available measurements within that period at each well. The extended record provides additional data for well 4P01, which had approximately two years of measurements available for the 2022 MCSB Update. Because of that limited record, the earlier MT for well 4P01 used the average of all other Key Well standard deviations. The revised MT uses the standard deviation calculated from well 4P01's own available measurements.

[4] The survey datum for the 2022 MCSB Update was the National Geodetic Vertical Datum of 1929 (NGVD29). Survey datum were converted to NAVD88 in Water Year 2020-2021 (Wood, 2022). Key Wells and select other wells were resurveyed for accuracy by each of the Agencies in 2023 (CVWD), 2024 (DWA), and 2025 (MSWD) as documented in the annual reports for WY 2023-2024 (WSP, 2025) and WY 2024-2025 (WSP, 2026).

[5] The groundwater-level evaluation period for this update ends with WY 2023–2024. As supporting context, the WY 2024–2025 low groundwater elevation at 4P01 was 722.3 feet NAVD88, 2.1 feet below the previously reported provisional minimum threshold (WSP, 2026) and 18.9 feet above the revised minimum threshold presented in this Update. This water-year-low comparison is provided as supporting context; the annual SMC comparisons and groundwater-level undesirable-result criterion use annual-average groundwater elevations, as described in Sections 6.3.2.4 and 6.3.4.

**Table 6-2** compares the previous and revised criteria. Except for wells 4P01 and 15R01, the revised MTs differ from the previous values by 1.5 feet or less. The revisions at wells 4P01 (a decrease of 21 feet) and 15R01 (a decrease of 5.4 feet) reflect both the revised estimates of 2009 groundwater elevations and the updated groundwater-level variability.

**Table 6-3** summarizes the groundwater-level statistics for each Key Well. Standard deviations range from 3.5 feet at well 15R01 to 14.8 feet at well 02S04E23N002S (23N02). Well 23N02 is located near the MC-GRF and has experienced relatively large groundwater-level fluctuations associated with the amounts and timing of recharge. For each Key Well, the calculated standard deviation was subtracted from the MO to establish the revised MT.

**Table 6-4** compares the revised criteria with observed historical low groundwater elevations or, for wells 4P01 and 15R01, estimated calendar-year 2009 low groundwater elevations. At well 23N02, the MO is 10.4 feet above the historical low, reflecting the influence of recharge before 2009. The MTs average 5.6 feet below the observed historical lows or estimated reference elevations, with the greatest difference being 8.9 feet at well 02S04E36D001S (36D01).

**Figure 6-3** shows the hydrograph for each Key Well along with its revised MO and MT.

The following subsections verify that groundwater levels represented by the MTs will not result in significant and unreasonable conditions by comparing the revised MTs to pump settings and other sustainability indicators.

**Table 6-1: Key Wells**

| State Well Number | Local Name | Well Name | Rationale for Selection as a Key Well |
|---|---|---|---|
| 02S04E23N002S | Well No. 30 | 23N02 | Long monitoring history. Northern portion of 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 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 3405-2 | 12C01 | Long monitoring history. Near the center of the main subbasin |
| 03S05E15R001S | Desert Springs Aquaculture Inc. | 15R01 | Southern end of the main subbasin |
| 03S05E17J001S | Seven Palms | 17J01 | Long monitoring history. South central part of the main subbasin |

San Bernardino County

Riverside County

Mission Creek

Mission Creek Groundwater Replenishment Facility

San Bernardino Mountains

Little San Bernardino Mountains

Whitewater River

Bonnie Bell

23N02

28J01

36D01

36K01

04P01

12C01

11L04

17J01

15R01

Whitewater River Groundwater Replenishment Facility

| 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 3505 | 200 - 480 |
| 15R01 | 03S05E15R001S | 15R01 | 200 - 400 |
| 17J01 | 03S05E17J001S | 17J01 | 182 - 405 |

N

0 4,000 8,000

Feet

## Explanation

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

## Notes

1. bgs = below ground surface.
2. SWN=State Well Number

Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018.

KEY WELLS FOR GROUNDWATER LEVELS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

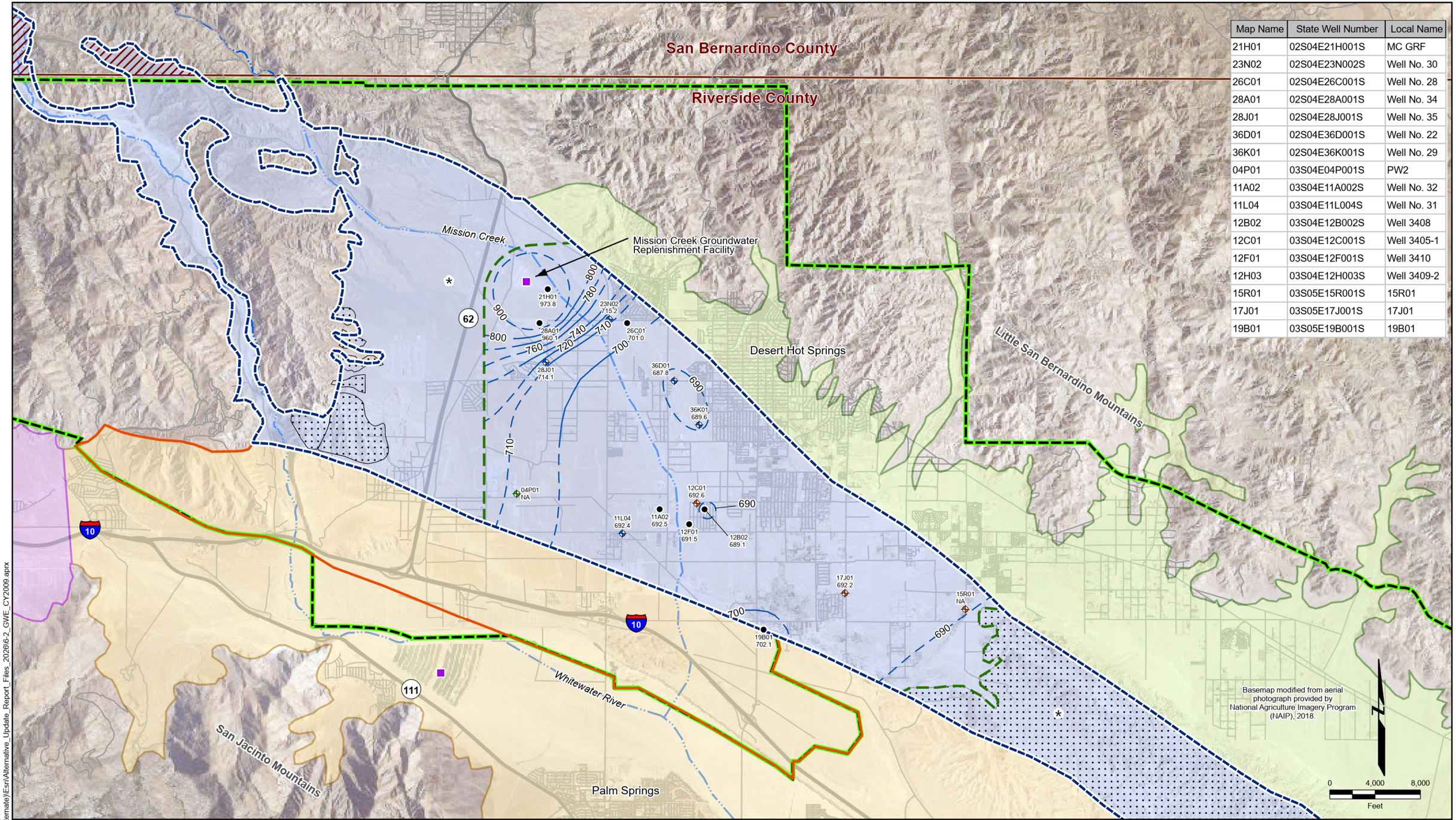
By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616

WSP

Figure 6-1

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| Map Name | State Well Number | Local Name |
|---|---|---|
| 21H01 | 02S04E21H001S | MC GRF |
| 23N02 | 02S04E23N002S | Well No. 30 |
| 26C01 | 02S04E26C001S | Well No. 28 |
| 28A01 | 02S04E28A001S | Well No. 34 |
| 28J01 | 02S04E28J001S | Well No. 35 |
| 36D01 | 02S04E36D001S | Well No. 22 |
| 36K01 | 02S04E36K001S | Well No. 29 |
| 04P01 | 03S04E04P001S | PW2 |
| 11A02 | 03S04E11A002S | Well No. 32 |
| 11L04 | 03S04E11L004S | Well No. 31 |
| 12B02 | 03S04E12B002S | Well 3408 |
| 12C01 | 03S04E12C001S | Well 3405-1 |
| 12F01 | 03S04E12F001S | Well 3410 |
| 12H03 | 03S04E12H003S | Well 3409-2 |
| 15R01 | 03S05E15R001S | 15R01 |
| 17J01 | 03S05E17J001S | 17J01 |
| 19B01 | 03S05E19B001S | 19B01 |




## Explanation

- Groundwater Replenishment Facility
- Monitored Well
  - Coachella Valley Water District - Key Well
  - Mission Springs Water District - Key Well
  - Desert Water Agency - Key Well
  - Other - Non Key Well
- Stream
- Highway/road
- Planning Area
- Low permeability/non-water bearing sediments/bedrock
- Water level data boundary line
- Mission Creek Subbasin fringe area
- Garnet HIll Subarea of Indio Subbasin
- Mission Creek Subbasin
- Desert Hot Springs Subbasin
- Indio Subbasin
- San Gorgonio Pass Subbasin
- Groundwater elevation contour (feet NAVD88)
- * Water level data not available

## 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 720 feet NAVD88. Contours dashed where projected or inferred.
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.
3. NA = Not available.

# LOW GROUNDWATER ELEVATION CONTOURS 2009
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 9/11/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | Figure | 6-2 |

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## Table 6-2: Key Wells - Previous and Revised Measurable Objectives and Minimum Thresholds

| State Well Number | Local Name | Well Name | 2022 Measurable Objective 2009 Levels[1] (feet NAVD88) | Revised Measurable Objective 2009 Levels[2] (feet NAVD88) | Change in Measurable Objective Revised - 2022 Level (feet) | 2022 Minimum Threshold[3] (feet NAVD88) | Revised 2027 Minimum Threshold[4] (feet NAVD88) | Change in Minimum Threshold Revised - 2022 Level (feet) |
|---|---|---|---|---|---|---|---|---|
| 02S04E23N002S | Well No. 30 | 23N02 | 715.2 | 715.2 | 0.0 | 698.9 | 700.4 | 1.5 |
| 02S04E28J001S | Well No. 35 | 28J01 | 714.1 | 714.1 | 0.0 | 704.9 | 706.1 | 1.2 |
| 02S04E36D001S | Well No. 22 | 36D01 | 687.8 | 687.8 | 0.0 | 676.3 | 677.2 | 0.9 |
| 02S04E36K001S | Well No. 29 | 36K01 | 689.6 | 689.6 | 0.0 | 682.2 | 682.7 | 0.5 |
| 03S04E04P001S[5] | PW2 | 4P01 | 732.3 | 708.0 | -24.3 | 724.4 | 703.4 | -21.0 |
| 03S04E11L004S | Well No. 31 | 11L04 | 692.4 | 692.4 | 0.0 | 685.0 | 685.4 | 0.4 |
| 03S04E12C001S[6] | Well 3405-2 | 12C01 | 692.6 | 692.6 | 0.0 | 685.9 | 686.2 | 0.3 |
| 03S05E15R001S[5] | 15R01 | 15R01 | 698.7 | 690.1 | -8.6 | 692.0 | 686.6 | -5.4 |
| 03S05E17J001S | 17J01 | 17J01 | 692.2 | 692.2 | 0.0 | 688.5 | 687.5 | -1.0 |

Notes:

1. 2022 MO from 2022 MCSB Update and based on the minimum calendar year 2009 water levels or groundwater model derived water level for calendar year 2009 (4P01 and 15R01) and using new surveys for accuracy to NAVD88 conducted by CVWD for its wells in 2023 (WSP, 2025), DWA for its well in 2024, and MSWD for its wells in 2025 (WSP, 2026). Values are rounded to the nearest 0.1 foot.
2. Revised MO is based on the minimum groundwater level at the well in 2009 or estimated minimum groundwater level in 2009 (see note 5). Values are rounded to the nearest 0.1 foot.
3. 2022 MT from 2022 MCSB Update and based on the MO minus the standard deviation of water levels at that well from calendar year 2002 to calendar year 2019. Values are rounded to the nearest 0.1 foot.
4. Revised MT based on the revised MO minus the standard deviation of water levels at that well from WY 2001-2002 to WY 2023-2024. Values are rounded to the nearest 0.1 foot.
5. Wells 4P01 and 15R01 water level data do not extend back to 2009. The MOs for these wells were derived using the groundwater contour map of the minimum (lowest) groundwater level in the MCSB in calendar year 2009 (See Figure 6-2).

Acronym: NAVD88 = North American Vertical Datum of 1988.

**Table 6-3: Key Wells - Water Level Statistics WY 2001-2002 to WY 2023-2024**

| State Well Number | Local Name | Well Name | Minimum Level (feet NAVD88) | Maximum Level (feet NAVD88) | Average Level (feet NAVD88) | Standard Deviation (feet) |
|---|---|---|---|---|---|---|
| 02S04E23N002S | Well No. 30 | 23N02 | 704.8 | 762.1 | 728.2 | 14.8 |
| 02S04E28J001S | Well No. 35 | 28J01 | 712.6 | 744.6 | 728.6 | 8.0 |
| 02S04E36D001S | Well No. 22 | 36D01 | 686.1 | 719.3 | 705.0 | 10.6 |
| 02S04E36K001S | Well No. 29 | 36K01 | 688.5 | 713.5 | 703.6 | 6.9 |
| 03S04E04P001S | PW2 | 4P01 | 723.2 | 744.8 | 731.9 | 4.6 |
| 03S04E11L004S | Well No. 31 | 11L04 | 692.4 | 716.1 | 704.7 | 7.0 |
| 03S04E12C001S | Well 3405-2 | 12C01 | 691.9 | 715.4 | 702.0 | 6.4 |
| 03S05E15R001S | 15R01 | 15R01 | 695.2 | 706.9 | 703.2 | 3.5 |
| 03S05E17J001S | 17J01 | 17J01 | 691.4 | 707.9 | 699.8 | 4.7 |
| **Average Standard Deviation of Key Wells** | | | | | | **7.4** |

NAVD88 = North American Vertical Datum of 1988

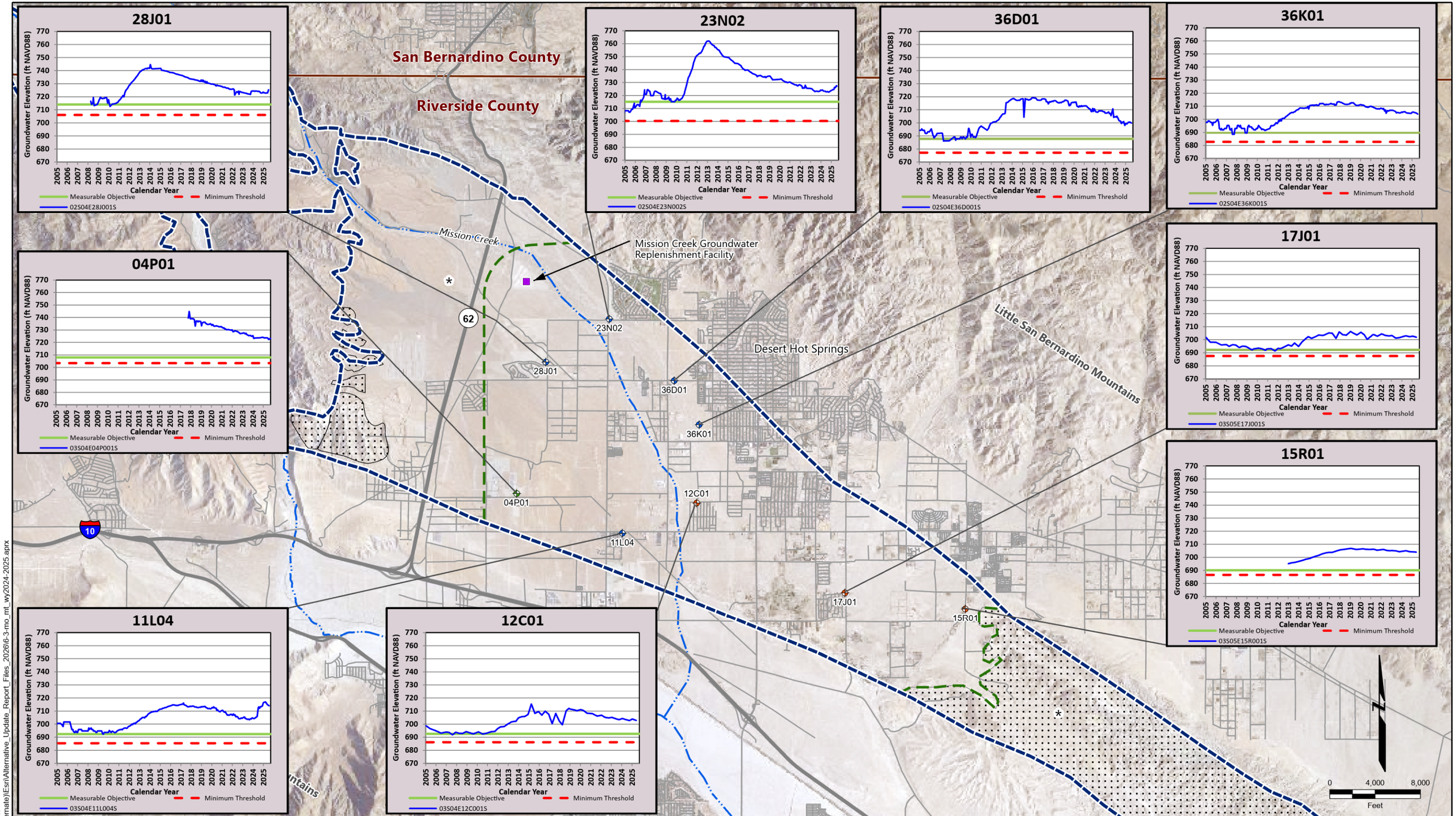
**Table 6-4: Key Wells - Measurable Objectives, Minimum Thresholds, and Historical Low Groundwater Levels**

| State Well Number | Local Name | Well Name | Revised Measurable Objective 2009 Levels[1] (feet NAVD88) | Revised Minimum Threshold[2] (feet NAVD88) | Historical Low Groundwater Elevation[3] (feet NAVD88) | Date of Historical Low Groundwater Elevation | Depth of Revised Measurable Objective Below Historical Low Groundwater Elevation (feet) | Depth of Revised Minimum Threshold Below Historical Low Groundwater Elevation (feet) |
|---|---|---|---|---|---|---|---|---|
| 02S04E23N002S | Well No. 30 | 23N02 | 715.2 | 700.4 | 704.8 | 12/7/2004 | -10.4 | 4.4 |
| 02S04E28J001S | Well No. 35 | 28J01 | 714.1 | 706.1 | 712.6 | 3/29/2010 | -1.5 | 6.5 |
| 02S04E36D001S | Well No. 22 | 36D01 | 687.8 | 677.2 | 686.1 | 7/3/2007 | -1.7 | 8.9 |
| 02S04E36K001S | Well No. 29 | 36K01 | 689.6 | 682.7 | 688.5 | 11/6/2007 | -1.1 | 5.8 |
| 03S04E04P001S[4] | PW2 | 4P01 | 708.0 | 703.4 | 708.0 | See note 3 | 0.0 | 4.6 |
| 03S04E11L004S | Well No. 31 | 11L04 | 692.4 | 685.4 | 692.4 | 8/4/2009 | 0.0 | 7.0 |
| 03S04E12C001S | Well 3405-2 | 12C01 | 692.6 | 686.2 | 691.9 | 9/12/2007 | -0.7 | 5.7 |
| 03S05E15R001S[4] | 15R01 | 15R01 | 690.1 | 686.6 | 690.1 | See note 3 | 0.0 | 3.5 |
| 03S05E17J001S | 17J01 | 17J01 | 692.2 | 687.5 | 691.4 | 10/25/2011 | -0.8 | 3.9 |
| **Average** | | | **698.1** | **690.6** | **696.3** | | **-1.8** | **5.6** |

Notes:

1. Revised MO is based on the minimum groundwater level at the well in 2009 or estimated groundwater level in 2009 (see note 3). Values are rounded to the nearest 0.1 foot.
2. Revised MT based on the revised MO minus the standard deviation of water levels at that well from WY 2001-2002 to WY 2023-2024. Values are rounded to the nearest 0.1 foot.
3. Low groundwater elevations based on historical record with the exception of wells 4P01 and 15R01. Water level data are first available for 15R01 in February 2013 and for 4P01 in November 2017. Low groundwater levels for these wells are estimated based on contoured groundwater elevations for 2009. Values are rounded to the nearest 0.1 foot.
4. Wells 4P01 and 15R01 have limited groundwater monitoring histories that do not extend back to 2009. The MOs for these wells were derived using the groundwater contour map of low groundwater levels in calendar year 2009.

Acronym: NAVD88 = North American Vertical Datum of 1988.































## Explanation

- Groundwater Replenishment Facility
- Coachella Valley Water District - Key Well
- Mission Springs Water District - Key Well
- Desert Water Agency - Key Well
- Mission Creek Subbasin
- Water level data boundary line
- Low permeability/non-water bearing sediments/bedrock
- Stream
- Highway/road
- Water Level hydrograph for well indicated
- Measurable objective
- Minimum threshold
- * Water level data not available

Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018.

## 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 Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 6-3 |

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#### 6.3.2.1 Minimum Thresholds Impact on Water Supply Wells

MT values for the MCSB were evaluated in relation to known well pump-depth settings in the MCSB. MT values need to be above pump settings so that if MT values are reached, a well pump will still be below the water level in the well and able to operate. For the review, the Agencies agreed that 50 feet of water above the pump setting under static conditions was a conservative metric to use for screening potential impacts to pumping.

CVWD and MSWD provided known or estimated pump depth settings for their municipal supply wells, and DWA provided estimates of pump settings in two private wells in DWA's area. This information was compared to the MTs for the Key Wells and other nearby wells with available pump setting information. Based on this review, only one well, Well 37 (P39) 02S04E36P001S, had a pump setting below the level identified by the Agencies (approximately 30 feet of water above the 2009 low groundwater elevation at the well instead of 50 feet) as necessary for pump operation. The top of the perforations for this well are several hundred feet below the pump setting and therefore lowering of the pump is all that is required to mitigate this potential issue.

Construction data for private wells in the MCSB are limited. No well construction information was available for any wells termed "minimal pumpers." However, there are no recorded instances of well performance issues reported to the Agencies at the time of historical low groundwater levels in 2009 or subsequent years. MTs are slightly below the historical low groundwater levels (ranging from approximately 3.5 to 8.9 feet below historical groundwater levels, see **Table 6-4**). Based on available information, impacts to private wells are not anticipated at the proposed MTs; however, this assessment is limited by the lack of construction and pump-setting information for all but a few private wells.

#### 6.3.2.2 Relationship Between Minimum Thresholds and Other Sustainability Indicators

The relationship between groundwater level MTs and other sustainability indicators is described below.

**Change in Groundwater Storage**

The MCSB consists of a single aquifer laterally and vertically. Groundwater levels are directly related to groundwater storage for the MCSB. MTs for water levels that are slightly below 2009 groundwater levels will not result in a significant change in storage compared to 2009 and the MCSB is of sufficient size that this level of storage will not limit groundwater use.

### Degraded Groundwater Quality

A significant and unreasonable condition for degraded water quality is water that does not meet regulatory limits for COCs in production wells due to groundwater management actions. Groundwater-quality conditions and the applicable management framework for nitrate, uranium, Cr(VI), and TDS are discussed in Section 6.6. In addition, setting the MT for groundwater levels slightly below 2009 groundwater levels is not anticipated to modify groundwater flow patterns within the MCSB significantly from 2009 groundwater conditions.

Conceptually, underflow from the Desert Hot Springs Subbasin (DHSSB) to the MCSB should increase with increasing water level difference across the Mission Creek Fault, resulting in groundwater degradation to the MCSB from higher TDS water in the DHSSB. However, groundwater model results described in Section 5.7.3.1 indicate that the variability in natural recharge in the DHSSB has a greater influence on groundwater underflow across the fault than local declining groundwater levels in the MCSB. In addition, groundwater recharge activities at the MC-GRF appear to have reduced groundwater underflow across the fault. From 1994 through 2009, estimated underflow from DHSSB to the MCSB ranged from approximately 1,250 to 1,400 acre-feet per year (AFY). From 2012 to 2023, the underflow ranged from approximately 1,100 AFY to 1,220 AFY. Based on this analysis, continued groundwater recharge at the MC-GRF, and average groundwater levels in the MCSB at or near 2009 levels, will not result in unusually high groundwater underflows across the fault compared with pre-2009 groundwater levels. In addition, the Mission Creek Fault underflow is only a small component of recharge to the MCSB, and any incremental increase in groundwater underflow due to groundwater level differences across the fault is a small fraction of the total underflow. Therefore, no significant and unreasonable groundwater quality impacts are anticipated with groundwater levels in the MCSB maintained at or slightly below 2009 groundwater levels.

### Land Subsidence

A significant and unreasonable condition for land subsidence is any measurable long-term inelastic land subsidence that is caused by lowering of groundwater elevations and damages existing infrastructure. Land subsidence may be caused by depressurization or dewatering of saturated sediments through lowering of groundwater levels. The groundwater level MTs are set slightly below historical low groundwater levels (10 feet or less). Because there was no evidence of land subsidence during historical low groundwater levels, MT groundwater levels are not anticipated to result in significant and unreasonable land subsidence if they were to occur.

## 6.3.2.3 Effect of Minimum Thresholds on Neighboring Subbasins/Subareas

The anticipated effect of groundwater level MTs on each of the neighboring subbasins is addressed below.

### Desert Hot Springs Subbasin

The DHSSB is separated from the MCSB by the Mission Creek Fault. Groundwater levels are more than 150 feet higher on the DHSSB side of the fault, and no groundwater flows out of the MCSB into the DHSSB. Lowering groundwater in the MCSB to slightly below 2009 groundwater levels will have a slight impact on groundwater underflows across the Mission Creek Fault, but as discussed above for groundwater quality, the impact of this additional underflow is minimal in context of the overall variability in underflow, reduction in underflow due to recharge at the MC-GRF, and the quantity of this underflow compared to natural recharge.

### Indio Subbasin

The MCSB is separated from the Indio Subbasin by the Banning Fault. Groundwater levels are more than 100 feet lower on the Indio Subbasin side of the fault and therefore groundwater flows from the MCSB to the Indio Subbasin. This flow primarily occurs via the GHSA of the Indio Subbasin. Conceptually, groundwater flow across the Banning Fault will decrease if the difference in groundwater levels across the fault decreases. Results of groundwater modeling indicate that the difference in flow from the MCSB to the GHSA resulting from decreasing water levels in the MCSB is relatively small compared with other inflows to the GHSA (see Section 5). Therefore, MTs for groundwater levels in the MCSB will have no significant effect on conditions in the GHSA. However, should groundwater levels drop below minimum thresholds in the GHSA near its boundary with the MCSB, groundwater level thresholds will be reevaluated.

#### 6.3.2.4 Measurement of Minimum Thresholds

Groundwater levels will be monitored at each Key Well and documented as part of the Annual Report's SMC review. For each WY, an annual average groundwater elevation will be calculated separately for each Key Well and compared with its applicable MO and MT. The annual average represents groundwater conditions during the evaluation year; it does not change the low calendar-year 2009 reference elevations used to establish the MOs. Key Well data and other monitoring data will also be used to prepare groundwater-elevation contour maps where data are sufficient.

## 6.3.3 Measurable Objectives

The MOs for groundwater levels in the MCSB are set to maintain groundwater levels at or above conditions observed or estimated for 2009. The MO for each Key Well is listed in **Table 6-4**. The MOs for all the Key Wells are shown on **Figure 6-3**. Additional discussion of MOs and MTs in context of the groundwater levels forecast using the calibrated groundwater model are provided in Section 7.

### 6.3.4 Undesirable Results

The criteria for defining undesirable results from lowering groundwater levels are based on annual-average groundwater elevations falling below the MTs. For the MCSB, a groundwater level undesirable result occurs when the annual-average groundwater elevation at the same four or more of the nine Key Wells[6] is below the applicable MT in each of three consecutive water years. This criterion identifies groundwater-level conditions below the MTs over a broad area for a sustained period. Annual-average groundwater elevations will be compared with the MOs and MTs as part of each Annual Report.

Groundwater levels falling below the MTs would trigger evaluation and, as appropriate, management actions such as mandatory water conservation measures, purchase of supplemental imported water for recharge, increased recharge of State Water Project (SWP) deliveries at MC-GRF, and/or other actions as needed. Based on the forecast results described in Section 7 and the planned PMAs described in Section 8, groundwater levels are anticipated to remain above their MTs at all Key Wells through the 2050 planning horizon under both the Near-Term Projects with Climate Change and Future Projects with Climate Change scenarios.

## 6.4 Reduction in Groundwater Storage

The storage capacity of the MCSB has been estimated at 2,600,000 acre-feet (AF) (DWR, 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 MCSB (GCI, 1979). Available groundwater in storage, however, is limited by the level to which groundwater levels may be lowered without causing undesirable results. This level has been established as the MT groundwater levels discussed in Section 6.3.

### 6.4.1 Significant and Unreasonable Reduction in Groundwater Storage Conditions

Significant and unreasonable groundwater storage conditions were selected for the MCSB based on meetings and discussions with the Agencies, review of hydrogeology, and historical changes in storage. Significant and unreasonable reduction in groundwater storage in the MCSB is that which:

- Leads to long-term reduction in groundwater storage.
- Contributes to significant and unreasonable conditions for other sustainability indicators.

[6] As noted in **Table 6-4,** two of the Key Wells (4P01 and 15R01) have limited groundwater monitoring histories that do not extend back to 2009 groundwater level conditions. The minimum thresholds and measurable objectives for these wells are considered provisional and subject to change based on how groundwater levels in these wells compare with regional groundwater levels.

### 6.4.2 Minimum Thresholds

As previously mentioned, groundwater storage in the MCSB is related to regional groundwater levels. Because the MCSB is managed as one hydrogeologic unit both laterally and vertically, the arithmetic mean of the annual-average groundwater elevations at the nine Key Wells is used as a proxy for groundwater storage in the MCSB. The groundwater storage MT is the arithmetic mean of the nine groundwater-level MTs presented in **Table 6-4**. For each WY, the mean of the nine Key Well annual-average groundwater elevations will be compared with this threshold. Annual-average elevations at individual Key Wells may be below their respective MTs while the nine Key Well mean remains above the groundwater storage MT. Individual well conditions will also be evaluated separately under the groundwater-level criteria described in Section 6.3.

#### 6.4.2.1 Effect of Minimum Thresholds on Beneficial Uses and Users

Groundwater storage is related to regional groundwater levels, and the effect of MTs on beneficial uses and users is the same as discussed for lowering groundwater levels.

#### 6.4.2.2 Effect of Minimum Thresholds on Neighboring Subbasins/ Subareas

Groundwater storage is related to regional groundwater levels, and the effect of MTs on neighboring subbasins/subareas is the same as discussed for lowering groundwater levels.

#### 6.4.2.3 Relationship Between Minimum Thresholds and Other Sustainability Indicators

Groundwater storage is related to regional groundwater levels, and the effect of MTs on other sustainability indicators is the same as discussed for lowering groundwater levels.

#### 6.4.2.4 Measurement of Minimum Thresholds

At any time, water levels in one part of the MCSB may increase while water levels in other portions of the MCSB may decrease. Reduction in groundwater storage, therefore, should consider the MCSB as a whole. Any reduction in groundwater storage is related to groundwater levels at the Key Wells, and because the Key Wells are spatially distributed in the MCSB, water level changes in all the Key Wells may be used to estimate the change in groundwater storage. For each WY, the annual-average groundwater elevation will be calculated for each of the nine Key Wells, and the arithmetic mean of those nine annual averages will be compared with the average MT of 690.6 feet NAVD88 (**Table 6-4**), which represents groundwater levels slightly below 2009 conditions. By using the average of the nine Key Well annual-average elevations, an overall reduction in groundwater storage for the MCSB can be considered and compared to

the MT. Water-level measurements and comparisons with the MTs will be presented in the Annual Reports.

### 6.4.3 Measurable Objectives

Available groundwater storage in the MCSB is fundamentally tied to groundwater levels in the MCSB. The MO for groundwater storage is to maintain groundwater storage corresponding to the 2009 reference groundwater conditions described in Section 6.3. For annual evaluation, the groundwater-level proxy for this objective is the arithmetic mean of the nine Key Well MOs presented in **Table 6-4**. The arithmetic mean of the nine Key Well annual-average groundwater elevations will be compared with that objective.

### 6.4.4 Undesirable Results

The criteria for defining groundwater storage reduction undesirable results are the volume of groundwater that can be withdrawn from the MCSD based on measurements from multiple areas without leading to undesirable results. For the MCSB, measured groundwater levels in the nine Key Wells will be used as a proxy representative for storage in the subbasin. An undesirable result for reduction in groundwater storage occurs when the arithmetic mean of the annual-average groundwater elevations at the nine Key Wells is below the average MT of 690.6 feet NAVD88 for three consecutive water years.

## 6.5 Land Subsidence

Land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials. Although several different earth processes can cause land subsidence, more than 80 percent of the land subsidence in the United States is related to the withdrawal of groundwater (Galloway and others, 1999). Groundwater level related land subsidence occurs when groundwater is withdrawn from an aquifer and causes the loss of pore space and compaction of sediments, that in turn, results in the lowering of the ground surface overlying the aquifer. Compaction of sediments at depth is the primary cause of this type of land subsidence. Consequently, it is more likely to occur where compactible fine-grained sediments (clay, clayey silt, and silty clay mixtures) are present. Land subsidence resulting from groundwater withdrawal can be elastic or inelastic. Inelastic land subsidence is permanent. Elastic land subsidence is the small, reversible lowering and rising of the ground surface resulting from groundwater level fluctuations. The SMC for land subsidence concern only inelastic (permanent) land subsidence.

Land subsidence has the potential to cause damage to infrastructure which could result in hazards to public health and safety. Examples of infrastructure that have the potential to be impacted by land subsidence include pipelines, bridges, private and public property, streets and highways, stormwater conveyance facilities, utility infrastructure, and groundwater wells.

Land subsidence may also result in a permanent loss of groundwater storage capacity if dewatering of an aquifer results in compression of sediments. Compaction of sediments permanently reduces the size and amount of pore spaces where water occurs in an aquifer, thus reducing overall aquifer storage capacity.

No groundwater-extraction-related land subsidence or associated infrastructure impacts have been identified historically in the MCSB. Geologic conditions of generally coarse-grained sediments and lack of thick, laterally extensive fine-grained sediments in the MCSB aquifer reduce the likelihood of land subsidence.

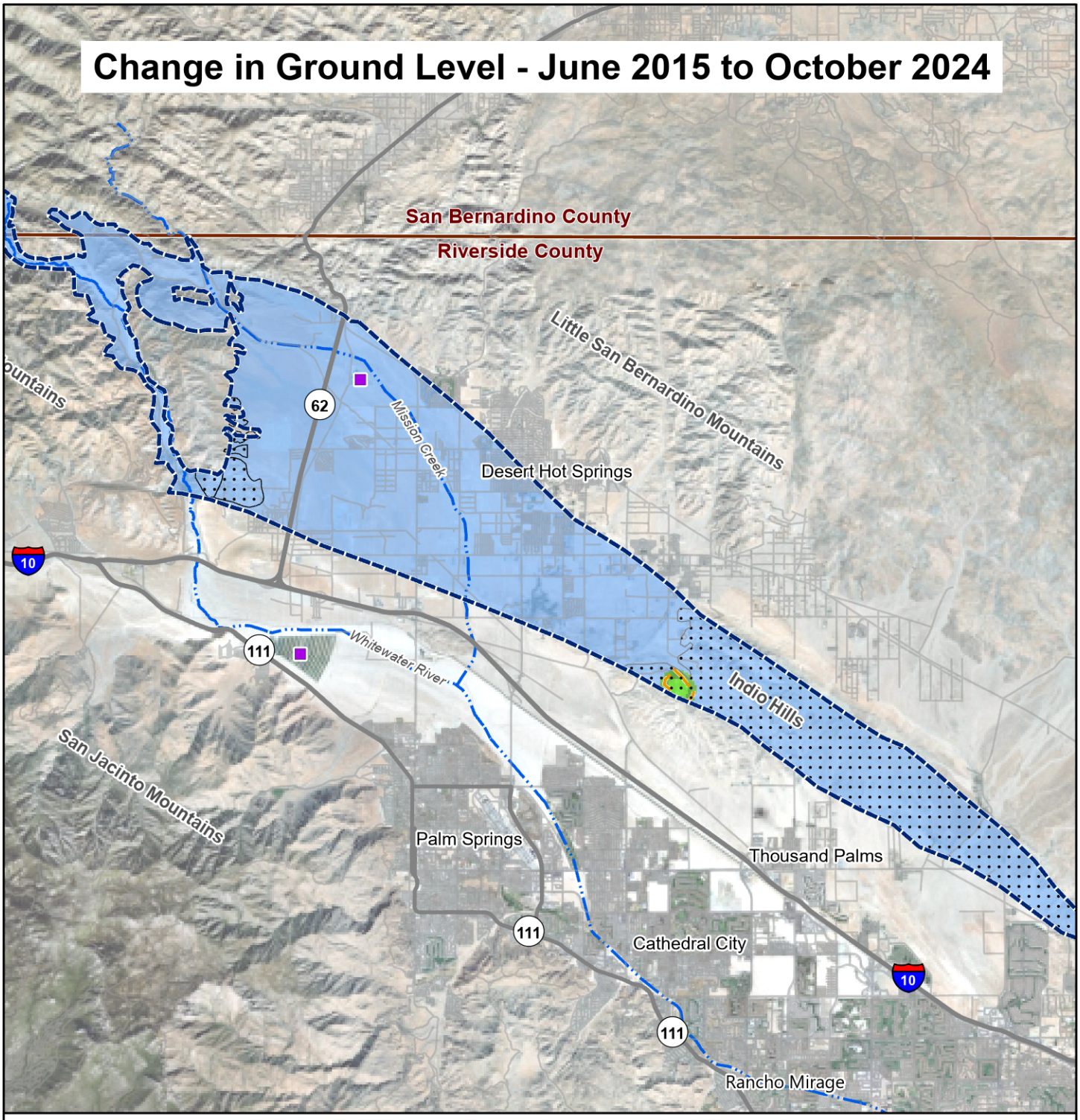
**Figure 6-4** shows the estimated vertical displacement of ground level as derived from InSAR data collected by the European Space Agency Sentinel-1A satellite and processed by TRE ALTAMIRA Inc., under contract with DWR. The vertical displacement data were obtained from DWR (DWR, 2026) for the period where it was first collected for the area of interest (June 2015 through October 2024). With the exception of the former Edom Hill Landfill area in the northwestern part of the Indio Hills, ground level change in the MCSB has exhibited less than an absolute vertical displacement of 0.1 foot. Vertical ground-level displacement at the former Edom Hill Landfill was up to 0.4 feet downward (-0.4 feet). This is likely due to settlement at the former landfill.

These findings are consistent with the previous general finding of no systematic downward permanent vertical displacement of ground levels caused by groundwater withdrawal. This monitoring occurred over a period where groundwater levels were relatively stable and well above historical low groundwater levels. Land subsidence is more likely to be observed, however, under conditions of continued lowering of groundwater levels below historical groundwater levels. Therefore, land subsidence continues to be a concern when water levels fall below historical low values.

### 6.5.1 Significant and Unreasonable Land Subsidence Conditions

Significant and unreasonable land subsidence conditions were defined for the MCSB based on discussions with the Agencies, review of hydrogeology, and historical change in storage. Significant and unreasonable land subsidence in the MCSB is land subsidence that results in any inelastic land subsidence that significantly impacts infrastructure and is caused by lowering of groundwater elevations occurring in the MCSB.

# Change in Ground Level - June 2015 to October 2024




## Explanation

- Groundwater Replenishment Facility
- Mission Creek Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Stream
- 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

Source: Vertical ground surface displacement estimates rasters are derived from Interferometric Synthetic Aperture Radar (InSAR) data collected by European Space Agency and processed by TRE ALTAMIRA under contract with California Department of Water Resources (https://sigma.water.ca.gov/webgis/?appid=SGMADataViewer#landsub).

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

N

0 9,000 18,000

Feet

CHANGE IN GROUND LEVEL
2015 TO 2024
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 9/15/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | Figure | 6-4 |

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### 6.5.2 Minimum Thresholds

Although available DWR InSAR data have not identified groundwater-extraction-related land subsidence in the MCSB, the resolution of the data is coarse, and the data are for a period of stable groundwater levels. The ongoing United States Geological Survey (USGS) evaluation of land subsidence potential in the MCSB is described below.

To further evaluate the potential for land subsidence, the Agencies have engaged the USGS to conduct a more detailed evaluation of the potential for land subsidence in the MCSB. If this initial evaluation identifies land subsidence as a potential issue, the USGS will develop a land subsidence monitoring workplan for the MCSB and conduct ground surface monitoring.

As a part of this effort, three additional benchmarks were installed in early 2023 for precise global positioning system (GPS) measurements in collaboration with USGS. The USGS evaluation includes consideration of groundwater levels and land-surface elevation measurements from new and existing benchmarks. Available study findings will be used to evaluate land subsidence potential and the associated SMC will be incorporated into subsequent Annual Reports.

Groundwater levels serve as a proxy indicator of the potential for land subsidence. Groundwater levels are well above historical lows, and land subsidence is unlikely to occur if groundwater levels remain above historical low levels. Because land subsidence was not observed or known to occur when groundwater levels in the MCSB were at historical lows, and considering that MTs for groundwater levels are only slightly (between 3 and 10 feet) lower than historic groundwater levels, land subsidence is not anticipated even if MTs for groundwater levels are reached.

#### 6.5.2.1 Effect of Minimum Thresholds on Beneficial Uses and Users

The land subsidence MT is set to prevent any long-term inelastic land subsidence that could harm infrastructure. Available information indicates that land subsidence has not occurred in the MCSB. Therefore, there is no negative impact on any beneficial user.

#### 6.5.2.2 Effect of Minimum Thresholds on Neighboring Subbasins/Subareas

The anticipated effect of land subsidence MTs on the neighboring subbasins is discussed below.

### Desert Hot Springs Subbasin

No evidence of land subsidence has been reported in the DHSSB. The MTs for land subsidence in the MCSB are not anticipated to impact the DHSSB. However, if land subsidence is identified near the boundary of the MCSB and DHSSB, it will be evaluated.

### Indio Subbasin

No evidence of groundwater extraction-related land subsidence has been identified in the GHSA of the Indio Subbasin based on available DWR InSAR data (DWR, 2026). The MTs for land subsidence in the MCSB are not anticipated to impact the Indio Subbasin. However, if land subsidence is identified near the boundary of the MCSB and the Indio Subbasin, it will be evaluated.

## 6.5.2.3 Relationship Between Minimum Thresholds and Other Sustainability Indicators

Land subsidence MTs have little or no impact on other sustainability criteria, as described below.

### Chronic Lowering of Groundwater

Land subsidence MTs will not result in significant and unreasonable lowering of groundwater levels.

### Reduction in Groundwater Storage

Land subsidence has the potential to reduce groundwater storage through compaction of aquifer materials. Compaction primarily occurs in fine-grained sediments which are limited in thickness and areal extent in the MCSB. Therefore, any loss of groundwater storage in the MCSB due to land subsidence would be negligible.

### Degraded Water Quality

The land subsidence MTs will not change the groundwater flow directions or flow rates across groundwater barriers, and therefore will not result in a significant and unreasonable change in groundwater quality.

## 6.5.2.4 Measurement of Minimum Thresholds

The Agencies will continue to evaluate available benchmark measurements collected as part of the USGS land subsidence evaluation. The status of the USGS land subsidence evaluation and benchmark monitoring is summarized above. In the interim, groundwater levels and DWR InSAR data will be used as indicators to monitor for the potential that inelastic land subsidence

may occur (groundwater levels) or is occurring (DWR InSAR data). Measurement of MTs for land subsidence will be documented as part of the Annual Reports.

### 6.5.3 Measurable Objectives

The Agencies will await the findings of the USGS work to evaluate MOs for land subsidence in the MCSB. In the interim, the MO is set identical to the MT.

### 6.5.4 Undesirable Results

The Agencies will await the findings of the USGS work to define the undesirable results for land subsidence in the MCSB. Undesirable results for land subsidence are most likely to occur with widespread and persistent lowering of groundwater levels below historical groundwater levels. Therefore, the groundwater-level undesirable result criterion described in Section 6.3.4 will be used as the interim undesirable result criterion for land subsidence.

## 6.6 Degraded Groundwater Quality

Groundwater supply wells with water quality analyses collected during the evaluation period are shown on **Figure 6-5**. Groundwater quality conditions in the MCSB, including the occurrence and temporal variability of naturally occurring constituents, are described in Section 4.6.

Uranium, Cr(VI)[7], and nitrate are evaluated as COCs in the MCSB. Uranium has historically exceeded its MCL in municipal supply wells and has previously been addressed through the MCSB groundwater quality SMC framework. Nitrate remains a COC because of ongoing potential anthropogenic sources, including wastewater infiltration and fertilizer use, although it has not exceeded its MCL in municipal supply wells. Groundwater quality occurrence and trends are discussed in Section 4.6, and results for the selected COCs with primary MCLs are summarized in **Table 6-5**.

[7] Hexavalent chromium now has a primary drinking water MCL of 10 micrograms per liter (µg/L), adopted by the California State Water Resources Control Board (SWRCB), effective October 1, 2024 (SWRCB, 2024a). Between the invalidation of California's earlier Cr(VI) MCL in 2017 and the effective date of the 2024 regulation, CR(VI) was regulated as component of total chromium under the 50 µg/L MCL. Hexavalent chromium is included in this review as a constituent of concern based on the adoption of this MCL.

**Table 6-5: Groundwater Quality Compared with California Primary MCLs – WY 2019-2020 to 2023-2024**

| Constituent of Concern | California Primary MCL | Units | Number of Wells Sampled WY 2020-2024 | Number of Wells with One or More Reported Results Above the Listed MCL WY 2020-2024 |
|---|---|---|---|---|
| Uranium | 20 | pCi/L | 11 | 0 |
| Nitrate (N) | 10 | mg/L | 12 | 0 |
| Hexavalent Chromium[1] | 10 | µg/L | 11 | 7 |

Note:
1. Cr(VI) results from WY 2020-2024 are compared with the 10 µg/L MCL adopted in 2024. This comparison characterizes groundwater-quality conditions and does not establish a Cr(VI) minimum threshold under this Alternative Plan Update.

Acronyms/abbreviations:
µg/L = micrograms per liter.
mg/L = milligrams per liter.
Nitrate (N) = nitrate as nitrogen.
pCi/L = picocuries per liter.

Cr(VI) is included as a COC in this 2027 MCSB Update because the State Water Resources Control Board Division of Drinking Water (SWRCB-DDW) established a new primary MCL of 10 µg/L, effective October 1, 2024. As described in Section 4.6, Cr(VI) concentrations both above and below 10 µg/L have occurred historically in MCSB groundwater, including concentrations above 10 µg/L before SGMA implementation. Available information indicates that Cr(VI) occurrence in the MCSB is naturally occurring. The new MCL therefore warrants continued evaluation of this COC and drinking-water compliance monitoring but does not, by itself, demonstrate degradation of groundwater quality caused by groundwater management.

TDS continues to require separate evaluation through the ongoing Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) process described in Section 6.6.2.2.

### 6.6.1 Significant and Unreasonable Degraded Groundwater Quality

Significant and unreasonable degraded groundwater quality conditions were defined for the MCSB based on discussions with the Agencies, review of the Hydrogeologic Conceptual Model, historical groundwater quality conditions, and potential effects of groundwater management on beneficial uses.

For purposes of this 2027 MCSB Update, significant and unreasonable degraded groundwater quality is groundwater quality degradation associated with groundwater extraction, recharge, or other groundwater management activities that:

- Results in exceedance of an established groundwater quality MT for a constituent for which a MT has been adopted under this 2027 MCSB Update; or
- Results in exceedance of applicable numeric objectives established through the CV-SNMP, when completed.

An exceedance of a drinking-water MCL may require action under applicable drinking-water regulations but does not, by itself, demonstrate that groundwater quality has been degraded by groundwater management. This distinction is particularly relevant for naturally occurring constituents such as Cr(VI), for which concentrations above the current MCL occurred in portions of the MCSB before SGMA implementation.

## 6.6.2 Minimum Thresholds

The 2022 MCSB Update established groundwater quality MTs for nitrate and uranium based on their California primary MCLs. Those criteria are retained in this 2027 MCSB Update. TDS continues to be addressed through the CV-SNMP process described in Section 6.6.2.2.

Cr(VI) is evaluated separately in this 2027 MCSB Update because the 10 µg/L primary MCL became effective in 2024 and available information indicates that concentrations above that value are part of the naturally occurring historical groundwater quality condition in portions of the MCSB. A separate numeric Cr(VI) MT is not established in this 2027 MCSB Update. The approach for evaluating Cr(VI) is described in Sections 6.6.2.1 and 6.6.2.6 below.

### 6.6.2.1 Constituents of Concern with Primary Maximum Contaminant Levels

The MCSB contains three COCs with primary MCLs: uranium, Cr(VI), and nitrate. Nitrate and uranium retain the groundwater quality SMC established in the 2022 MCSB Update. Cr(VI) is evaluated separately in this 2027 MCSB Update based on the historical and naturally occurring conditions described below. The following subsections summarize each constituent's occurrence, source, and relevance to groundwater management.

#### Uranium

Uranium is considered a COC because it has historically exceeded its MCL in a drinking water supply well in the MCSB. Uranium occurs naturally in portions of the MCSB, particularly within sediments in the northwestern area where elevated activity has been observed (MWH, 2013). The natural source is the weathering of uranium-bearing minerals in granitic and metamorphic rocks of the San Bernardino Mountains, which supply much of the sediment to the Mission Creek alluvial system. The distribution reflects these localized geologic inputs rather than anthropogenic sources, and recent data show that uranium activity has generally declined where recharge influences groundwater quality.

#### Hexavalent Chromium

Cr(VI) is considered a COC because the SWRCB-DDW established a primary drinking-water MCL of 10 µg/L, effective October 1, 2024, and concentrations above that value occur in some MCSB municipal supply wells. As described in Section 4.6, and shown on Figures 4-20 and 4-21, concentrations both above and below 10 µg/L have occurred historically in MCSB

groundwater, including concentrations above 10 µg/L before SGMA implementation. Available information indicates that Cr(VI) occurrence in the MCSB is naturally occurring.

The adoption of the 10 µg/L MCL therefore changed the drinking-water regulatory benchmark applicable to an existing groundwater quality condition rather than creating a new groundwater quality condition. Municipal water purveyors are responsible for compliance with applicable drinking-water requirements and manage Cr(VI), as necessary, through existing monitoring, treatment, source management, and other SWRCB-DDW-approved compliance measures. For purposes of this 2027 MCSB Update, Cr(VI) will continue to be evaluated to determine whether groundwater conditions are materially changing and whether any such change may be associated with groundwater extraction, recharge, or other groundwater management activities.

**Nitrate**

Nitrate is considered a COC based on ongoing sources for this constituent, including wastewater infiltration to the groundwater system through septic systems, disposal of treated wastewater effluent, and fertilizer application at golf courses. Nitrate has not exceeded its MCL in any municipal supply well.

Table 6-5 summarizes the number of water supply wells sampled for the selected COCs and the number with reported results above the listed California primary MCLs during WY 2020–2024.

### 6.6.2.2 Total Dissolved Solids

Sources of TDS in the MCSB include irrigation return flows subject to evaporation, wastewater infiltration to the groundwater system (through septic systems and disposal of treated wastewater effluent), fertilizer application at golf courses, and recharge of Colorado River Aqueduct (CRA) water at the MC-GRF.

TDS has three secondary maximum contaminant levels (SMCLs), or Consumer Acceptance Contaminant Level Ranges, set by the SWRCB-DDW: a recommended 500 milligrams per liter (mg/L) level, an upper 1,000 mg/L level, and a short-term 1,500 mg/L limit for rare circumstances. While primary MCLs are health-based standards, SMCLs, such as those for TDS, are based on aesthetic concerns (e.g., taste, color, and odor). TDS has exceeded the recommended 500 mg/L-level in some wells in the MCSB but has not exceeded the 1,000 mg/L upper level in any municipal supply well in the MCSB.

In 2015, the CV-SNMP was developed for the Coachella Valley Groundwater Basin in accordance with the SWRCB 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 Colorado River Basin Regional Water Quality Control Board (RWQCB) found the 2015 CV-SNMP insufficient and made recommendations for improvements in 2020. In 2020 and 2021, the CV-SNMP Agencies – which include CVWD, DWA, MSWD, Coachella Sanitary District, Indio Water Authority, Myoma Dunes Mutual Water Company, Valley Sanitary District, and City of Palm Springs – prepared a monitoring program workplan titled Groundwater Monitoring

Program Workplan for the Coachella Valley Salt and Nutrient Management Plan Update (GMP Workplan, West Yost, 2020). The RWQCB approved this GMP Workplan in February 2021. Within the MCSB alone, 22 wells were identified for the monitoring program, including wells screened in the shallow and deep portions of the MCSB aquifer system. Although the MCSB aquifer system is considered a single aquifer system, stratification of water quality is likely to occur based on the shallow sources for nutrients and TDS.

The CV-SNMP Agencies have also prepared a plan development workplan titled Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan (SNMP Workplan, West Yost, 2021) that was submitted to the RWQCB in September 2021 and approved in October 2021. This SNMP Workplan outlines the steps and schedule to update the CV-SNMP. The SNMP Workplan defines the updated CV-SNMP monitoring network, and identifies monitoring wells needed to address network gaps. Implementation activities include but are not limited to: public outreach, creation of a Technical Advisory Committee (TAC), characterization of current groundwater quality and salt loading, development of nitrogen/total dissolved solids (N/TDS) forecasting methodologies, completion of forecasting for multiple scenarios, selection of a preferred scenario, establishing management zones, and recommending TDS objectives.

In support of implementation, the TAC developed and published a series of Technical Memoranda (TMs) that have been released for public review and are available on the CV-SNMP website: https://www.cvsnmp.com/resources/.

- TM #1: Characterize TDS/N Mass Loading to the Coachella Valley Groundwater Basin (West Yost, 2024),
- TM #2: Characterize Current Groundwater Quality (West Yost, 2025a),
- TM #3: Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection (West Yost, 2025b),
- TM #4: Develop Technical Approach for Forecasting TDS/N Concentrations in Groundwater (West Yost, 2025c), and
- TM #5: Construct TDS/N Forecasting Tools and Evaluate the Baseline Scenario. (West Yost, 2026).

Two additional TMs will precede completion of the final CV-SNMP:

- TM #6: Forecast of TDS/N Concentrations, and
- TM #7: Characterize and Compare the Costs.

The TAC has met regularly with CV-SNMP Agency representatives and RWQCB staff to review technical work products and provide input on key assumptions, modeling approaches, and management strategies.

Preparation of the final CV-SNMP will include selection of a preferred CV-SNMP scenario, which will form the basis for a CV-SNMP implementation plan and any recommended updates to the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) (RWQCB, 2024), which could include: establishment of management zone delineations and descriptions;

groundwater beneficial use descriptions for each management zone; addition of numeric TDS objectives for each management zone; and addition of CV-SNMP implementation measures. The final CV-SNMP will include a plan and schedule to implement the preferred CV-SNMP scenario and perform the monitoring, reporting, and update activities as required by the Recycled Water Policy.

Elements of the CV-SNMP that will address DWR Recommended Corrective Action 1 on the 2022 MCSB Update (DWR, 2024) include:

- Continued progress to complete the CV-SNMP that is approved by the RWQCB and that can then be incorporated into future periodic evaluations of the 2027 MCSB Update to address salt loading in the MCSB.
- TDS antidegradation analyses will be conducted using the preferred CV-SNMP scenario. This scenario will include all sources of TDS including recharge of water sourced from the Colorado River. This antidegradation analysis will identify the potential extent of impacts to beneficial uses and will demonstrate that any water quality degradation allowed by the CV-SNMP provides maximum benefit to the people of California.

The ongoing CV-SNMP process is intended to address DWR's Recommended Corrective Action 1. The Final CV-SNMP is not anticipated to be complete until later in 2027 and therefore, is not yet available to incorporate into this 2027 MCSB Update.

#### 6.6.2.3 Effect of Minimum Thresholds on Beneficial Uses and Users

For nitrate and uranium, the retained MCL-based MTs provide criteria for evaluating groundwater quality conditions under this 2027 MCSB Update. Drinking-water compliance for these and other regulated constituents is separately administered through applicable SWRCB-DDW requirements.

For Cr(VI), no separate numeric MT is established in this 2027 MCSB Update. Municipal water purveyors continue to monitor and manage Cr(VI) through existing drinking-water compliance programs, including treatment, source management, or other measures where necessary to provide compliant municipal water. The 2027 MCSB Update separately evaluates whether groundwater management is causing significant and unreasonable degradation of groundwater quality.

For TDS loading, the CV-SNMP includes a process to demonstrate that beneficial uses are considered and protected.

### 6.6.2.4 Effect of Minimum Thresholds on Neighboring Subbasins/ Subareas

The possible effects of degraded groundwater quality conditions in the MCSB on neighboring subbasins are discussed below.

#### Desert Hot Springs Subbasin

DHSSB is separated from the MCSB by the Mission Creek Fault. Groundwater levels are higher on the DHSSB side of the Mission Creek Fault, and groundwater underflow is directed from the DHSSB toward the MCSB, as discussed in Section 6.3.2.3. Under these conditions, groundwater quality degradation in the MCSB is not anticipated to affect the DHSSB through groundwater underflow.

#### Indio Subbasin

The MCSB is separated from the Indio Subbasin by the Banning Fault, and groundwater generally flows from the MCSB toward the Indio Subbasin, primarily through the GHSA. Available groundwater quality information has not identified adverse groundwater quality impacts to the Indio Subbasin attributable to groundwater management in the MCSB. If future monitoring indicates adverse groundwater quality changes near the boundary that may be associated with MCSB groundwater management, those conditions will be evaluated.

### 6.6.2.5 Relationship Between Minimum Thresholds and Other Sustainability Indicators

The relationships between groundwater quality MTs and other sustainability indicators are described below.

#### Chronic Lowering of Groundwater

Groundwater quality MTs are not anticipated to affect chronic lowering of groundwater levels.

#### Reduction in Groundwater Storage

Groundwater quality MTs are not anticipated to affect groundwater storage.

#### Land Subsidence

Nothing in the groundwater quality management framework promotes conditions that could cause land subsidence. Therefore, groundwater quality management is not anticipated to result in significant and unreasonable land subsidence.

#### 6.6.2.6 Measurement and Evaluation of Groundwater Quality

Groundwater quality will continue to be evaluated using data from existing and new municipal supply wells and other applicable Agency, State, and local monitoring programs. Groundwater quality conditions and available monitoring data will continue to be summarized as part of Annual Reports and periodic evaluation of the 2027 MCSB Update.

For nitrate and uranium, concentrations will continue to be compared with the established MCL-based MTs.

For Cr(VI), monitoring results will be evaluated in the context of the historical groundwater quality conditions described in Section 4.6 and applicable drinking-water requirements. A Cr(VI) concentration above the 10 µg/L MCL will be addressed by the applicable municipal water purveyor under existing drinking-water compliance requirements but will not, by itself, be considered evidence of groundwater quality degradation caused by groundwater management.

If Cr(VI) monitoring indicates a material worsening of groundwater quality conditions that may be associated with groundwater extraction, recharge, or other groundwater management activities, the Agencies will investigate the condition using available historical and current groundwater quality and hydrogeologic information. Based on the findings of that evaluation, the Agencies will determine whether management actions, or additional or revised SMC, are warranted.

Consistent with the existing 2027 MCSB Update framework, if additional COCs are identified with concentrations exceeding applicable MCLs, the Agencies will investigate the occurrence and potential source of the exceedance and determine whether additional groundwater quality management actions or SMC are warranted.

For TDS, the CV-SNMP Update will establish the applicable water quality objectives and management framework. Groundwater quality monitoring and evaluation will be documented as part of Annual Reports.

### 6.6.3 Measurable Objectives

For nitrate and uranium, the MOs remain equal to the established MCL-based MTs.

A separate numeric MO is not established for Cr(VI) in this 2027 MCSB Update. Cr(VI) will be monitored and evaluated as described in Section 6.6.2.6, with municipal drinking-water compliance managed through applicable SWRCB-DDW requirements and groundwater management-related changes evaluated through implementation of the 2027 MCSB Update.

## 6.6.4 Measurable Objectives for TDS will be Determined Based on the Results of the CV-SNMP

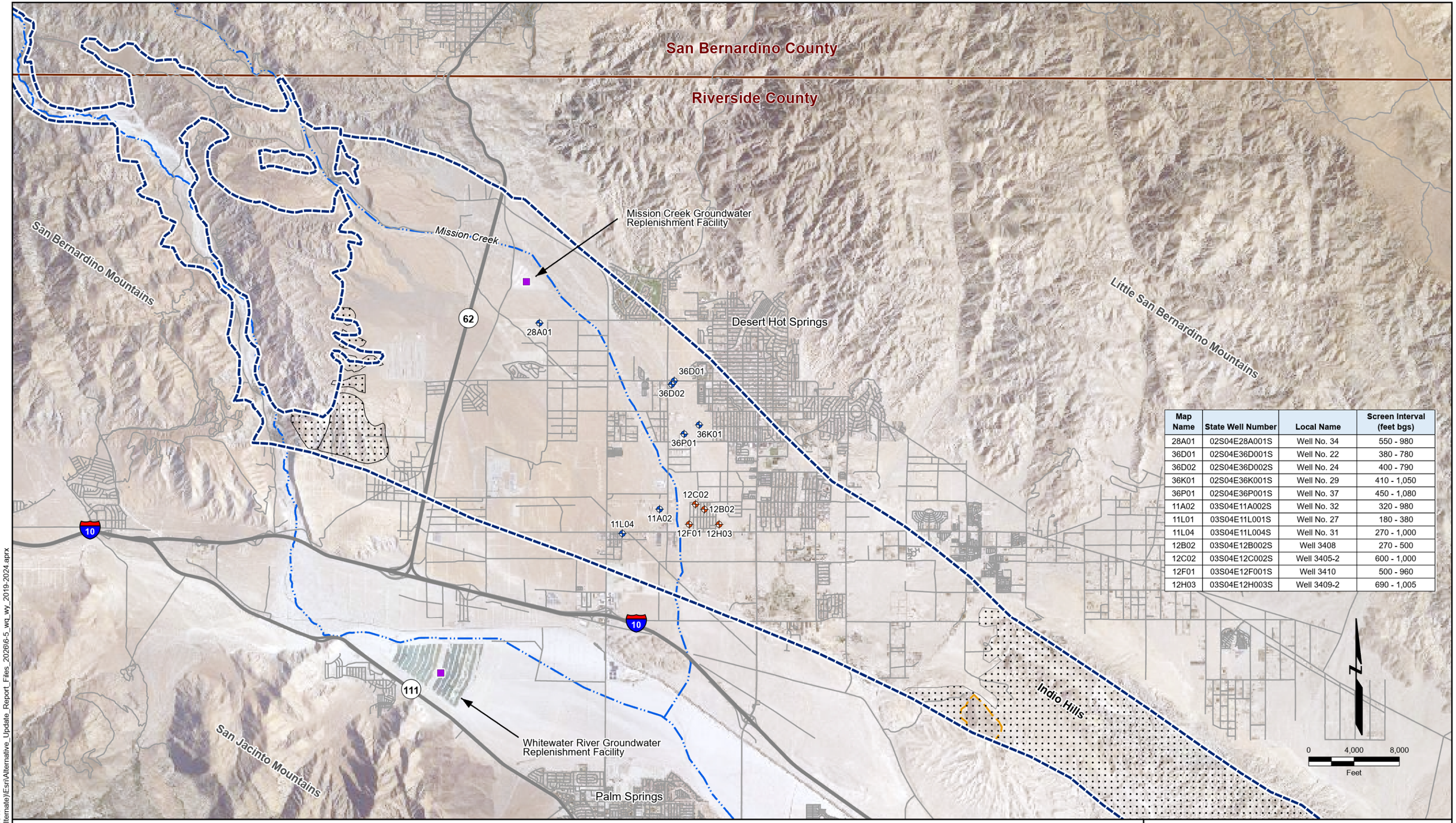
### 6.6.4.1 Undesirable Results

The existing undesirable results framework for nitrate and uranium is retained. Exceedances of the established groundwater quality criteria will be evaluated consistent with the significant and unreasonable conditions described in Section 6.6.1.

An exceedance of a drinking-water MCL does not necessarily constitute a SGMA undesirable result where the exceedance reflects a naturally occurring or otherwise pre-existing groundwater quality condition unrelated to groundwater management. This distinction applies to Cr(VI), for which concentrations above the current 10 µg/L MCL occurred in portions of the MCSB before SGMA implementation.

A separate numeric undesirable result criterion is not established for Cr(VI) in this 2027 MCSB Update. Cr(VI) monitoring will instead be evaluated for evidence of significant and unreasonable groundwater quality degradation associated with groundwater extraction, recharge, or other groundwater management activities. Conditions indicating potential groundwater management-related degradation will be investigated, and appropriate management actions or the need for revised or additional SMCs will be evaluated based on the findings.

For TDS, undesirable results will be determined based on the findings of the CV-SNMP and included in future periodic evaluations of the 2027 MCSB Update, as appropriate.




| Map Name | State Well Number | Local Name | Screen Interval (feet bgs) |
|---|---|---|---|
| 28A01 | 02S04E28A001S | Well No. 34 | 550 - 980 |
| 36D01 | 02S04E36D001S | Well No. 22 | 380 - 780 |
| 36D02 | 02S04E36D002S | Well No. 24 | 400 - 790 |
| 36K01 | 02S04E36K001S | Well No. 29 | 410 - 1,050 |
| 36P01 | 02S04E36P001S | Well No. 37 | 450 - 1,080 |
| 11A02 | 03S04E11A002S | Well No. 32 | 320 - 980 |
| 11L01 | 03S04E11L001S | Well No. 27 | 180 - 380 |
| 11L04 | 03S04E11L004S | Well No. 31 | 270 - 1,000 |
| 12B02 | 03S04E12B002S | Well 3408 | 270 - 500 |
| 12C02 | 03S04E12C002S | Well 3405-2 | 600 - 1,000 |
| 12F01 | 03S04E12F001S | Well 3410 | 500 - 960 |
| 12H03 | 03S04E12H003S | Well 3409-2 | 690 - 1,005 |

## Explanation

- Groundwater Replenishment Facility
- Coachella Valley Water District
- Mission Springs Water District
- Mission Creek Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Stream
- Highway/road
- Former Edom Hill Sanitary Landfill

## Notes

1. Only wells with water quality for Water Years 2019-2020 to 2023- 2024 are shown.
2. bgs = below ground surface.

Basemap modified from aerial photograph provided by National Agriculture Imagery Program (NAIP), 2018.

# WATER SUPPLY WELLS WITH GROUNDWATER QUALITY DATA
## WY 2019-2020 TO 2023-2024
## Mission Creek Subbasin Alternative Update
## Coachella Valley, California

| By: MWW | Date: 9/1/2026 | Project No.: US0043968.7681 |
|---|---|---|
| wsp | Figure | 6-5 |

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## 6.7 Summary of Sustainable Management Criteria

**Table 6-6** summarizes the SMC for each of the four relevant sustainability indicators. The rationale and background for each indicator are described in the preceding sections, including:

- Relevance of the sustainability indicator to the MCSB,
- Significant and unreasonable conditions,
- Minimum thresholds,
- Measurable objectives, and
- Definition of undesirable results.

**Table 6-6: 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 each Key Well between WY 2001-2002 and WY 2023-2024 below the known or estimated lowest 2009 water level of the well | Annual-average groundwater elevation at each of the nine Key Wells is compared with its measurable objective and minimum threshold (see **Table 6-4**) | Set to known or estimated lowest 2009 groundwater elevations | The annual-average groundwater elevation at the same four or more of the nine Key Wells is below the applicable minimum threshold in each of three consecutive water years |
| Reduction in groundwater storage | Corresponds to the arithmetic mean of the Key Well minimum thresholds: 690.6 feet NAVD88 | Compare the arithmetic mean of the nine Key Well annual-average groundwater elevations with the arithmetic mean of their minimum thresholds presented in **Table 6-4**). | Set to 2009 subbasin groundwater storage | The arithmetic mean of the nine Key Well annual-average groundwater elevations is below the average minimum threshold in each of three consecutive water years. |
| Land Subsidence | Pending evaluation of the USGS study findings, the groundwater-level minimum thresholds described in Section 6.3 serve as interim proxy criteria for land subsidence potential | Review DWR InSAR data and available benchmark measurements for land-surface displacement, with groundwater levels relative to the groundwater-level minimum thresholds used as an interim proxy for land subsidence potential | Same as minimum thresholds. | Pending evaluation of the USGS study findings, the groundwater-level undesirable-result criterion described in Section 6.3.4 serves as the interim proxy criterion for land subsidence. |
| Degraded groundwater quality | For nitrate and uranium, the minimum threshold is set at the California MCL for drinking water in wells used for municipal supply. No separate numeric minimum threshold is established for Cr(VI); monitoring and evaluation are described in Section 6.6.2.6. For TDS, a minimum threshold for TDS will be established through the ongoing CV-SNMP Update (in progress). | Groundwater quality data from municipal supply wells, compiled annually from Agency, State, and local sources | For nitrate and uranium, the measurable objective equals the MCL. No separate numeric measurable objective is established for Cr(VI). TDS measurable objectives will be set per the CV-SNMP Update. | An undesirable result occurs for COCs nitrate and uranium if concentrations in municipal supply wells exceed their respective minimum thresholds. No separate numeric undesirable-result criterion is established for Cr(VI); Cr(VI) will be evaluated for evidence of significant and unreasonable groundwater-quality degradation associated with groundwater management, as described in Sections 6.6.2.6 and 6.6.4. Undesirable results for TDS will be determined based on the findings of the CV-SNMP Update (in progress). |

# 7. Water Management Forecasting

This section evaluates and compares the simulated effects of selected future water management scenarios on groundwater conditions in the Mission Creek Subbasin (MCSB). The water management scenarios were simulated using the updated groundwater flow model referred to as the 2027 MCSB model and is described in Section 5 and **Appendix A** of this 2027 MCSB Alternative Plan Update (2027 MCSB Update).

The 2027 MCSB model was prepared to evaluate the future sustainable use of groundwater within the MCSB through a 50-water year (WY) modeling horizon (WY 2024-2025 through WY 2073-2074) in accordance with the 2014 Sustainable Groundwater Management Act (SGMA). In addition, the groundwater flow model will be used to support groundwater resources planning in the Garnet Hill Subarea (GHSA) of the Indio Subbasin. For SGMA compliance and reporting, however, the GHSA is part of the 2027 Indio Subbasin Water Management Plan Update (Todd/Rincon, 2026). The Desert Hot Springs Subbasin (DHSSB) was also included in the 2027 MCSB model because it is adjacent to the MCSB and contributes subsurface flows to the MCSB water balance. Under SGMA, the DHSSB is considered a very low-priority basin and therefore does not have a SGMA requirement. This section focuses on selected water management scenarios and the effects these may have on the MCSB. Supporting 2027 MCSB forecast model tables and Key Well hydrographs are provided in **Appendix B**.

## 7.1 Introduction and Objective

The 2027 MCSB model was developed using the water demand forecast provided in Section 3, the imported water forecast provided in Section 4.2, and plans for wastewater recycled water use described in Section 4.3. In addition, information and assumptions were developed during discussions with the Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD), collectively the Management Committee of the Agencies (Management Committee or the Agencies).

The objective of the 2027 MCSB forecast model was to evaluate the sustainable use of groundwater within the MCSB under several potential future operational scenarios and two potential future climate change scenarios. Sustainability was evaluated using the forecast model to evaluate longer-term groundwater response, by:

- Comparing groundwater elevations at Key Wells within the MCSB to the Sustainable Management Criteria (SMC), measurable objective (MO), and minimum threshold (MT) for each Key Well as described in Section 6; and
- Calculating the changes in groundwater storage in the MCSB.

## 7.2 Overview of MCSB Forecast Model Scenarios

This section provides a general overview of the MCSB water management forecast model scenarios, presents the nomenclature assigned to the forecast models, and describes how the assumed impacts of climate change are accounted for in the forecast scenarios. The scenarios described in this section reflect water management projects already in progress or considered likely to occur on the noted schedules; supporting scenario tables are provided in **Appendix B**.

### 7.2.1 Scenario Descriptions

Three water management forecast scenarios were simulated to evaluate the potential effects of projects and management actions (PMAs) that may be implemented to enhance water supplies in the MCSB. The following paragraphs present the nomenclature and universal characteristics of these three scenarios. Supporting 2027 MCSB model tables and key-well hydrographs are provided in **Appendix B**.

- The **Baseline** scenario provides a "benchmark" for comparison with other water management scenarios and includes the current understanding of the pumping demand based on population growth projections and conservation estimates described in Section 3. Population is projected through the WY 2049-2050 planning horizon using the updated demand projections in Section 3 and is held constant thereafter for the extended modeling horizon. The Baseline scenario includes increasing groundwater pumping to meet demands and a resulting proportional increase in the State Water Project (SWP) deliveries to the Mission Creek Groundwater Replenishment Facility (MC-GRF). The Baseline scenario also includes operation of the Nancy Wright Regional Water Reclamation Facility (Nancy Wright RWRF) in the GHSA, which went into operation in 2025. The Nancy Wright RWRF diverts a portion of the wastewater collected in the MCSB and conveys it for treatment and discharge in the GHSA. The Baseline scenario assumes that the wastewater conveyance out of MCSB is permanent and will grow as the population increases in the Planning Area. The Baseline scenario also includes longer-term programs that are within the control of the Agencies and have a high certainty of being implemented on schedule based on historical implementation of similar programs (e.g., MSWD planned septic to sewer conversions).
- The **Near-Term Projects** scenario includes the new projects factored into the Baseline scenario plus additional water management projects planned for implementation prior to 2035. Projects in the near-term category include the Horton Wastewater Treatment Plant (WWTP) tertiary treatment expansion project starting in 2032, and the construction of a pipeline to bring treated water from the Nancy Wright RWRF back into the MCSB for beneficial reuse as recharge starting in 2035.
- The **Future Projects** scenario builds on the Near-Term Projects scenario with the addition of water management projects that are planned for implementation starting in 2035 and beyond. Projects in the future category include the Sites Reservoir (online in 2035) and Delta Conveyance Project (online in 2045) that are anticipated to result in increased reliability and availability of SWP water deliveries.

### 7.2.2 Climate Change Assumptions

The SGMA guidance requires an evaluation of the potential impacts of climate change on proposed water management projects and water budgets for a groundwater basin/subbasin. The California Department of Water Resources (DWR) recommends utilizing a targeted subset of 20 prioritized Global Climate Models (GCMs) drawn from Coupled Model Intercomparison Project Phase 5 (CMIP5) downscaled datasets to bracket future hydrological and temperature conditions for regional water planning and vulnerability assessments (**Figure 7-1;** DWR, 2018b). These GCMs include the following:

- Model for Interdisciplinary Research on Climate (MIROC)_S Representative Concentration Pathway (RCP) 2.6 (Cool-Dry)[1],
- Centre National de Recherches Météorologiques Coupled Global Climate Model, version 5 (CM5) RCP 4.5 (Cool-Wet),
- CM5 RCP 8.5 (Warm-Wet), and
- MIROC, version 5 (MIROC5) RCP 8.5 (Hot-Dry).

These climate change models are based on RCPs of greenhouse gas concentrations, assuming various levels of efforts to curtail future greenhouse gas emissions and associated climate impacts.

DWR advises planning agencies to run sensitivity analyses and extreme stress tests using specialized bounding scenarios (such as Dry-Extreme Warm and Wet-Extreme Warm climate change models) rather than relying solely on the mean averages of multi-model ensembles. However, these bounding extremes do not provide the planning agencies with information necessary to evaluate and make decisions on potential projects using more probable and reasonable forecasts of future hydrologic conditions. As such, the Indio Subbasin and MCSB technical teams and various agencies serving as the management committees for the two subbasins agreed to use the downscaled GCM CM5 RCP 4.5 (Cool-Wet) and the GCM MIROC5 RCP 8.5 (Hot-Dry) GMCs which are near the corners of the 75$^{th}$ percentile box of the 20 GMCs and are not extremely wet nor extremely dry scenarios. These climate scenarios were chosen to provide outcomes under moderate climate change conditions (CM5 RCP 4.5) as well as severe climate change conditions (MIROC5 RCP 8.5).

The United States Geological Survey (USGS) has developed a Basin Characterization Model version 8 (BCM) for California and surrounding watershed discharging into California. The BCM is a very large dataset of hydraulic properties (soil type, elevation, land use, etc.) and monthly hydrologic parameters (precipitation, snowpack, evapotranspiration, runoff, and recharge) from 1896 to 2025 based on a 270-meter grid across California. The data set was used to develop

[1] "Cool-Dry," "Cool-Wet," "Warm-Wet," and "Hot-Dry" are relative descriptors used for GCM comparison purposes. Categorizations of "Cool", "Warm", and "Hot" may differ in other analyses. All GCMs project an increase in minimum air temperatures.

estimates of quarterly mountain front recharge (MFR) into the MCSB and DHSSB as discussed in Section 5.

The USGS has also developed BCMs for WY 2019-2020 through WY 2098-2099 based on 20 GCMs, including CM5 RCP 4.5 and MIROC5 RCP 8.5. These BCM forecasts for the watersheds discharging into the MCSB and DHSSB were used to prepare quarterly estimates of MFR for the MCSB and DHSSB for the period October 2024 through September 2074 (50-Year modeling horizon) for evaluating the Baseline, Near-Term Project, and Future Project forecast scenarios. These longer-term climate projections support the extended groundwater model simulation, while demand, supply, and project planning for the 2027 MCSB Update are evaluated through WY 2049-2050 and then held constant through WY 2073-2074.

#### 7.2.2.1 CM5 RCP 4.5 Climate Change Scenario

The CM5 configured under RCP 4.5 is a core earth-system simulation framework contributed by France to the CMIP5. This specific configuration combines a highly integrated GCM with a mid-range, stabilization emissions pathway (A. Voldoire, et.al., 2013).

The CM5 links five core components that affect climate change including:

1) an atmospheric dynamics component that operates on a spectral grid with a resolution of about 155 km and incorporates a longwave radiation scheme to estimate global warming,
2) an ocean dynamic component that operates on a spectral grid with a resolution of about 112 km,
3) a land surface component that calculates energy, water and mass exchange over natural land covers,
4) sea ice component that simulates the thermodynamics of marine ice, and
5) a surface interface and routing component that standardizes the parameters exchanged across land, lakes, and oceans, with a Total Runoff Integrating Pathways model that routes terrestrial runoff back into the ocean grids.

The RCP 4.5 pathway acts as the prescriptive boundary constraint feeding human-induced greenhouse effect values to the GCM. It represents a medium-low emissions future where global carbon emissions plateau around 2040 and decline mid-century, forcing atmospheric carbon dioxide ($CO_2$) to stabilize at roughly 540 parts per million (ppm). It further assumes that global energy imbalances will flatten out precisely at 4.5 watts per square meter ($W/m^2$) by the year 2100 relative to pre-industrial baselines. This results in increased global temperatures of 2 to 3 degrees Celsius (°C) by 2100.

BCM downscaled the CM5 GCM for RCP 4.5 (medium-low emissions) for hydrologic California. This Localized Constructed Analog (LOCA) climate scenarios span water years 1950 to 2099 with greenhouse-gas forcings beginning in 2006. The LOCA downscaling method has been

shown to produce better estimates of extreme events and reduces the common downscaling problem of too many low-precipitation days (Pierce et al., 2018). The LOCA method statistically downscaled the CM5 GMC from approximately 222-kilometer (km) quadrangles to 6-km resolution. Next, the scenarios were spatially downscaled from 6 km to 270 meters (Flint and Flint, 2012) and run through the BCM using the same model parameters and input files as the historical BCM model (BCM; Flint et al., 2021). The downscaled gridded climate variables include precipitation (ppt), minimum temperature (tmn), maximum temperature (tmx), and potential evapotranspiration (pet). The gridded hydrologic variables include actual evapotranspiration (aet), climatic water deficit (cwd), snowpack (pck), recharge (rch), runoff (run), and soil storage (str). Monthly variables from WY 1950-1951 to WY 2098-2099 are summarized into water year files (for example, water year 1951 includes October 1950 - September 1951) which can be downloaded from the USGS BCM website (Stern, et al., 2024).

The BCM raster grids are in the North American Datum of 1983 (NAD83) California Teale Albers, (meters) projection in an open format ascii text file (*.asc). This data release includes separate pages for each RCP 4.5 and RCP 8.5 for the CM5 GCM and include: 1) 30-year summaries (water year files averaged for selected 30-year periods, zipped by variable); 2) Monthly BCM hydrology variables (monthly BCM hydrology variables zipped by decade); 3) Monthly climate variables (monthly climate variables zipped by decade); and 4) Water year summaries (monthly variables summed by water year, zipped by variable).

The BCM data set for CM5 RCP 4.5 were downloaded for the WY 2020-202121 through WY 2098-2099 for the watersheds draining into the Coachella Valley including the GHSA, MCSB, and DHSSB (**Figure 7-2**). The resulting monthly runoff and recharge for each watershed were then extracted from the BCM data sets and used to estimate MFR (recharge and runoff) for each quarter for use in the MCSB numerical model. MFR under CM5 RCP 4.5 is discussed in Section 7.3.2.

#### 7.2.2.2 MIROC5 RCP 8.5 Climate Change Scenario

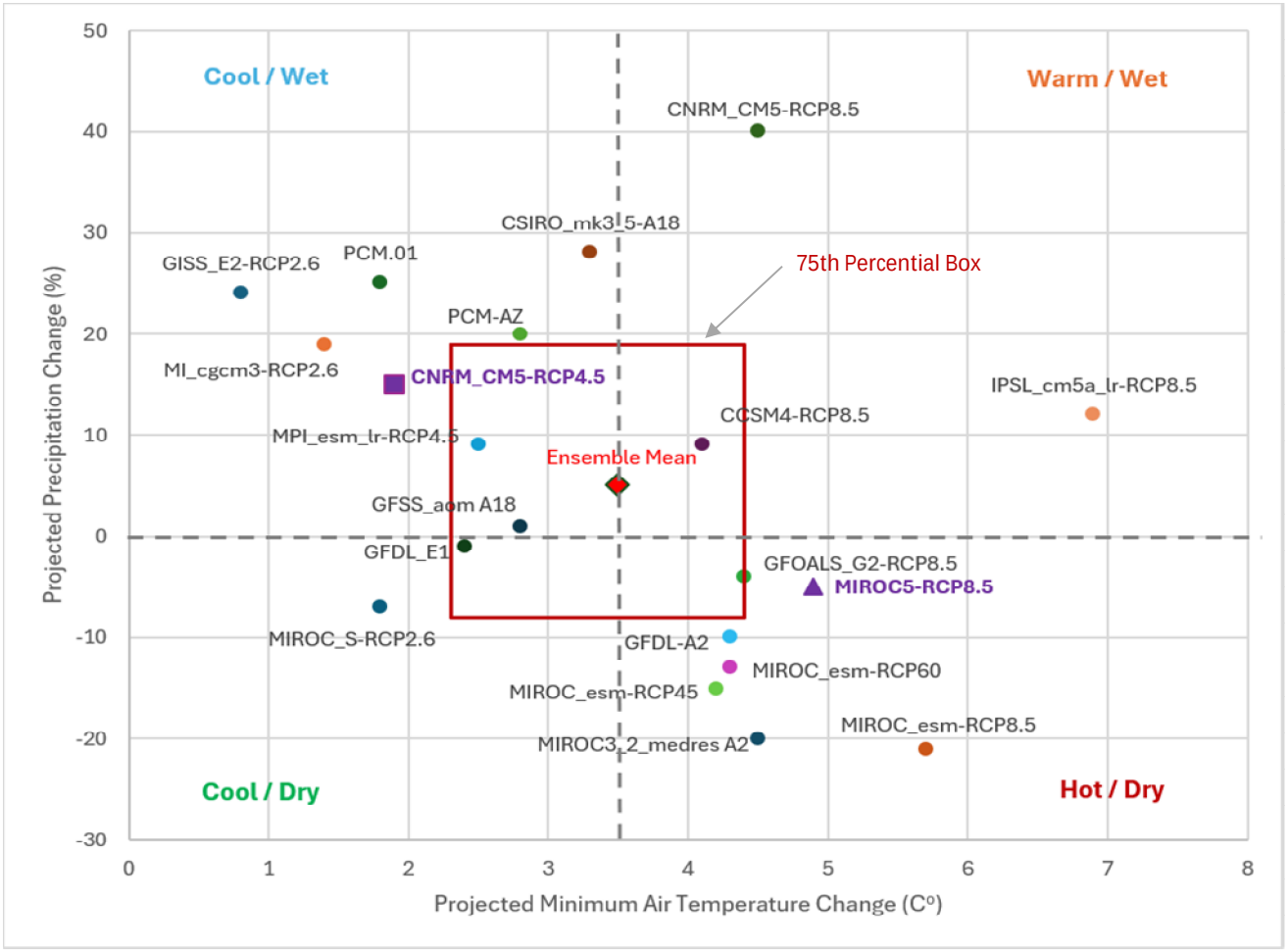
The MIROC5 GMC configured under RCP 8.5 is a core earth-system simulation framework contributed by Japan to the CMIP5. This specific configuration represents a high-emissions, "no-mitigation" baseline trajectory (Lang, C., Fettweis, X., Erpicum, M., 2015).

The MIROC5 links three core components that affect climate change including:

1) an atmospheric general circulation model with updated parameterizations for clouds, radiation, and aerosols,

2) an ocean general circulation model designed to simulate complex currents, thermal forcing, and sea-ice variations, and

3) A land surface component for tracking soil moisture, temperature, and vegetation characteristics.




Note: The CNRM CM5-RCP4.5 and MIRCO5-RCP8.5 GMCs are near the Cool/Wet and Hot/Dry corners of the 75th percential box.

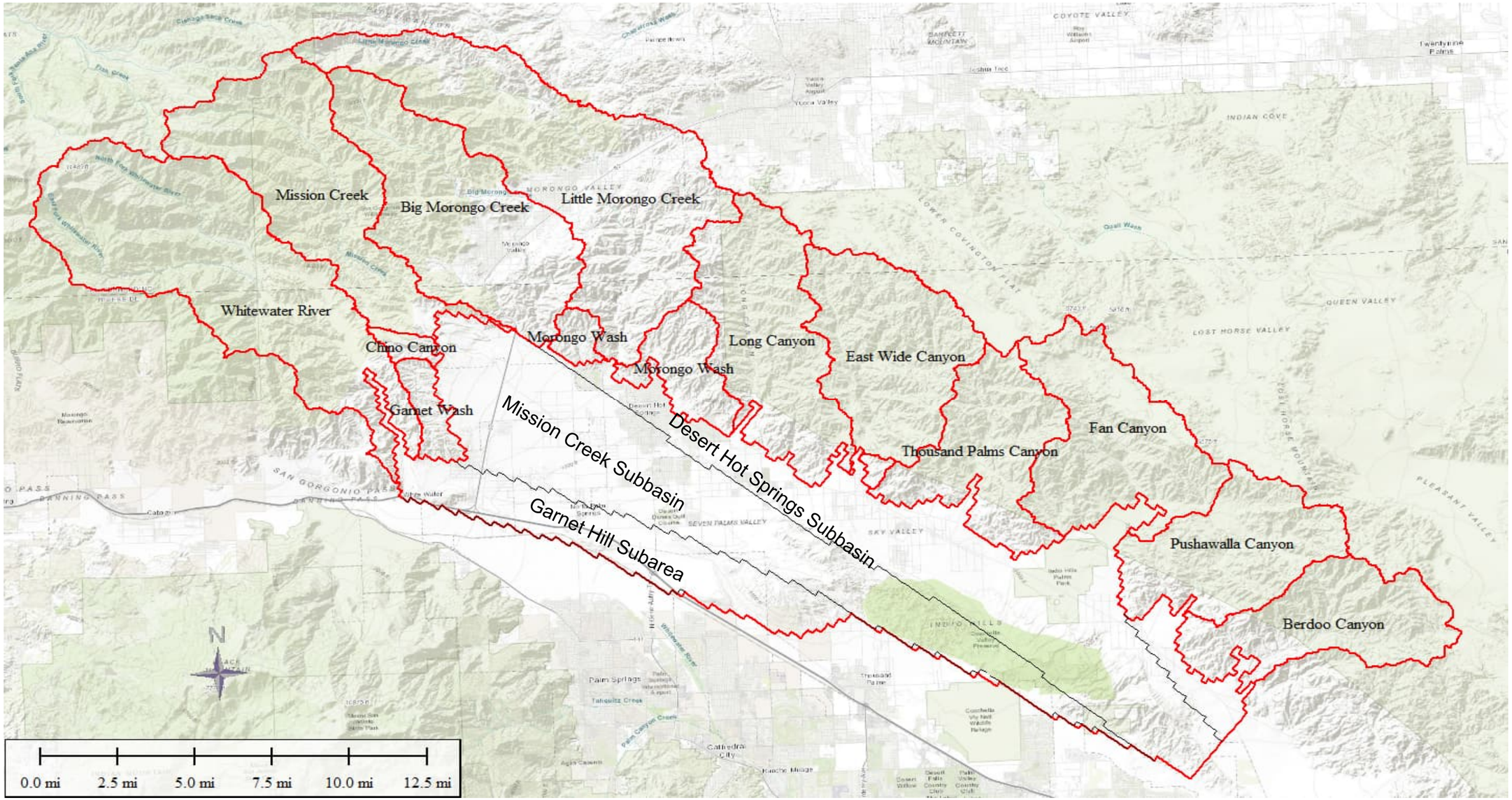
Modified from USGS Future Climate and Hydrology from Twenty Localized Constructed Analog (LOCA) Scenarios and the Basin Characterization Model (BCMv8) (ver. 1.1, November 2024).

Global Climate Change Models
for California 2020-2099

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/08/2026 | Project No.: US0043968.2616 |
|---|---|---|

Figure **7-1**

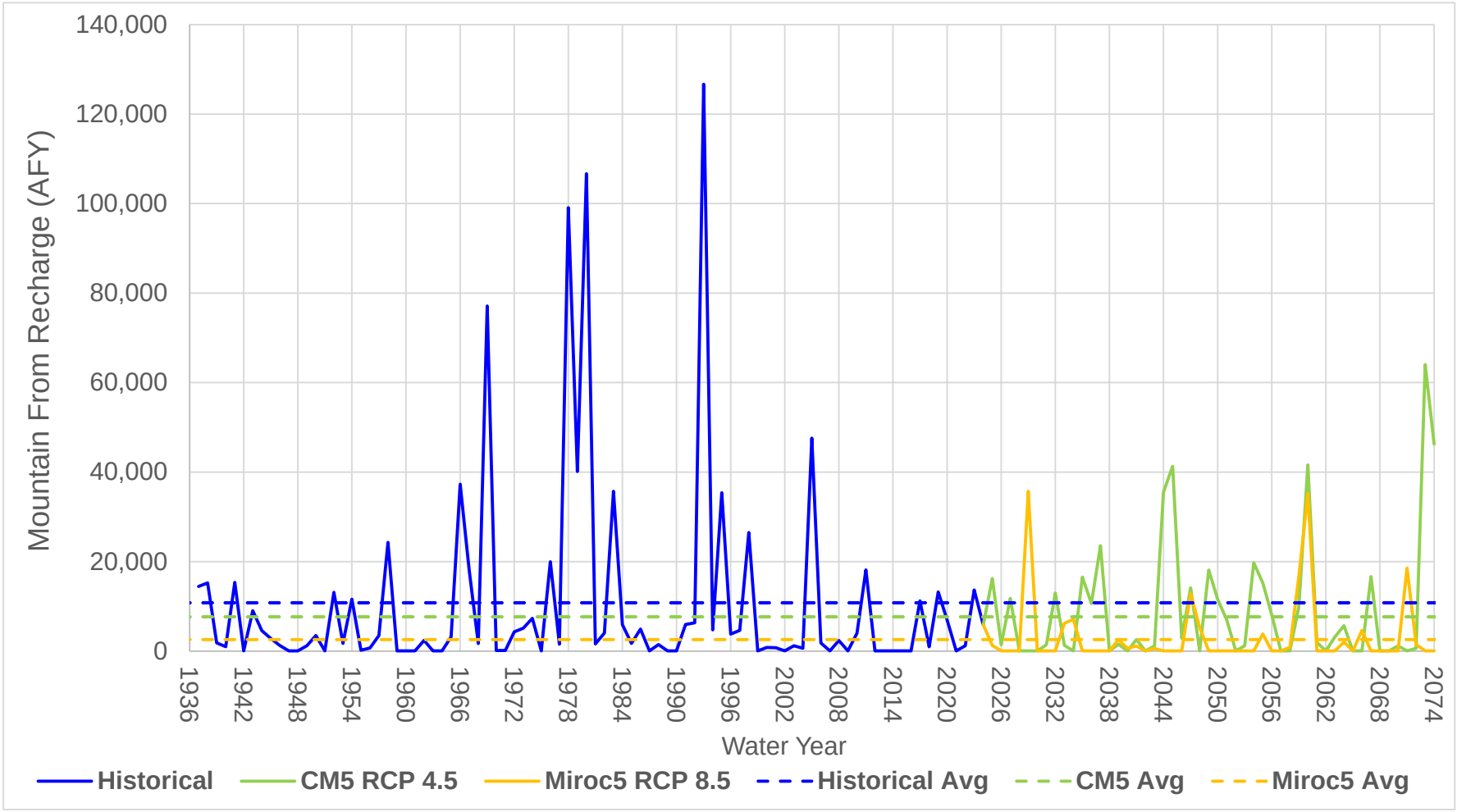



Note: Watershed boundaries derived from USGS Basin Characterization Model (Flint, 2020)

Mountain Front Recharge Watersheds

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 7-2 |




Abbreviations:
AFY = Acre-feet per Year
Avg = Average

Note:
Flint, L.E. and Flint, A.L., 2014, California Basin Characterization Model: A Dataset of Historical and Future Hydrologic Response to Climate Change, (ver. 1.1, May 2017) U.S. Geological Survey Data Release https://doi.org/10.5066/F76T0JPB.

USGS BCM 1936-2074
Mountain Front Recharge

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| | | Figure **7-3** |

The RCP 8.5 pathway acts as the prescriptive boundary constraint feeding human-induced greenhouse effect values to the GCM. It represents a high emissions (no mitigation) future where global carbon emissions plateau continue to rise through WY 2099-2100, with atmospheric $CO_2$ to rising to 1,100 ppm. It further assumes that global energy imbalances will increase to 8.5 W/m² by the year 2100 relative to pre-industrial baselines. This results in increased global temperatures of 4 to 5 °C by 2100

BCM downscaled the MIROC5 GMC for RCP 8.5 for hydrologic California in the same manner as described in Section 7.2.2.1. Likewise, the MIROC5 RCP 8.5 BCM data sets were downloaded for the WY 2020-2021 through WY 2098-2099 for the watersheds draining into the Coachella Valley including the GHSA, MCSB, and DHSSB. The resulting monthly runoff and recharge for each watershed were then extracted from the BCM data sets and used to estimate MFR (recharge and runoff) for each quarter for use in the MCSB numerical model. MFR under MIROC5 RCP 8.5 is discussed in Section 7.3.2.

### 7.2.3 Summary of Modeled Scenarios for Water Management Forecasting

Each of the three water management scenarios was simulated under two climate change assumptions, resulting in six total scenarios:

1. **Baseline with CM5 RCP 4.5** climate change assumptions,
2. **Near-Term Projects with CM5 RCP 4.5** climate change assumptions,
3. **Future Projects with CM5 RCP 4.5** climate change assumptions,
4. **Baseline with MIROC5 RCP 8.5** climate change assumptions,
5. **Near-Term Projects with MIROC5 RCP 8.5** climate change assumptions, and
6. **Future Projects with MIROC5 RCP 8.5** climate change assumptions

The Management Committee agreed that four project scenarios that involve additional projects, Near-Term Projects and Future Projects, each under the CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions, are reasonable and conservative and should be the focus of MCSB planning. The two Baseline scenarios are evaluated under the same climate assumptions to evaluate the impact of the Near-Term Projects and Future Projects scenarios. Therefore, the following discussion addresses all six scenarios. Key hydrologic assumptions incorporated into all the scenarios are described in Section 7.4, and supporting tables and Key Well hydrographs for each scenario are provided in **Appendix B**.

## 7.3 Common Assumptions

Several assumptions and hydrologic inputs are common to all the forecast scenarios. These are discussed in the following sections.

### 7.3.1 Model Domain and Simulation Period

The calibrated 2027 MCSB model summarized above formed the hydrogeologic basis of the 2027 MCSB forecast models. There were no structural or hydrogeologic changes to the 2027 MCSB forecast models since the 2022 MCSB Update, except for the changes in MFR under the two climate change scenarios and the addition or removal of scenario specific WWTP recharge areas or pumping wells. The calibrated 2027 MCSB model (see Section 5) simulation period was extended to September 30, 2024.

Consistent with SGMA guidance documents, the 2027 MCSB forecast model simulates the 50-WY period from October 2024 to September 2074 using 200 quarterly stress periods. Quarterly stress periods were used to maintain consistency with the 2027 MCSB model, which uses quarterly stress periods from January 1990 through September 2024, and to capture the seasonality of water usage and water supply.

### 7.3.2 Mountain Front Recharge

MFR within the model domain occurs from 13 watershed located in the San Bernardino and Little San Bernardino mountains. The watersheds are shown on **Figure 7-2** and forecasted annual MFR for CM5 RCP 4.5 and MIROC5 RCP 8.5 are summarized in **Tables B1a** and **B1b** in **Appendix B**. Between WY 1935-1936 and WY 2023-2024 (89 years), the period of record, MRF within the model domain ranged from 33 to 103,293 acre-feet per year (AFY) and averaged 9,190 AFY (**Figure 7-3**; **Table A8** in **Appendix A**). The forecast MFR within the model domain under CM5 RCP 4.5 ranges from 39 to 63,992 AFY and averages 9,342 AFY or about the same as the historical average, while the forecast MFR within the model domain under MIROC5 RCP 8.5 ranges from 39 to 35,718 AFY and averages 3,150 AFY or about 34 percent of the historical average. The CM5 RCP 4.5 and MIROC5 RCP 8.5 USGS BCM MFR forecasts are common to the Baseline, Near-Term, and Future scenarios.

### 7.3.3 SWP Groundwater Replenishment

Groundwater replenishment in the MCSB is conducted through surface water deliveries by exchanging State Water Project (SWP) water, including Table A allocation (Table A) and other SWP water, with Metropolitan Water District of Southern California (MWD) for Colorado River Aqueduct (CRA) water. The primary natural source of water for the SWP is the Sacramento River watershed in Northern California and the Sierra Nevada mountains. The Feather River, a major tributary to the Sacramento River, flows into Lake Oroville, the SWP primary upstream storage reservoir. Future SWP water supply for the Feather River watersheds feeding Lake Oroville was estimated with the USGS BCM, which simulates watershed hydrologic response to

projected changes in precipitation and temperature under two RCP climate scenarios, CM5 RCP 4.5 and MIROC5 RCP 8.5.

SWP Table A entitlements and Yuba River Accord Dry Year Water Purchase Program (Yuba Accord) amounts for delivery are common to each scenario. CVWD and DWA both have Table A entitlements that total 194,100 AFY and the Yuba Accord delivery amount is 633 AFY. SWP allocations range from zero to 100% of the State Water Contractors' entitlements depending on hydrologic conditions in the source watersheds. The modeled SWP deliveries were adjusted for annual hydrologic variability according to the BCM RCP climate scenarios. SWP deliveries were then proportioned between Indio Subbasin and the MCSB based on groundwater production in the adjacent management areas, and further adjusted per operation of MWD's Advanced Delivery Account (ADA) which is a groundwater bank used by MWD to store wet weather deliveries (see Section 5).

The impacts of the climate scenarios on SWP delivery variability were developed using empirical relationships between Feather River watershed (source waters for the SWP) hydrologic conditions and historical Table A allocations. Observed water year precipitation (treated as rainfall) and April 1 snowpack water equivalent data within the Lake Oroville watershed were correlated with final SWP Table A allocations for water years 2008 through 2025, excluding years affected by Oroville Dam spillway operations. Linear regression relationships were developed to relate hydrologic indicators to allocation percentages, incorporating antecedent conditions where applicable to improve fit.

The empirically derived relationships were then applied to BCM-simulated precipitation outputs under the CM5 RCP 4.5 and MIROC5 RCP 8.5 scenarios to generate time series of Table A allocation percentages. For the CM5 RCP 4.5 scenario, these allocation estimates were normalized to the observed historical period to account for differences between modeled and observed hydrologic data and to ensure consistency with recent system performance. For the MIROC5 RCP 8.5 scenario, the model generated allocations were used to directly as they represented a reduced system performance.

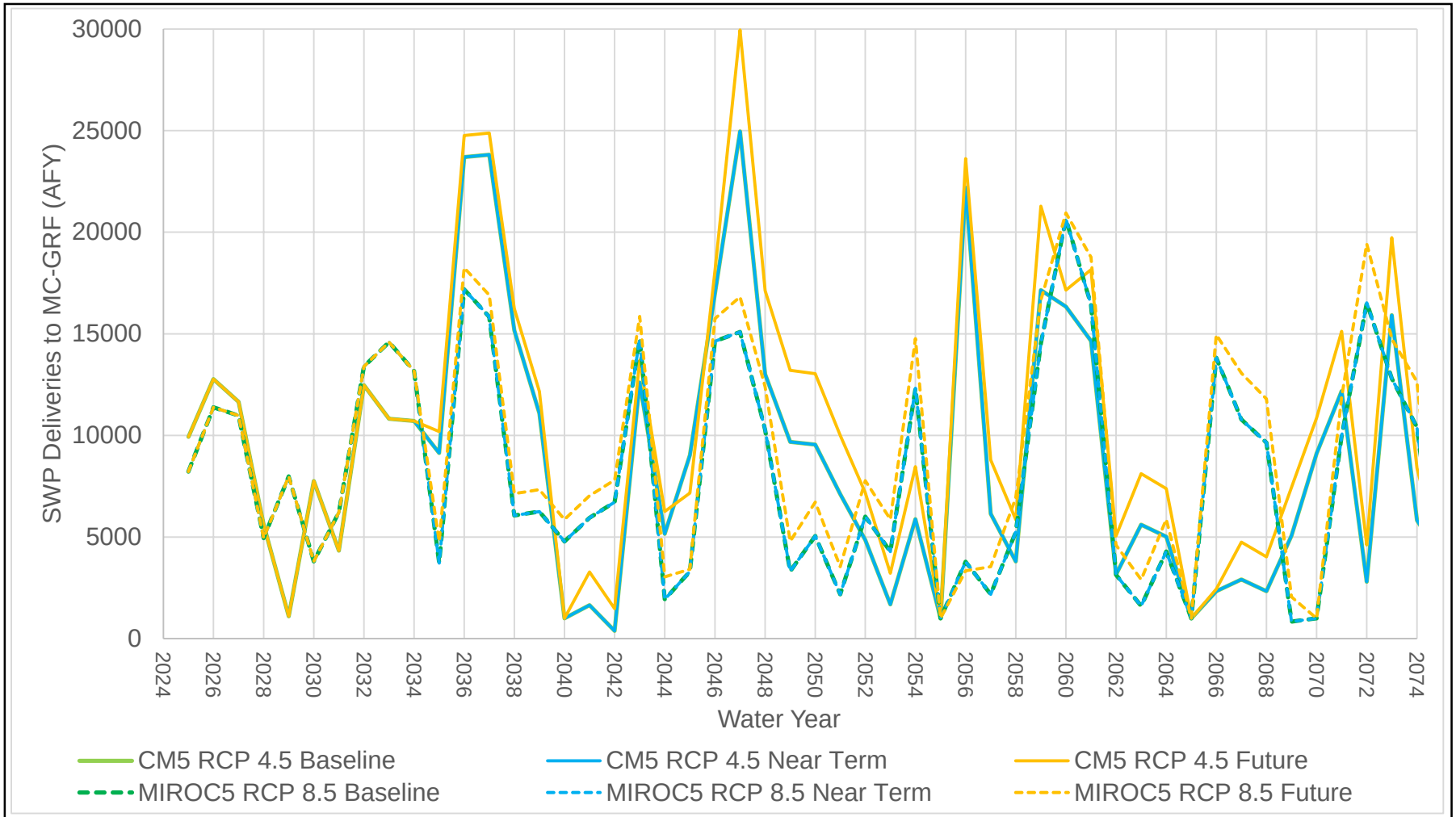
SWP deliveries are split between groundwater replenishment facilities in the West Whitewater River Management Area (in the Indio Subbasin) and the Mission Creek Management Area (in MCSB) based on the proportion of groundwater production in each two management areas. The percentage of recharged water delivered to the MC-GRF is estimated to be 10% of total deliveries in WY 2024-2025. This number is anticipated to vary to between 9% in WY 2029-2030 and 10% in WY 2044-2045 based on forecasted water demands and associated pumping. These percentages were applied to total estimated SWP deliveries to calculate recharge projections for the MC-GRF from WY 2024-2025 to WY 2073-2074.

This delivery estimate is adjusted for advanced deliveries deposited by MWD that are stored in the Coachella Valley Groundwater Basin and that are later credited against future deliveries. Based on the historical record of the ADA program, deposits occur in wet years and credits (where MWD keeps all or a portion of CVWD and DWA's SWP allocation) occur in dry years. While the actual dates that ADA credits will be exercised is unknown, the scenario modeling

assumes continuous operation of the ADA program through the end of the modeling horizon (through WY 2073-2074).

The total SWP forecast deliveries (with adjustments factors) to MCSB for groundwater replenishment at the MC-GRF under CM5 RCP 4.5 climate conditions average 8,685 AFY for the Baseline and Near-Term Projects scenarios and 10,130 AFY for the Future Projects scenario. Under MIROC5 RCP 8.5 climate conditions, groundwater replenishment at the MC-GRF is forecast to average 7,975 AFY for the Baseline and Near-Term Projects scenarios and 9,005 AFY for the Future Projects scenario. These forecast SWP volumes were reduced by 2% to account for evaporation in the MC-GRF spreading basins.

Additional water supply assumptions under the Near-Term Projects and Future Projects scenarios result in additional SWP supplies. Changes in SWP supplies as a result of climate change factors were also calculated. These differences are described where applicable for each scenario in Section 7.4. **Figure 7-4** shows SWP forecast deliveries for groundwater replenishment (less evaporation) from WY 2024-2025 to WY 2073-2074 for each scenario under both climate conditions.




Note: SWP deliveries to MC-GRF include 2% losses for evaporation.

Abbreviations:
AFY = Acre-feet per Year
SWP = State Water Project
MC-GRF = Mission Creek Groundwater Replenishment Facility

Forecast State Water Project Deliveries for Groundwater Replenishment

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|

Figure **7-4**

### 7.3.4 Plan Area Growth and Pumping Demand

There are no surface water supplies used to meet demands within the model domain (study area). All water supplies are from pumped groundwater. Hence, demographic growth will result in increased pumping demand. All forecast scenarios utilize the same assumptions regarding demographic growth and associated groundwater pumping demand.

#### 7.3.4.1 Plan Area Growth

As described in Sections 2 and 3, Planning Area demographics are based on household and employment projections from the Southern California Association of Governments' (SCAG) regional growth forecast contained in the *2024-2050 Regional Transportation Plan/Sustainable Communities Strategy*, also known as *Connect SoCal 2024* (SCAG, 2024). The forecast includes household and employment estimates for 2019, 2035, and 2050. SCAG used the Transportation Analysis Zones (TAZ), which are similar to the Census Block Groups, in their projections.

The projected household and employment numbers for each TAZ polygon within the Planning Area were analyzed using graphical information system (GIS) methods to provide estimates for the Planning Area of approximately 22,843 households and 8,726 employees in 2025, with anticipated growth to 38,891 households and 14,374 employees in 2050 (see Section 3, **Figure 3-3**). These projections were linearly interpolated to provide an annual estimate of future households and employment in the Planning Area from 2025 through 2050. Housing and employment was held constant after 2050 due to the uncertainty in land use and growth beyond SCAG's planning horizon.

#### 7.3.4.2 Groundwater Pumping Demand

Municipal pumping, which accounts for about 75% of total pumping, is correlated with housing and employment in the Planning Area. Historically, total pumping (municipal and private) in the Planning Area has ranged from a few thousand AFY in the 1950s to almost 20,000 AFY in 2006 (**Figure 7-5**). Based on the demand projections in Section 3, total municipal pumping demand was estimated to increase from about 11,000 AFY in WY 2024-2025 to about 14,200 AFY by WY 2049-2050 (**Figure 7-5; Table B2** in **Appendix B**). The increased pumping demand was distributed to existing well fields for each municipal planning area based on the employee and household projections by TAZ polygons. Production for existing wells was allowed to increase to the historical high groundwater production for each well in the Planning Area to accommodate the increase in demand. Based on historical performance, the currently existing wells could accommodate the increase in municipal demand, so no additional wells were added to the model.

Metered private well production, consisting of pumping for golf courses, agricultural (primarily fish farms), industrial, and single domestic wells, was assumed to remain at 3,460 AFY from WY 2024-2025 through WY 2030-2031 and then an average rate of 2,660 AFY through 2050[2]. Unmetered private well pumping assumed to be used primarily to meet domestic demands was estimated at about 540 AFY. However, because the unmetered pumping estimates are based on highly uncertain assumptions, this pumping was rounded to 500 AFY through the modeling horizon for modeling purposes.

Since the SCAG projections end in 2050, it was further assumed that all pumping demand would be held constant after WY 2049-2050 (**Table B2** in **Appendix B**).

The pumping demand described above is common to both Baseline scenarios. The Near-Term Projects and Future Projects scenarios also include a reduction in municipal pumping starting in 2032 due to the expanded use of tertiary treated recycled water to meet irrigation needs which would offset pumping demand (**Figure 7-5**).

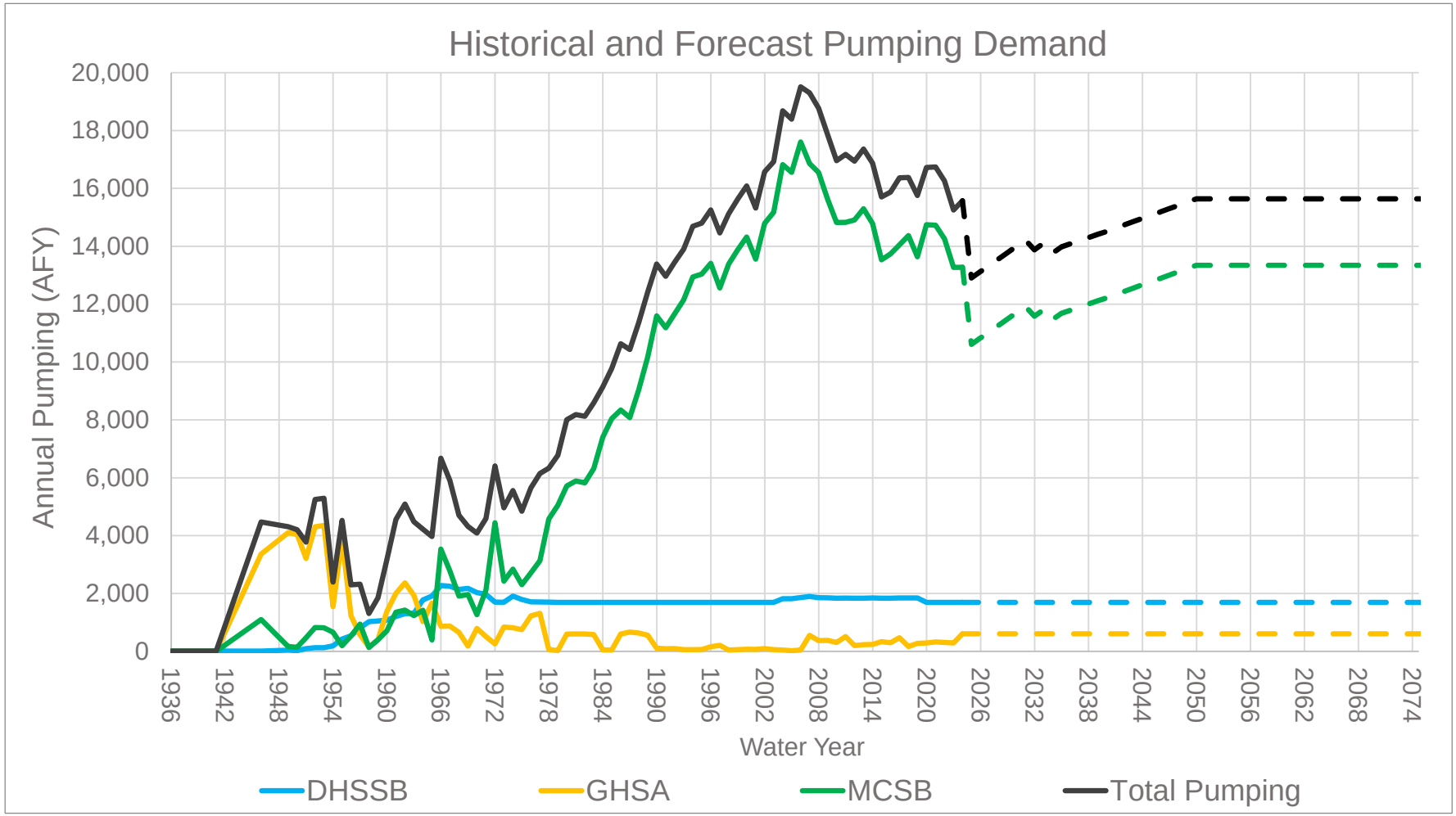
### 7.3.5 Return Flow Recharge

Return flow consists of the proportion of pumped groundwater that returns to the water cycle as recharge to groundwater after it has been used for its intended purpose (municipal, agricultural, industrial, or golf course). The assumptions for the return flow calculations for the 2027 MCSB forecast model are the same as those used in the 2027 MCSB model (**Table B3** in **Appendix B**) and are based on return flows estimated for the Coachella Valley Groundwater Basin as documented by Krieger & Stewart Engineering Consultants (K&SEC, 2018).

#### 7.3.5.1 Applied Water Return Flow

Applied water return flow includes return flow from municipal and private outdoor use of pumped groundwater including agricultural, industrial, and golf course irrigation. Because private metered production remains the same for the forecast period, the return flow for this use remains the same. Return flow for municipal outdoor use increases with increasing production through the planning horizon. Forecast outdoor demand and associated return flows are shown on **Figure 7-6**. Return flows for the Baseline scenario are provided in **Table B3** in **Appendix B**. Return flow from applied water has been estimated to be approximately 25 percent. Because applied water use is the same for all scenarios, applied water return flows are the same for all scenarios except for the Near-Term Projects and Future Projects scenarios which include alternative recharge location for the Nancy Wright RWRF treated water (see Section 7.4).

[2] Desert Dunes Golf Course closed in January 2025, which may reduce future metered private well production.




Notes:
1. Pumping records compiled from various sources including Fogg, 2000, PSOMAS, 2010, and Agency records.
2. Dashed lines represent forecast pumping demand.

Abbreviations:
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hills Subarea
MSCB = Mission Creek Subbasin

Municipal Groundwater Demand

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|

Figure **7-5**

### 7.3.5.2 Septic and Treated Wastewater Return Flows

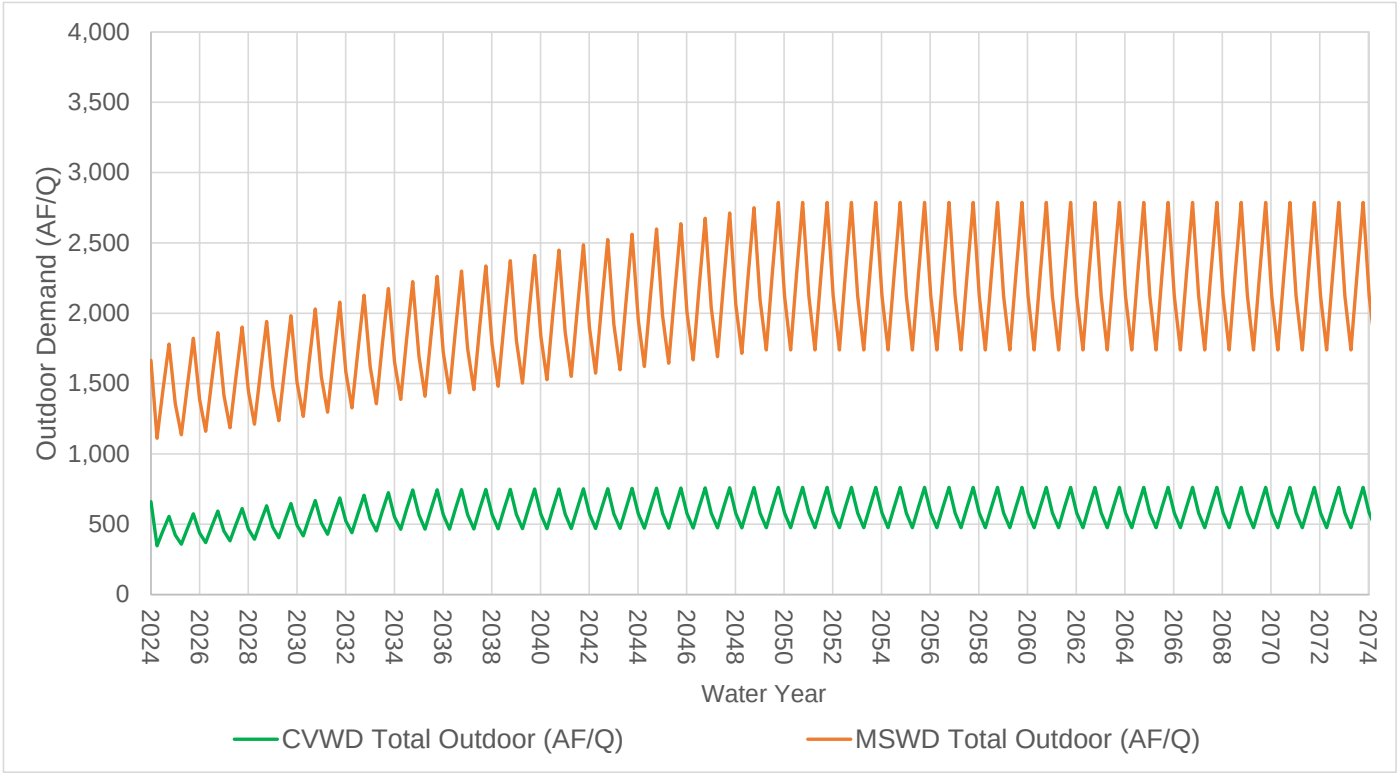
MSWD plans to continue to convert areas currently on septic systems to the municipal sewer system. The location of the areas to be converted (A, D3, M2, etc.) are shown on **Figure 7-6**. An estimated 2,250 parcels will be converted in the MCSB and DHSSB from WY 2024-025 through WY 2034-2035 (**Figure 7-8**). The top chart in **Figure 7-8** depicts the timeline of the conversion of septic systems to municipal sewer connections for the conversion areas. The lower chart shows the decrease in septic system flows as systems are converted and the increase in sewer system flows as septic systems are converted, and as undeveloped parcels are developed over the build-out period. Septic to sewer conversions are incorporated into the Baseline return flow provided in **Table B3** in **Appendix B**.

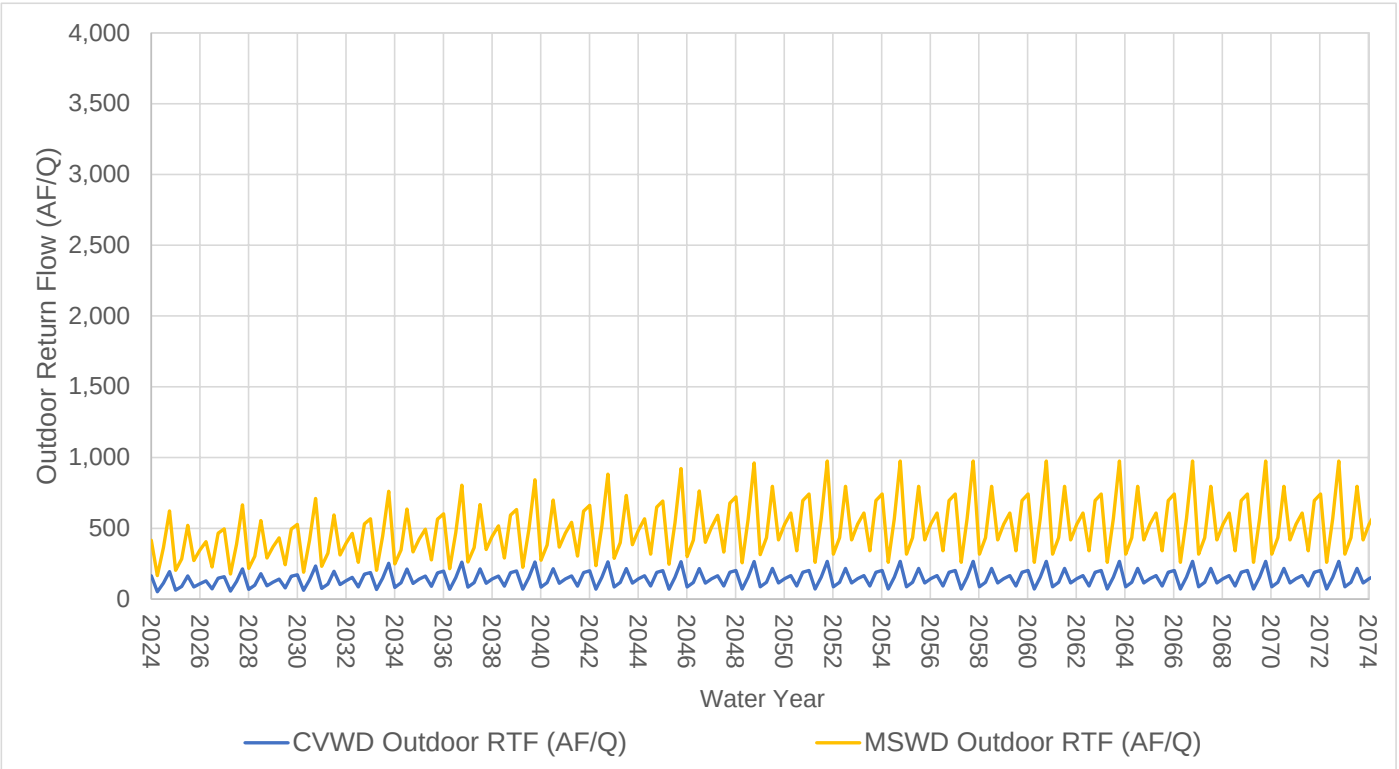
Total forecast return flows were calculated for each subbasin/subarea and are forecast to increase gradually from about 6,500 AFY to 10,800 AFY by WY 2049-2050 as a result of population growth. Forecast return flow volumes are the same for all scenarios; however, treated wastewater disposal locations differ between the Baseline, Near-Term Projects, and Future Projects scenarios for CM5 RCP 4.5 and MIROC5 RCP 8.5 climate change assumptions, as discussed in Section 7.4. Return flows for the 2027 MCSB forecast scenarios are summarized in tables provided in **Appendix B** and discussed in Section 5.

## 7.3.6 Garnet Hill Fault Flux and Whitewater River Recharge

For the GHSA, the hydraulic properties from the 1997-2074 Indio Subbasin model were adopted into the 2027 MCSB model in the GHSA, where the models overlap (see **Appendix A**). The simulated inter-subbasin groundwater underflow between the GHSA and main Indio Subbasin across the Garnet Hill Fault and Whitewater River recharge were incorporated into the GHSA portion of the 2027 MCSB model (see **Appendix A**). The processes for extracting the Garnet Hill Fault flux and Whitewater River recharge from the Indio Subbasin model and importing them into the 2027 MCSB model are discussed more fully in **Appendix A**, Section A.4.5.8.

As discussed in the 2027 Indio Subbasin Water Management Plan Update (Todd/Rincon, 2026), the Indio Subbasin model was also used to perform multiple forecast scenarios, including the same six scenarios listed above in Section 7.2. Using the same processes described in **Appendix A**, the Garnet Hill Fault flux and Whitewater River seepage losses were extracted from the Indio Subbasin model for each of the six forecast scenarios and incorporated into the MCSB forecast scenarios. **Figure 7-9** shows the Garnet Hill Fault flux (underflow), and **Figure 7-10** shows Whitewater River seepage losses as it runs through the norther portion of the GHSA. This resulted in a consistent treatment of Whitewater River seepage recharge and Garnet Hill Fault flux between the two models for all forecast scenarios. Although the Garnet Hill Fault flux varies between the scenarios, it has little influence on the MCSB and therefore is not discussed in this section. For a discussion of the Garnet Hill Fault flux for each scenario refer to Section 7.4.




Abbreviations:
AF/Q = Acre-feet per Quarter
CVWD = Coachella Valley Water District
MSWD = Mission Springs Water District
RTF = Return Flow

Forecast Outdorr Demand and Return Flows

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 7-6 |

San Bernardino County

Riverside County

Mission Creek

Mission Creek Groundwater Replenishment Facility

an Bernardino Mountains

Little San Bernardino Mountains

Mission Creek Subbasin

Whitewater River

Bonnie Bell

Proposed Percholation/ Recharge Location for Regional Wastewater Reclamation Facility

Horton Wastewater Treatment Plant

Nancy Wright Regional Water Reclamation Facility

Garnet Hill Subarea

Desert Hot Springs Subbasin

Desert Crest Wastewater Treatment Plant

Indio Hills

Whitewater River Groundwater Replenishment Facility

A

D-3

G

H

I

J-2

K

M2

62

10

111

## Explanation

- Wastewater Treatment and Reclamation facility
- A — Septic to sewer conversion area
- Groundwater Replenishment Facility
- Planning Area
- Approximate Active Model Boundary
- Streams
- Highway/road
- Mission Creek Subbasin fringe area
- Garnet Hill Subarea of Indio Subbasin
- Low permeability/non-water bearing sediments/bedrock
- Desert Hot Springs Subbasin
- Indio Subbasin
- Mission Creek Subbasin

0 4,000 8,000
Feet

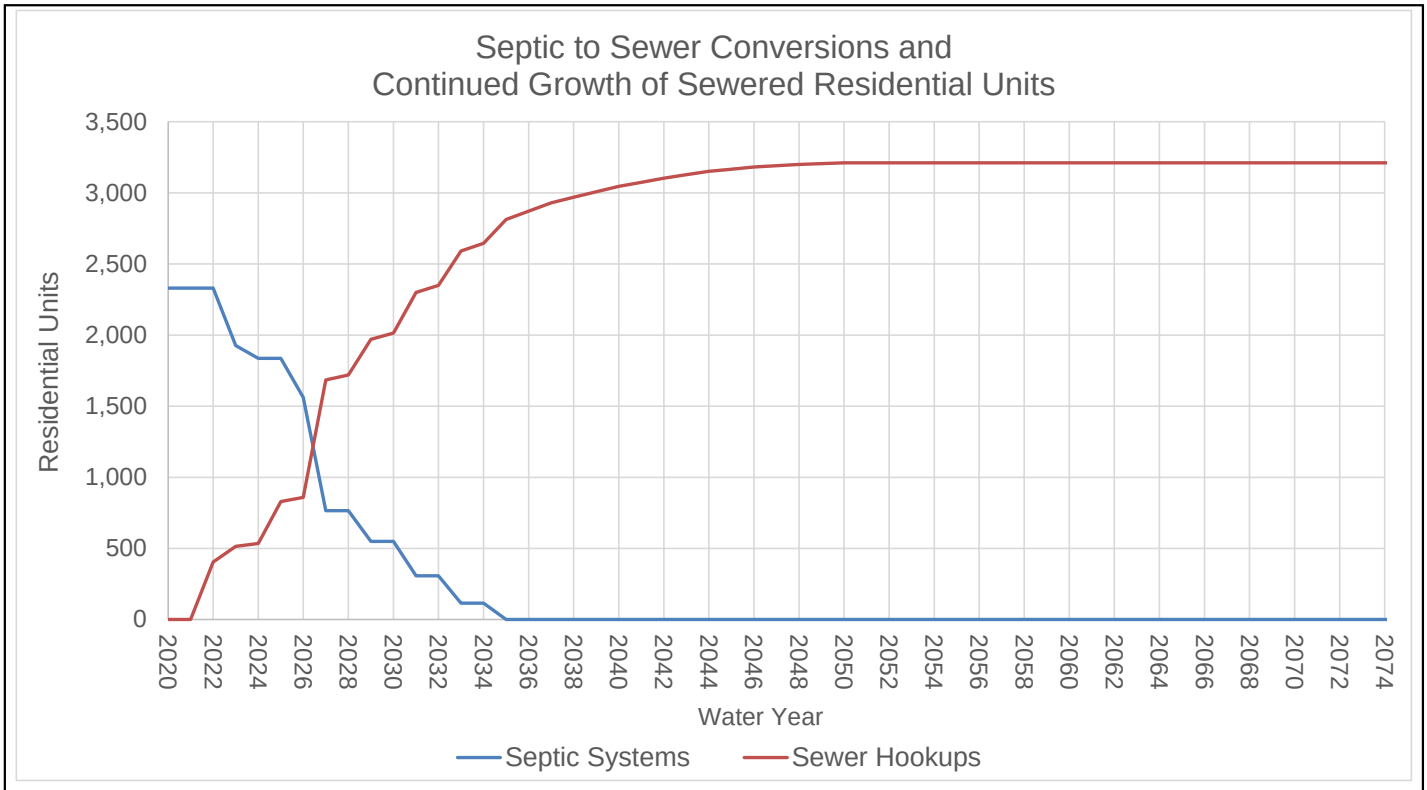
Basemap modified from aerial photograph provided by Esri, dated November 9, 2016. GSA areas from SGMA. Water.CA.gov.

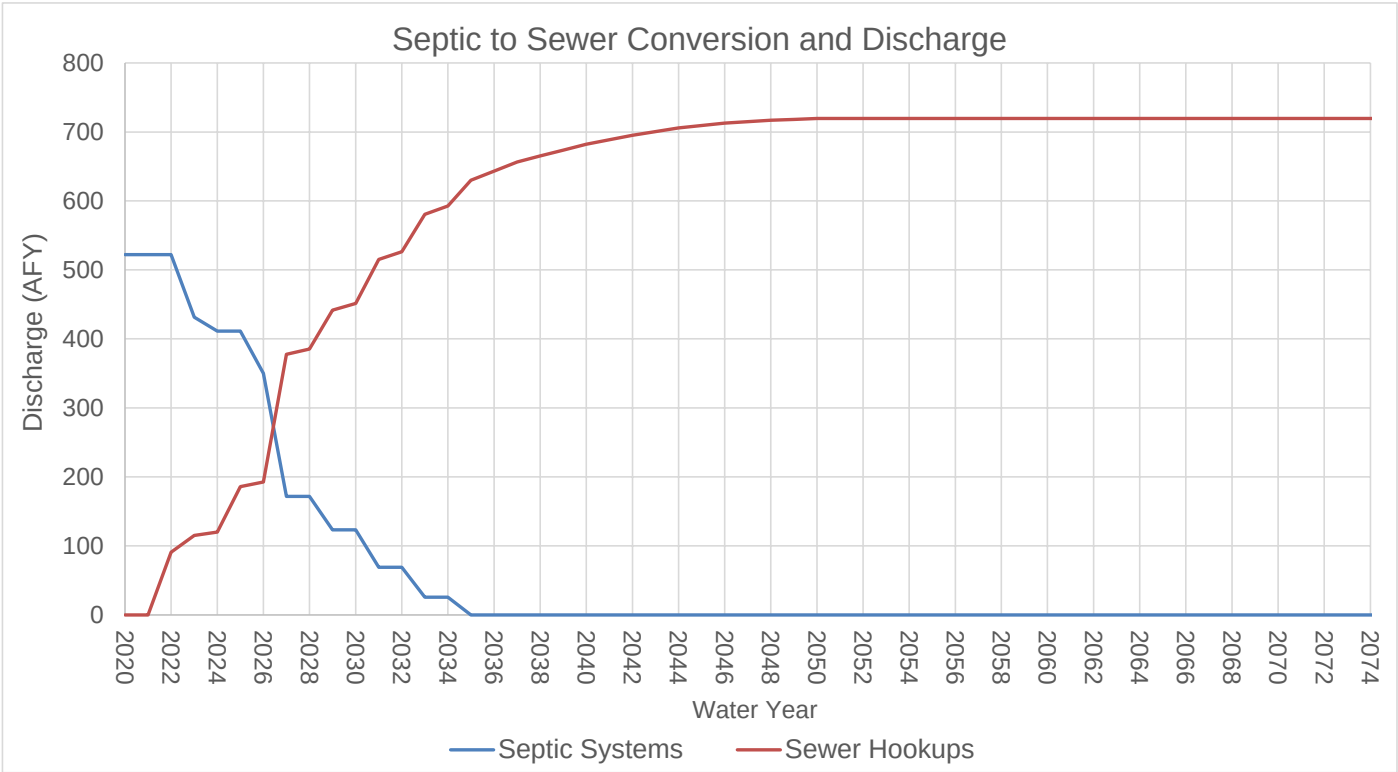
N

WASTEWATER TREATMENT AND RECLAMATION FACILITIES AND SEPTIC TO SEWER CONVERSION AREAS
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: MWW | Date: 10/8/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 7-7 |

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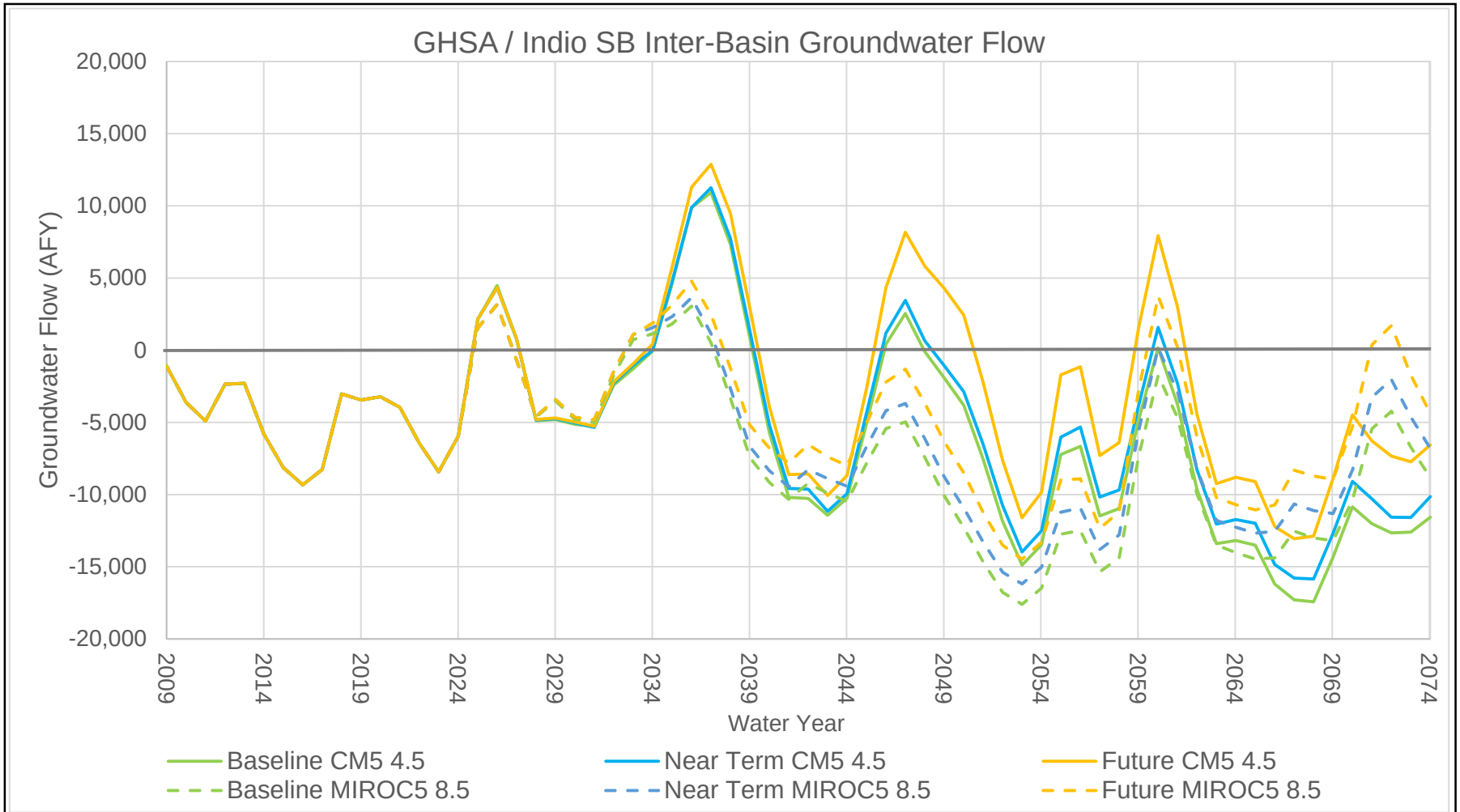




Abbreviations:
AFY = Acre-Feet per Year

Projected Septic to Sewer Conversions and Sewer and Septic Flows

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 7-8 |



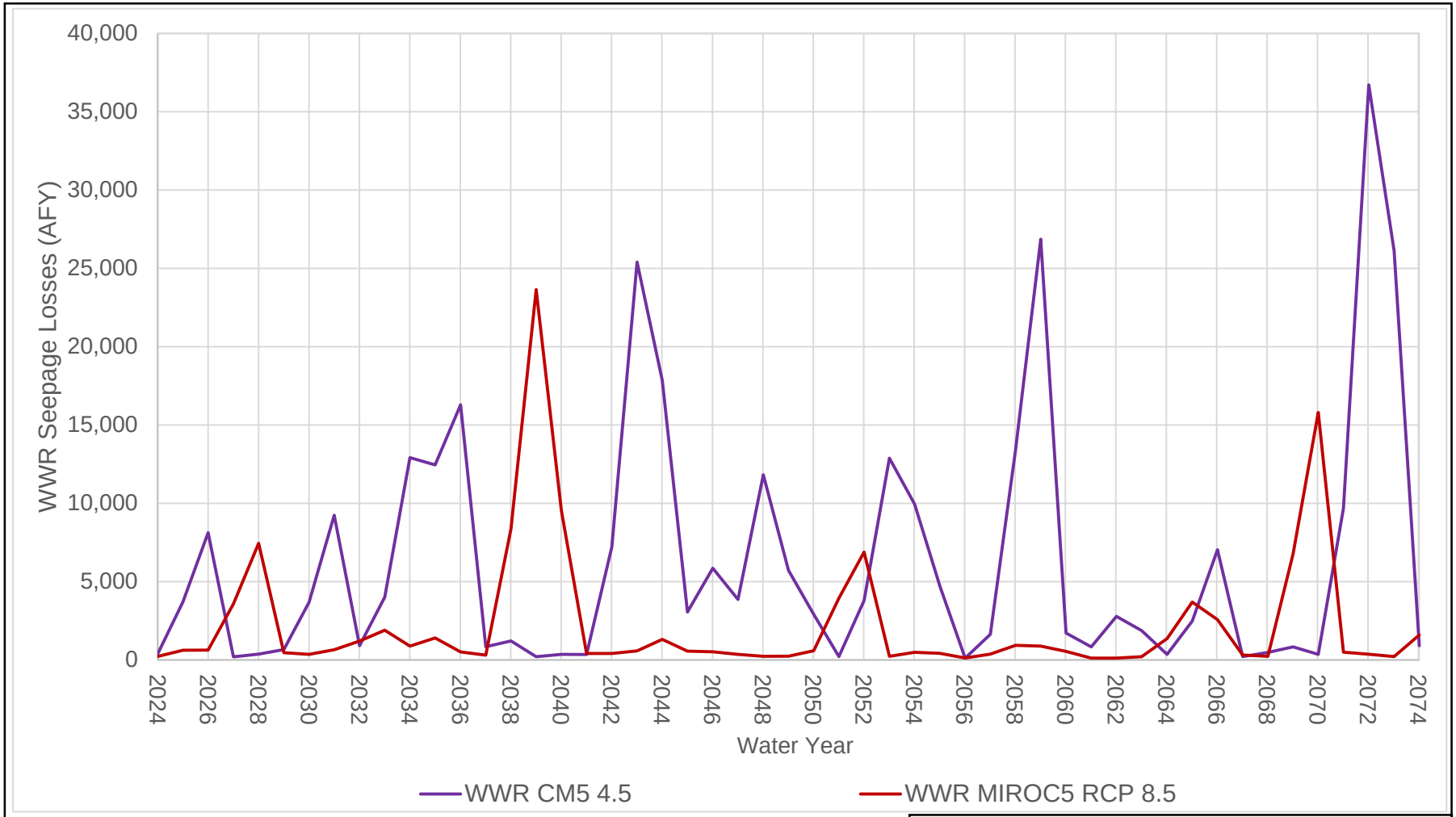

Abbreviations:

AF= Acre feet; AFY = Acre feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin
SB = Subbasin

Note: (-) values indicate flow from GHSA to Indio SB
(+) values indicate flow from Indio SB to GHSA

2009 - 2074 Simulated
Inter-Subbasin Groundwater Underflow between
GHSA and Indio Subbasin
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| | | Figure **7-9** |




Abbreviations:
AFY = Acre feet per Year
WWR = Whitewater River

Note: WWR seepage losses the same for Baseline, Near-Term, and Future scenarios.

Forecast Whitewater River Seepage Losses to Garnet Hill Subarea

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|

Figure **7-10**

## 7.4 Scenario Assumptions

The following sections discuss the specific assumptions unique to each of the WY 2024-2025 to WY 2073-2074 forecast scenarios. The primary differences in the Baseline, Near-Term Projects, and Future Projects scenarios includes differences in the volume and timing of SWP deliveries for groundwater replenishment at the MC-GRF, WWTP return flows, total return flows, Whitewater River seepage losses, Garnet Hill Fault Fluxes, and MFR.

### 7.4.1 Baseline

The Baseline scenario assumptions are identical under CM5 RCP 4.5 and MIROC5 RCP 8.5 climate change conditions except as specifically noted below. All values are rounded to the nearest 5 AF.

#### Mountain Front Recharge

MFR was discussed in Section 7.3.2 and shown graphically in **Figure 7-3**. A summary of the MFR assumptions are provided in **Table 7-1** and **Table 7-2**.

#### SWP Deliveries to the MC-GRF

**Figure 7-7** shows the locations of the Mission Creek and Whitewater River GRF. **Figure 7-4** shows the forecast SWP deliveries to the MC-GRF. The total SWP forecast deliveries to MCSB for groundwater replenishment at the MC-GRF listed in **Table 7-1** and **Table 7-2** reflect the adjustment factors described above in Section 7.3.3.

**Table 7-1: Model Inputs – Baseline with CM5 RCP 4.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| Mountain Front Recharge | 40 | 63,990 | 9,340 |
| SWP Deliveries to MC-GRF | 375 | 24,465 | 8,685 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 1,455 | 2,055 | 1,525 |
| Nancy Wright RWRF to GHSA | 145 | 990 | 880 |
| MBSC Return Flows | 3,740 | 4,545 | 3,955 |
| GHSA Return Flows | 85 | 1,080 | 9,500 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 430 | 23,830 | 4,375 |
| Garnet Hill Fault Flux | -26,405 | 23,695 | -8,640 |

**Table 7-2: Model Inputs – Baseline with MIROC5 RCP 8.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| Mountain Front Recharge | 40 | 35,720 | 3,150 |
| SWP Deliveries to MC-GRF | 825 | 20,240 | 7,975 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 1,455 | 2,055 | 1,525 |
| Nancy Wright RWRF to GHSA | 145 | 990 | 880 |
| MBSC Return Flows | 3,740 | 4,545 | 3,955 |
| GHSA Return Flows | 85 | 1,080 | 9,500 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 0 | 18,055 | 1,760 |
| Garnet Hill Fault Flux | -27,415 | 10,555 | -10,350 |

## Wastewater Treatment Plant Return Flows

**Figure** 7-7 shows the locations of the existing Horton WWTP in the MCSB, Desert Crest WWTP in the DHSSB, and the Nancy Wright RWRF in the GHSA. Annual projected total wastewater flows are shown on **Figure 7-11**. All wastewater effluent has a 3% evaporation loss applied to calculate the return flow (see **Appendix A**). A summary of the WWTP return flows assumptions are provided in **Table 7-1** and **Table 7-2** above.

## Total Return Flows

Total return flow (not including MC-GRF recharge) is shown for each of the subbasins/subareas on **Figure 7-12**. The graph shows that total return flows in MCSB declines from WY 2024-2025 to WY 2033-2034 and then slowly starts to increase from WY 2034-2035 through WY 2073-2074. In DHSSB, the total return flows remain relatively constant throughout the modeling horizon for all scenarios. In GHSA, total return flows increase from WY 2024-2025 to WY 2033-2035 with the addition of Nancy Wright RWRF wastewater flows and then stabilize for the remainder of the modeling horizon. A summary of the total return flows assumptions are provided in **Table 7-1** and **Table 7-2** above.

## Whitewater River Seepage

Whitewater River recharge (seepage) in the GHSA is shown on **Figure 7-10.** The Whitewater River seepage losses vary by WY with significantly more seepage losses under CM5 RCP 4.5 than under MIRCO5 RCP 8.5. A summary of the Garnet Hill Fault Flux assumptions are provided in **Table 7-1** and **Table 7-2** above.

## Garnet Hill Fault Flux

Garnet Hill Fault flux in the GHSA is shown on **Figures 7-9.** The Garnet Hill Fault fluxes vary by WY but are primarily negative (i.e., outflow from the GHSA into the Palm Springs Subarea of the Indio Subbasin). A summary of the Garnet Hill Fault Flux assumptions are provided in **Table 7-1** and **Table 7-2** above.

## 7.4.2 Near-Term Projects

The Near-Term Projects scenario assumptions are identical to the Baseline scenario assumptions described in Section 7.4.1, with differences as discussed below.

### Nancy Wright Regional Water Reclamation Facility Return Flow Location

The Nancy Wright RWRF will discharge treated water into percolation ponds located at the facility in the GHSA, as simulated in the Baseline scenario, through WY 2033-2034. Beginning in WY 2034-2035, the Near-Term Projects scenario assumes that the treated discharge water will be conveyed via pipeline to new ponds at the Nancy Wright RWRF disposal/recharge site in the MCSB for percolation and/or groundwater recharge. The associated return flow will therefore shift from GHSA to the MCSB after WY 2033-2034. Intentional recharge of the treated effluent to replenish groundwater would involve different permitting and regulatory approval steps than would disposal of the treated effluent in percolation ponds. From a water balance standpoint, however, this project will result in an increase in return flow to the MCSB regardless of whether the treated effluent is considered to be disposed of by percolation and evaporation or used for groundwater recharge.

### Mountain Front Recharge

MFR was discussed in Section 7.3.2 and shown graphically in **Figure 7-3**. A summary of the MFR assumptions are provided in **Table 7-3** and **Table 7-4**.

### SWP Deliveries to the MC-GRF

**Figure 7-4** shows the forecast SWP deliveries to the MC-GRF. The total SWP forecast deliveries to MCSB for groundwater replenishment at the MC-GRF listed in in **Table 7-3** and **Table 7-4** reflect the adjustment factors described above in Section 7.3.3.

**Table 7-3: Model Inputs – Near-Term Projects with CM5 RCP 4.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| SWP Deliveries to MC-GRF | 375 | 24,465 | 8,685 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 370 | 2,055 | 610 |
| Nancy Wright RWRF to MCSB | 900 | 2,055 | 1,115 |
| Nancy Wright RWRF to GHSA | 0 | 900 | 90 |
| MBSC Return Flows | 3,320 | 4,545 | 3,865 |
| GHSA Return Flows | 85 | 830 | 150 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 430 | 23,830 | 4,375 |
| Garnet Hill Fault Flux | -24,470 | 24,400 | -7,3108 |
| Mountain Front Recharge | 40 | 63,990 | 4,375 |

**Table 7-4: Model Inputs – Near-Term Projects with MIROC5 RCP 8.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| Mountain Front Recharge | 40 | 35,720 | 3,110 |
| SWP Deliveries to MC-GRF | 825 | 20,240 | 7,975 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 370 | 2,055 | 610 |
| Nancy Wright RWRF to MCSB | 900 | 2,055 | 1,115 |
| Nancy Wright RWRF to GHSA | 0 | 900 | 90 |
| MBSC Return Flows | 3,320 | 4,545 | 3,865 |
| GHSA Return Flows | 85 | 830 | 150 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 0 | 18,055 | 1,760 |
| Garnet Hill Fault Flux | -25,520 | 10,555 | -8,715 |

## Wastewater Treatment Plant Return Flows

**Figure** 7-7 shows the locations of the existing Horton WWTP in the MCSB, Desert Crest WWTP in the DHSSB, and the Nancy Wright RWRF in the GHSA. Annual projected total wastewater flows are shown on **Figure 7-11**. All wastewater effluent has a 3% evaporation loss applied to calculate the return flow (see **Appendix A**). A summary of the WWTP return flows assumptions are provided in in **Table 7-3** and **Table 7-4** above.

## Total Return Flows

Total return flow (not including MC-GRF recharge) is shown for each of the subbasins/subareas on **Figure 7-12.** The graph shows that total return flows in MCSB declines from WY 2024-2025 to WY 2033-2034 and then slowly starts to increase from WY 203420-35 through WY 2073-2074. In DHSSB, the total return flows remain relatively constant throughout the modeling horizon for all scenarios. In GHSA, total return flows increase from WY 2024-2025 to WY 2033-2035 with the addition of Nancy Wright RWRF wastewater flows and then stabilize for the remainder of the modeling horizon. A summary of the total return flows assumptions are provided in in **Table 7-3** and **Table 7-4** above.

## Whitewater River Seepage

Whitewater River recharge (seepage) in the GHSA is shown on **Figure 7-10.** The Whitewater River seepage losses vary by WY with significantly more seepage losses under CM5 RCP 4.5 than under MIRCO5 RCP 8.5. A summary of the Garnet Hill Fault Flux assumptions are provided in in **Tables 7-3 and 7-4** above.

## Garnet Hill Fault Flux

Garnet Hill Fault flux in the GHSA is shown on **Figures 7-9.** The Garnet Hill Fault fluxes vary by WY but are primarily negative (i.e., outflow from the GHSA into the Palm Springs Subarea of the Indio Subbasin). A summary of the Garnet Hill Fault Flux assumptions are provided in in **Tables Table 7-3** and **Table 7-4** above.

## 7.4.3 Future Projects

The Future Projects scenario assumptions are identical to those described in Section 7.4.2, Near-Term Projects scenario assumptions, with the differences discussed below.

### Sites Reservoir and Delta Conveyance Project

The SWP supplies in the Future Projects scenario are identical to the Near-Term Projects scenario with the addition of Sites Reservoir and the Delta Conveyance Project. The details of these two projects are provided in Section 4. For the purposes of the model forecast, these two projects increase the SWP deliveries to the MC-GRF for groundwater replenishment. The Sites Reservoir project increases SWP deliveries starting in 2035 by approximately 1,124 AFY in all scenarios. In 2047, the Delta Conveyance Project increases SWP deliveries by 2,060 AFY in the CM5 RCP 4.5 climate scenario and by 812 AFY in the MIRCO5 RCP 8.5 climate scenario..

### Mountain Front Recharge

MFR was discussed in Section 7.3.2 and shown graphically in **Figure 7-3**. A summary of the MFR assumptions are provided in **Table 7-5** and **Table 7-6**.

### SWP Deliveries to the MC-GRF

**Figure 7-4** shows the forecast SWP deliveries to the MC-GRF. The total SWP forecast deliveries to MCSB for groundwater replenishment at the MC-GRF listed in **Table 7-5** and **Table 7-6** reflect the adjustment factors described above in Section 7.3.3.

**Table 7-5: Model Inputs – Future Projects with CM5 RCP 4.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| Mountain Front Recharge | 40 | 63,990 | 4,375 |
| SWP Deliveries to MC-GRF | 980 | 29,355 | 10,130 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 370 | 2,055 | 610 |
| Nancy Wright RWRF to MCSB | 900 | 2,055 | 1,115 |
| Nancy Wright RWRF to GHSA | 0 | 900 | 90 |
| MBSC Return Flows | 3,320 | 4,545 | 3,865 |
| GHSA Return Flows | 85 | 830 | 150 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 430 | 23,830 | 4,375 |
| Garnet Hill Fault Flux | -21,985 | 27,025 | -3,750 |

**Table 7-6: Model Inputs – Future Projects with MIROC5 RCP 8.5**

| Model Input | Minimum (AFY) | Maximum (AFY) | Average (AFY) |
|---|---|---|---|
| Mountain Front Recharge | 40 | 35,720 | 3,110 |
| SWP Deliveries to MC-GRF | 980 | 20,530 | 9,005 |
| Desert Crest WWTP | 0 | 50 | 50 |
| Horton WWTP | 370 | 2,055 | 610 |
| Nancy Wright RWRF to MCSB | 900 | 2,055 | 1,115 |
| Nancy Wright RWRF to GHSA | 0 | 900 | 90 |
| MBSC Return Flows | 3,320 | 4,545 | 3,865 |
| GHSA Return Flows | 85 | 830 | 150 |
| DHSSB Return Flows | 2,085 | 2,295 | 2,205 |
| Whitewater River Seepage | 0 | 18,055 | 1,760 |
| Garnet Hill Fault Flux | -23,780 | 14,295 | -6,385 |

## Wastewater Treatment Plant Return Flows

**Figure** 7-7 shows the locations of the existing Horton WWTP in the MCSB, Desert Crest WWTP in the DHSSB, and the Nancy Wright RWRF in the GHSA. Annual projected total wastewater flows are shown on **Figure 7-11**. All wastewater effluent has a 3% evaporation loss applied to calculate the return flow (See **Appendix A**). A summary of the WWTP return flows assumptions are provided in **Table 7-5** and **Table 7-6** above.

## Total Return Flows

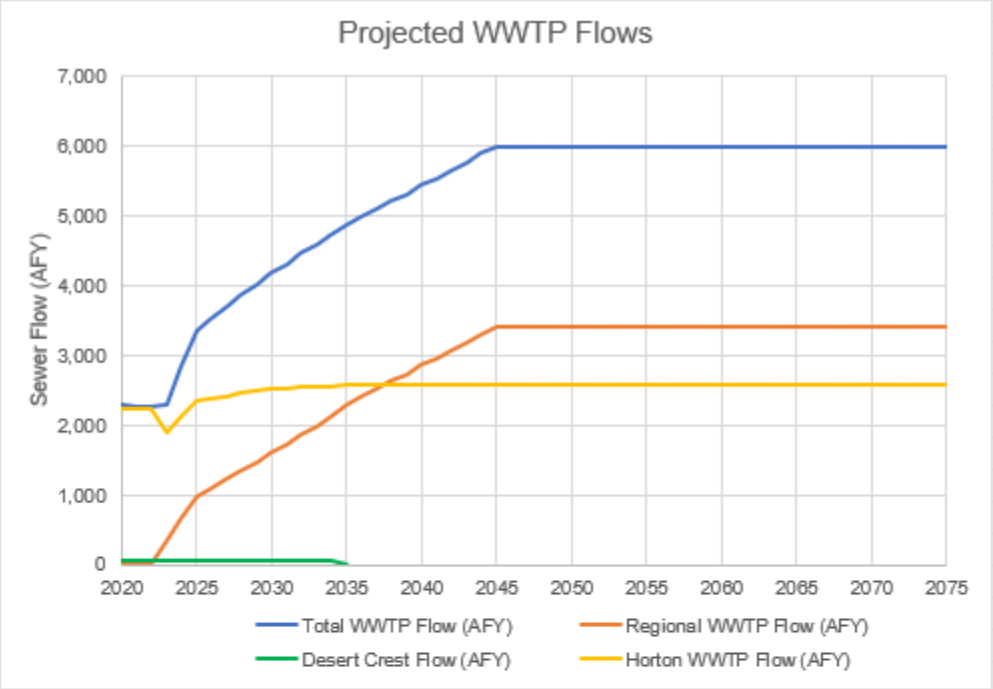
Total return flow (not including MC-GRF recharge) is shown for each of the subbasins/subareas on **Figure 7-12**. The graph shows that total return flows in MCSB declines from WY 2024-2025 to WY 2033-2034 and then slowly starts to increase from WY 2034-2035 through WY 2073-20-74. In DHSSB, the total return flows remain relatively constant throughout the modeling horizon for all scenarios. In GHSA, total return flows increase from WY 2024/25 to WY 2033/35 with the addition of Nancy Wright RWRF wastewater flows and then stabilize for the remainder of the modeling horizon. A summary of the total return flows assumptions are provided in **Table 7-5** and **Table 7-6** above.

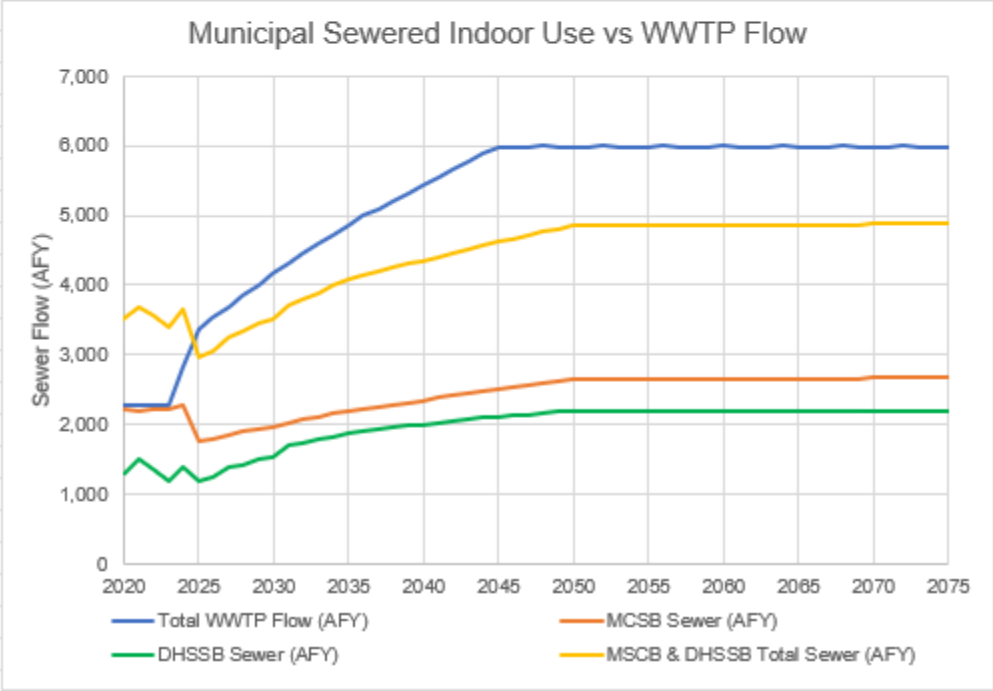
## Whitewater River Seepage

Whitewater River recharge (seepage) in the GHSA is shown on **Figure 7-10.** The Whitewater River seepage losses vary by WY with significantly more seepage losses under CM5 RCP 4.5 than under MIRCO5 RCP 8.5. There is no difference in the seepage losses under Baseline, Near-Term and Future scenarios. A summary of the Garnet Hill Fault Flux assumptions are provided in **Table 7-5** and **Table 7-6** above.

## Garnet Hill Fault Flux

Garnet Hill Fault flux in the GHSA is shown on **Figures 7-9.** The Garnet Hill Fault fluxes vary by WY but are primarily negative (i.e., outflow from the GHSA into the Palm Springs Subarea of the Indio Subbasin). A summary of the Garnet Hill Fault Flux assumptions are provided in **Table 7-5** and **Table 7-6** above.



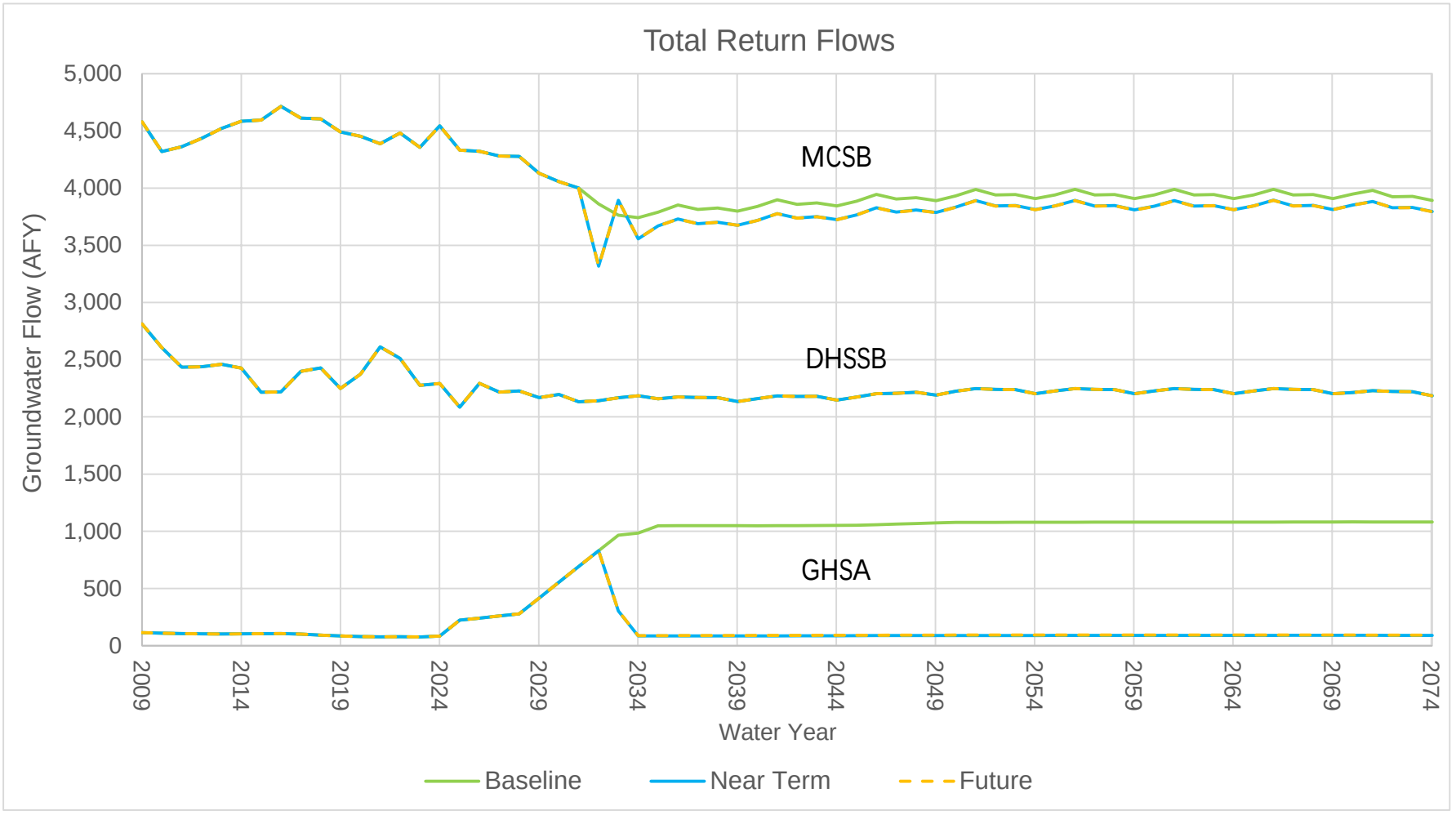




Abbreviations:
AFY = Acre-Feet per Year
WWTP = Waste Water Treatment Plant
MSCB = Mission Creek Subbasin
DHSSB = Desert Hot Springs Subbasin

Wastewater Treatment Plant Projected Flows

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/08/2026 | Project No.: US0043968.2616 |
|---|---|---|
| wsp | | Figure 7-11 |




Abbreviations:
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin

Note: Includes applied water and WWTP return flows

2009 - 2074 Simulated
Total Return Flows by Subbasin
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| | | Figure 7-12 |

## 7.5 Scenario Simulation Results

The following sections summarize the 2027 MCSB forecast scenario results, including simulated groundwater levels, simulated water balance and change in storage, inter-subbasin groundwater underflow, and overall conclusions. The climate change scenarios evaluated in the 2027 MCSB forecast models are based on the BCM climate change forecasts described in Section 7.2.2.

### 7.5.1 Simulated Groundwater Levels

Hydrographs of observed WY 2008-2009 to WY 2023-2024 groundwater elevations and forecast WY 2024-2025 to WY 2073-2074 groundwater elevations were prepared for the nine Key Wells in the MCSB (**Figure 7-13** and **Appendix B**). Because the 2027 MCSB model does not exactly match observed water levels and the forecast starts at the end of the 2027 MCSB model, the forecast water levels were modified as needed to match measured groundwater levels in the wells at the end of the calibration period (the end of WY 2023-2024).

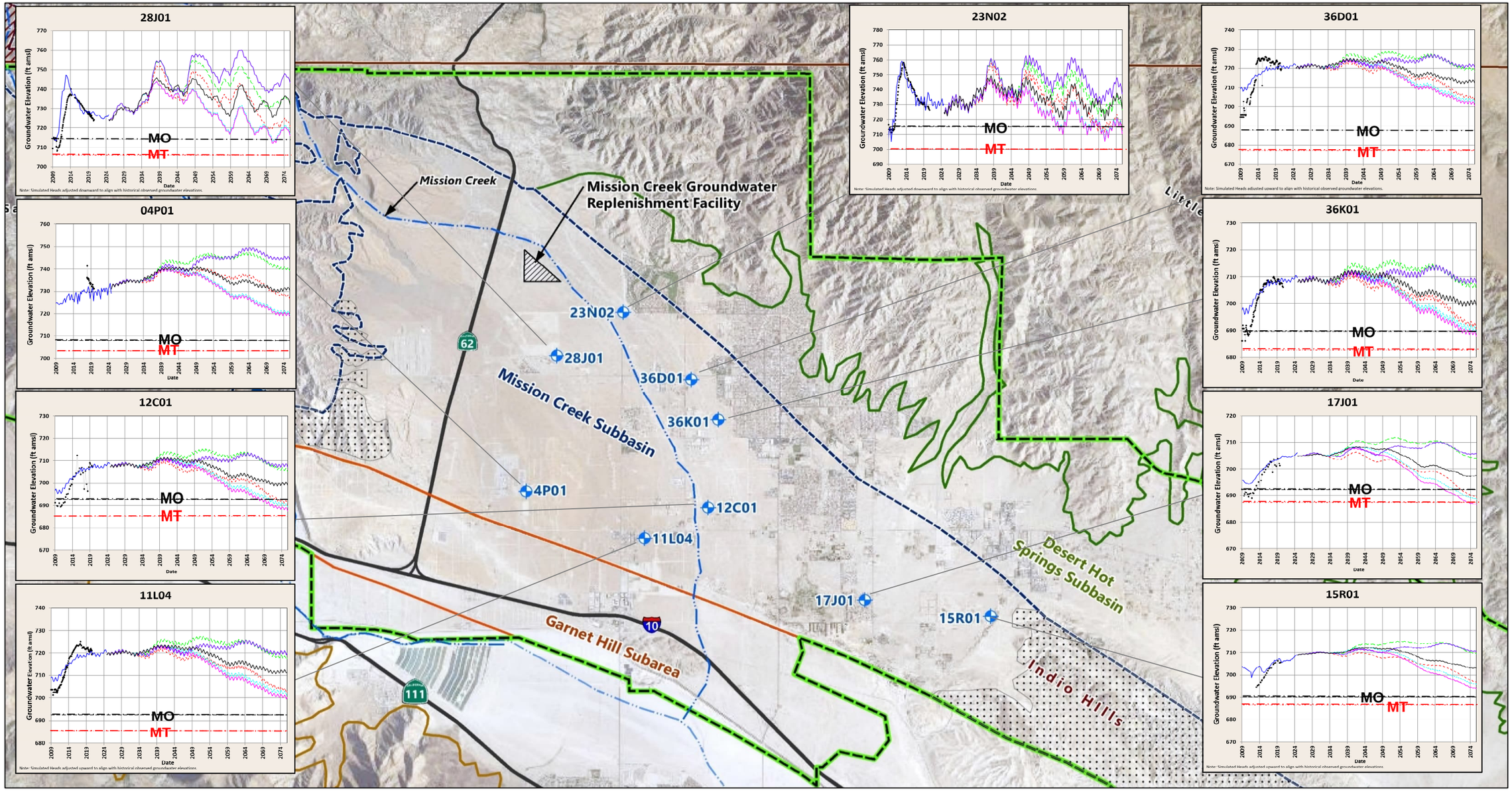
Simulated groundwater elevation hydrographs are shown in **Figure 7-13** for Key Wells under all six scenarios: the Baseline, Near-Term Projects, and Future Projects, each evaluated using the CM5 RCP 4.5 and MIROC5 RCP 8.5 climate change scenarios. Each hydrograph shows the simulated MO based on WY 2008-2009 groundwater levels and the MT described in Section 6. Hydrographs for individual Key Wells are included in **Appendix B**.

Under the **Baseline Scenarios:**

- **With CM5 RCP 4.5** climate change conditions, groundwater levels in three Key Wells fall below their MOs including 02S04E23N02 (23N02), 03S05E17J01 (17J01), 03S04E12C01 (12C01). Groundwater levels in all 9 Key Wells stay above their MTs during the modeling horizon (WY 2073-2074).
- **With MIROC5 RCP 8.5** climate change conditions, groundwater levels in four Key Wells fall below their MOs including 23N02, 02S04E28J01 (28J01), 12C01, and 17J01. Groundwater levels in all 9 Key Wells stay above their MTs during the modeling horizon (WY 2073-2074).

Under the **Near-Term Projects Scenarios:**

- **With CM5 RCP 4.5** climate change conditions, groundwater levels in all 9 Key Wells stay above their MOs and MTs during the modeling horizon (WY 2073-2074).
- **With MIROC5 RCP 8.5** climate change conditions, groundwater levels in five Key Wells fall below their respective MOs including 23N02, 28J01, 02S04E36K01 (36K01), 12C01, and 17J01. Groundwater levels in all but one Key Well stay above their MTs. Groundwater levels at 17J01 falls below its MT in WY 2072-2073, just before the end of the modeling horizon (WY 2073-2074).




Monitoring well (Key Well)
Groundwater Replenishment Facility
Planning Area
Streams
Highway/road
Mission Creek Subbasin

Garnet Hill Subarea of Indio Subbasin
Lower permeability/non-water bearing sediments/bedrock
Desert Hot Springs Subbasin
Indio Subbasin
Mission Creek Subbasin

Observed
Baseline CM5-4.5
NearTerm CM5-4.5
Future CM5-4.5
MO

Calibration v06r14
Baseline Miroc-8.5
NearTerm Miroc-8.5
Future Miroc5-8.5
MT

Note:

1. Ground surface elevation in feet above mean sea level.
2. See Appendix B for individual Key Well Hydrographs

Abbreviations:

MO = Measurable Objective

# Forecast Simulation Results For Key Wells with Measurable Objectives and Minimum Thresholds

Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/08/2026 | Project No.: US0043968.2616 |
|---|---|---|
| WSP | | Figure 7-13 |

Under the **Future Projects Scenarios:**

- **With CM5 RCP 4.5** climate change scenario conditions, groundwater levels in all 9 Key Wells stay above their MOs and MTs during the modeling horizon (WY 2073-2074).
- **With MIROC5 RCP 8.5** climate change conditions, groundwater levels in all 9 Key Wells stay above their MOs and MTs during the modeling horizon (WY 2073-2074).

Groundwater levels vary by climate assumptions and PMA implementation with Near-Term Projects and Future Projects scenarios, generally maintaining higher groundwater levels than the corresponding Baseline scenarios due to additional source substitution and supply acquisition. The MIROC5 RCP 8.5 Near-Term Projects scenario is the only with-project scenario with a MT exceedance, at 17J01 near the end of the modeling horizon (WY 2073-2074). Simulated MO and MT exceedances in the Baseline and Near-Term Projects scenarios demonstrate the need for implementation of PMAs that reduce water use, serve recycled water in lieu of groundwater pumping, and increase groundwater replenishment to maintain MCSB groundwater elevations above these criteria under both BCM climate forecasts.

## 7.5.2 Simulated Water Balance and Change in Storage

The simulated water balances and changes in groundwater storage for the six scenarios are presented in **Figure 7-14** through **Figure 7-19** and summarized in **Tables B4** through **B21** in **Appendix B**. **Figure 7-14** through **Figure** 7-16 present results for the Baseline, Near-Term Projects, and Future Projects scenarios under CM5 RCP 4.5 climate change conditions. **Figure 7-17** through **Figure 7-19** present the corresponding results under MIROC5 RCP 8.5 climate change conditions.

Water balance and change in storage simulated by the calibrated 2027 MCSB model includes storage for the entire subbasin/subarea. These areas are larger than the area developed for water supply and monitored by the Agencies. For example, in the MCSB, the northwestern portion of the subbasin comprises a relatively remote area without monitoring wells. This area is also where nearly all MFR into the subbasin occurs. Under extended drought conditions, MFR will decline along with groundwater levels in all subbasins. The reverse is true under wet conditions. This is part of the natural hydrogeologic cycle of the subbasin. Because this northwestern area is more than a mile upgradient from the nearest monitored area, there will be a considerable time lag for the decrease or increase in recharge to impact groundwater levels in monitoring wells. Consequently, the simulated water balance and change in storage will not directly reflect groundwater levels in some portions of the MCSB under some hydrologic conditions. As described in Section 6.4.3, the MO for groundwater in storage is based on 2009 groundwater conditions. Hence, the cumulative change in storage discussed below is relative to the 2009 conditions, which is a useful measure in evaluating long term trends for groundwater storage and water balance.

The cumulative change in storage for each subbasin is summarized below. Cumulative change in storage is calculated relative to WY 2008-2009 conditions, consistent with the groundwater in storage MO described in Section 6.4.3.

## Mission Creek Subbasin

The MCSB water balance is primarily driven by natural recharge, groundwater replenishment at the MC-GRF, and groundwater pumping. Additional inflows include return flows and inter-subbasin groundwater underflow with the DHSSB and the Mission Creek Fault. Primary discharge components include pumping, evapotranspiration, inter-subbasin groundwater underflow with the GHSA, and inter-subbasin groundwater underflow with the Indio Hills area along the southeastern model boundary. The annual water balance varies substantially among wet and dry water years under both climate scenarios. **Figure 7-14** and **Figure 7-17** present the simulated MCSB water balances under the CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions, respectively. The simulated cumulative change in storage at the end of WY 2073-2074 for each management and climate change scenario is summarized in **Table 7-7**.

**Table 7-7: MCSB Cumulative Change in Storage (AF)**

| Management Scenario | CM5 RCP 4.5 (Cool/Wet) | MIROC5 RCP 8.5 (Hot/Dry) |
|---|---|---|
| **Baseline** | 25,900 | −171,400 |
| **Near-Term Projects** | 58,000 | −174,700 |
| **Future Projects** | 128,800 | −126,200 |

Note: Values are rounded to the nearest 100 AF.

Under CM5 RCP 4.5 climate conditions, all three management scenarios simulate a positive cumulative change in MCSB groundwater storage by WY 2073-2074. Both with-project scenarios produce progressively greater increases in storage, with the Future Projects scenario resulting in the largest simulated benefit due to implementation of source substitution and supply acquisition projects.

Under MIROC5 RCP 8.5 climate conditions, all three management scenarios simulate a negative cumulative change in MCSB groundwater storage by WY 2073-2074 due to significantly reduced natural infiltration and imported water replenishment. Storage under the Near-Term Projects scenario is similar to storage simulated under the Baseline scenario. Storage under the Future Projects scenario reduces the deficit by approximately 45,000 to 49,000 AF relative to the other two scenarios, but does not eliminate the long-term decline.

## Garnet Hill Subarea

The GHSA water balance includes natural recharge, return flow recharge, recharge from the Nancy Wright RWRF, and groundwater underflow from the MCSB. The primary simulated discharge component in the GHSA is inter-subbasin groundwater underflow between the Garnet Hill Fault Flux and the Indio Subbasin. As shown on **Figure 7-9**, the magnitude and direction of this inter-subbasin groundwater underflow vary over time in response to changing groundwater

levels within both the GHSA and the Indio Subbasin. Consequently, annual changes in GHSA storage vary considerably throughout the forecast period. **Figure 7-15** and **Figure 7-18** present the simulated GHSA water balances under the CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions, respectively. The simulated cumulative change in storage at the end of WY 2074/75 for each management and climate change scenario is summarized in **Table 7-8**.

**Table 7-8: GHSA Cumulative Change in Storage (AF)**

| Management Scenario | CM5 RCP 4.5 (Cool/Wet) | MIROC5 RCP 8.5 (Hot/Dry) |
|---|---|---|
| **Baseline** | 91,700 | −85,100 |
| **Near-Term Projects** | 161,500 | −68,300 |
| **Future Projects** | 285,300 | 13,800 |

Note: Values are rounded to the nearest 100 AF.

Under CM5 RCP 4.5 climate conditions, all three scenarios simulate a positive cumulative change in GHSA groundwater storage by WY 2073-2074. Both with-project scenarios produce progressively greater increases in storage, with the Future Projects scenario resulting in the largest simulated benefit.

Under MIROC5 RCP 8.5 climate conditions, the Baseline and Near-Term Projects scenarios simulate a negative cumulative change in GHSA groundwater storage by WY 2073-2074. The Future Projects scenario improves the simulated water balance sufficiently to produce a small positive cumulative change in storage and therefore provides the greatest improvement in GHSA storage under the hot-dry climate assumption.

## Desert Hot Springs Subbasin

The DHSSB water balance is smaller than the MCSB and GHSA water balances and is primarily driven by natural recharge, return flow, pumping, and inter-subbasin groundwater underflow with the MCSB and Indio Hills East. Pumping and other non-climate dependent components remain similar among the three management scenarios. Consequently, differences in DHSSB storage are driven primarily by natural recharge and changes in the hydraulic gradient between the DHSSB and adjacent subbasins. **Figure** 7-16 and **Figure 7-19** present the simulated annual water balances. The simulated cumulative change in storage at the end of WY 2073-2074 for each management and climate change scenario is summarized in **Table 7-9**.

**Table 7-9: DHSSB Cumulative Change in Storage (AF)**

| Management Scenario | CM5 RCP 4.5 (Cool/Wet) | MIROC5 RCP 8.5 (Hot/Dry) |
|---|---|---|
| **Baseline** | 28,800 | −6,100 |
| **Near-Term Projects** | 30,700 | −6,300 |
| **Future Projects** | 33,000 | −4,600 |

Note: Values are rounded to the nearest 100 AF.

Under CM5 RCP 4.5 climate conditions, all three scenarios simulate a positive cumulative change in DHSSB groundwater storage by WY 2073-2074 due to adequate MFR.

Under MIROC5 RCP 8.5 climate conditions, all three scenarios simulate a negative cumulative change DHSSB groundwater storage by WY 2073-2074 due to reduced MFR. The Future Projects scenario simulates the most cumulative storage under both climate assumptions, although the differences among the management scenarios are smaller than those simulated for the MCSB and GHSA.

#### 7.5.2.1 Cumulative Change in Storage

The cumulative change in storage for all six scenarios is presented in **Figure 7-20**.

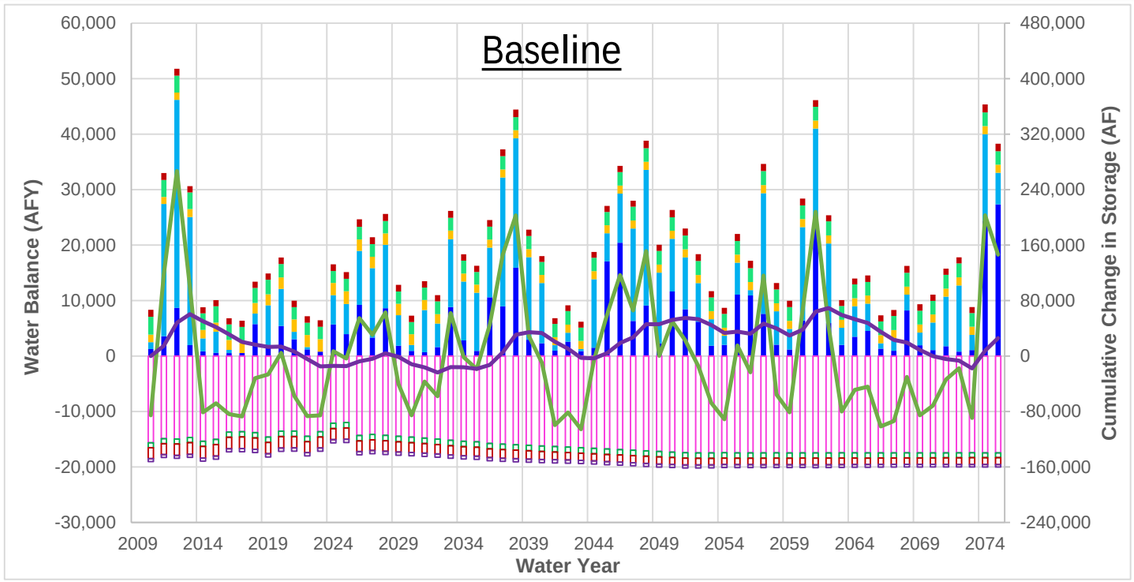
**Mission Creek Subbasin**

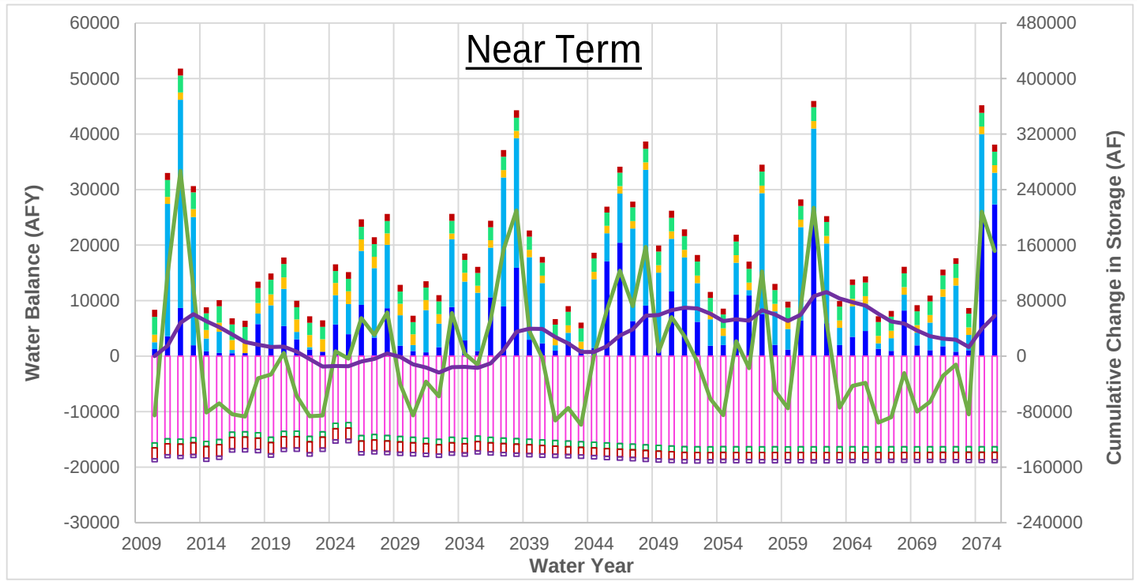
The cumulative change in storage in the MCSB for all six scenarios are compared in **Figure 7-20**. The cumulative change in storage clearly diverges around WY 2035-2036 as Near-Term Project and Future Projects, including the re-routing of Nancy Wright RWRF wastewater from GHSA to MCSB, start having effects. Under CM5 RCP 4.5 conditions, the cumulative change in storage is mostly positive for the Baseline, Near-Term Projects, and Future Projects scenarios. Only the Baseline cumulative change in storage briefly dips below zero. Under MIROC5 RCP 8.5 conditions, all three management scenarios simulate a negative cumulative change in MCSB groundwater storage for the entire modeling horizon.

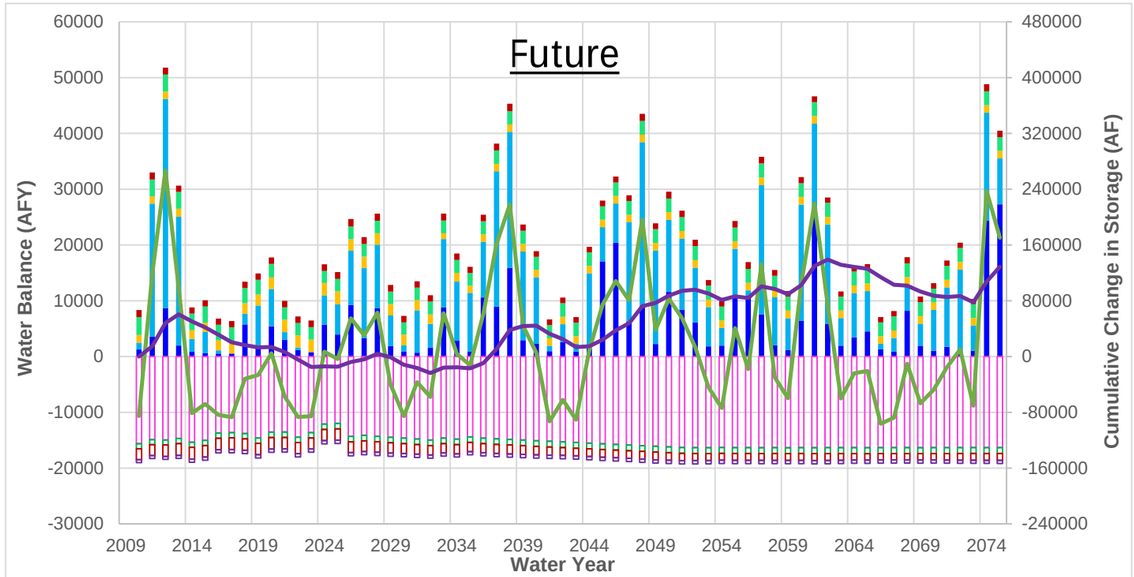
A comparison of the six MCSB scenarios demonstrates that climate-related variability in MFR is a major control on annual and cumulative storage. The project scenarios provide the greatest relative benefit during the latter portion of the modeling horizon, after the additional groundwater replenishment and Nancy Wright RWRF wastewater re-routing projects are implemented. Under both climate scenarios, the Future Projects scenario retains the most MCSB groundwater storage.

**Garnet Hill Subarea**

The cumulative change in storage in the GHSA for all six scenarios are compared in **Figure 7-20**. The cumulative change in storage also diverges around WY 2035-2036. Under CM5 RCP 4.5 conditions, the cumulative change in storage is positive for the Baseline, Near-Term Projects, and Future Projects scenarios. Under MIROC5 RCP 8.5 conditions, the Baseline scenario remains above zero because the re-routing of Nancy Wright RWRF wastewater from GHSA to MCSB does not occur, while the Near-Term Projects and Future Projects scenarios simulate a negative cumulative change in GHSA groundwater storage by WY 2060-2061 due to the Nancy Wright RWRF wastewater re-routing project.



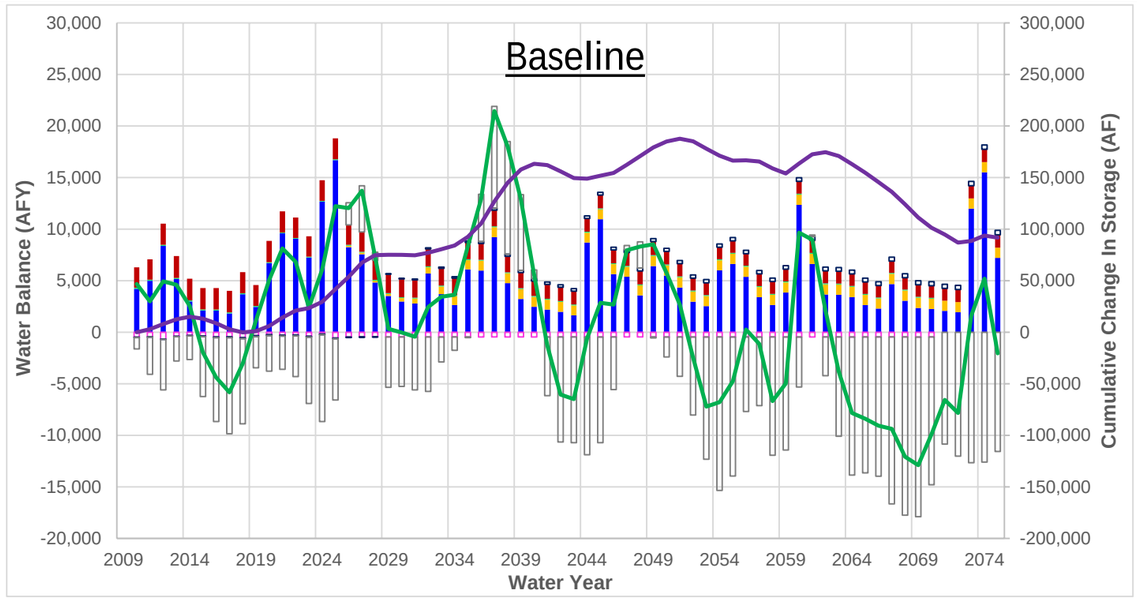

Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin

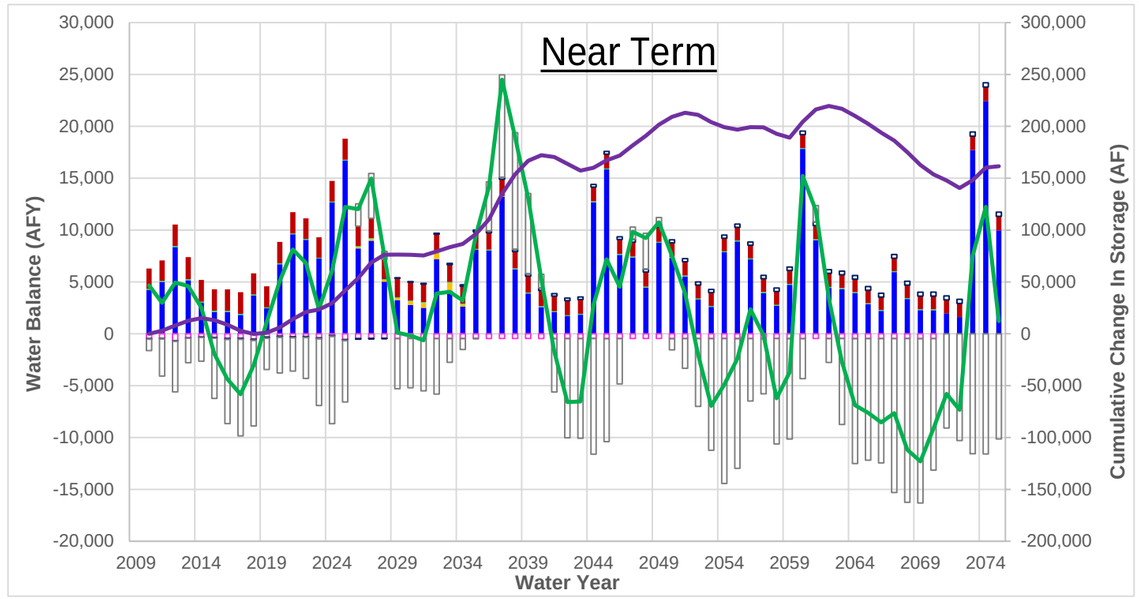
+ Natural Recharge
+ GW Replenishment
+ Wastewater Return
+ Other Return Flows
+ Underflow from DHSSB
- Pumping
- Evapo-transpiration
- Underflow to GHSA
- Underflow to Indio Hills
Change in Storage
Cumulative Change in Storage

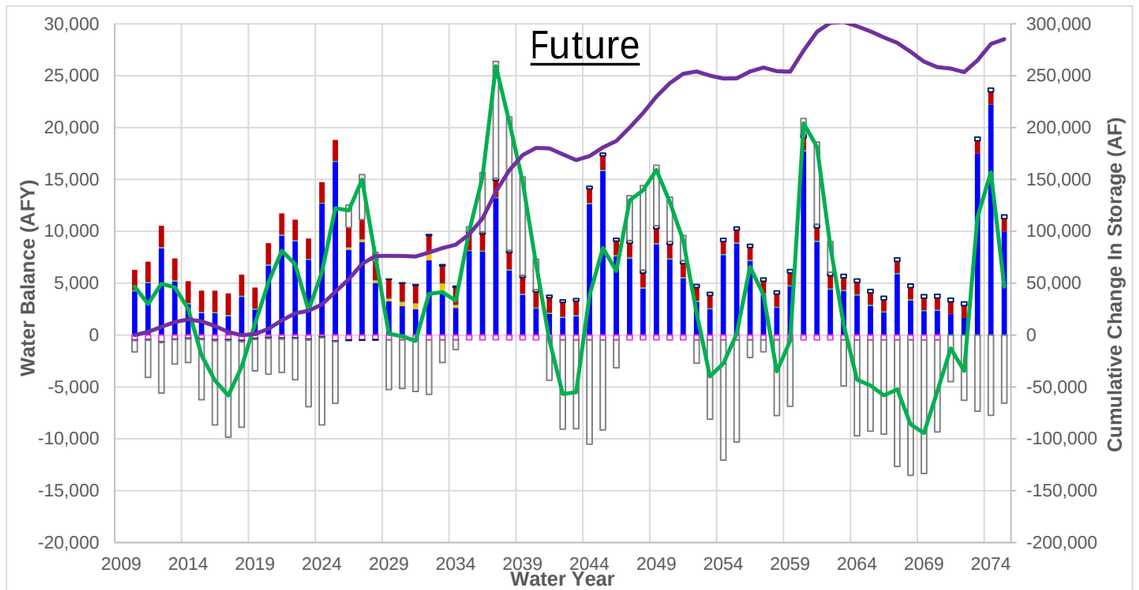
2009 - 2074 Simulated
Water Balances for MCSB
Forecast Scenarios CM5 RCP 4.5
Mission Creek Subbasin Alternative Update
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Figure 7-14



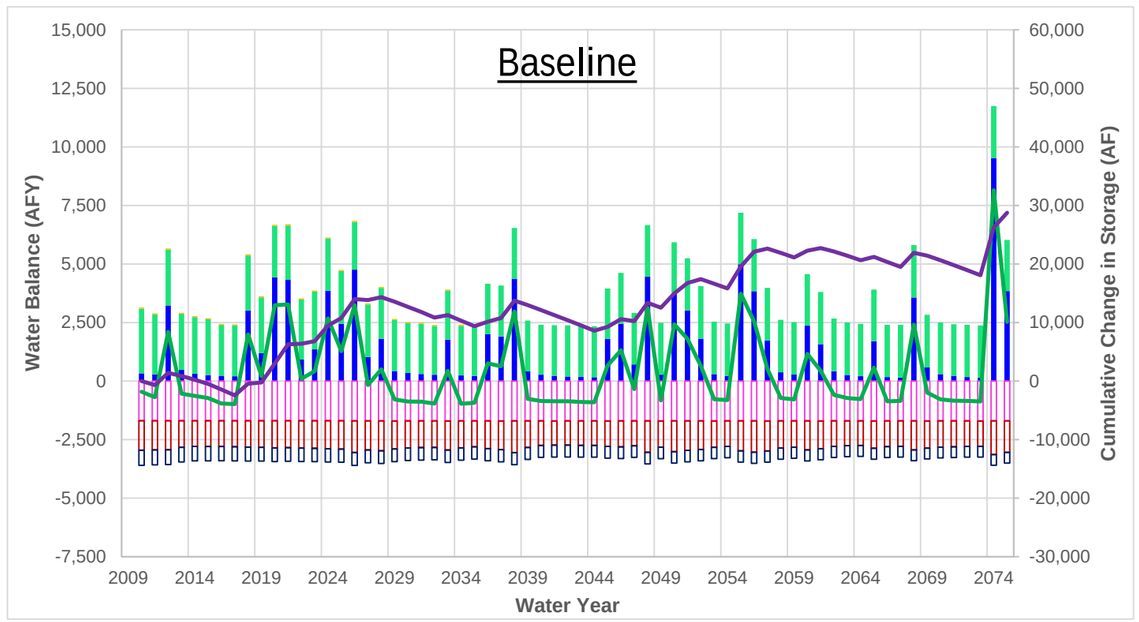

+ Natural Recharge
+ Underflow from MCSB
- Underflow to Indio SB
+ Wright RWRF
- Pumping
Change in Storage
+ Other Return Flows
- Underflow to Indio Hills
Cumulative Change in Storage

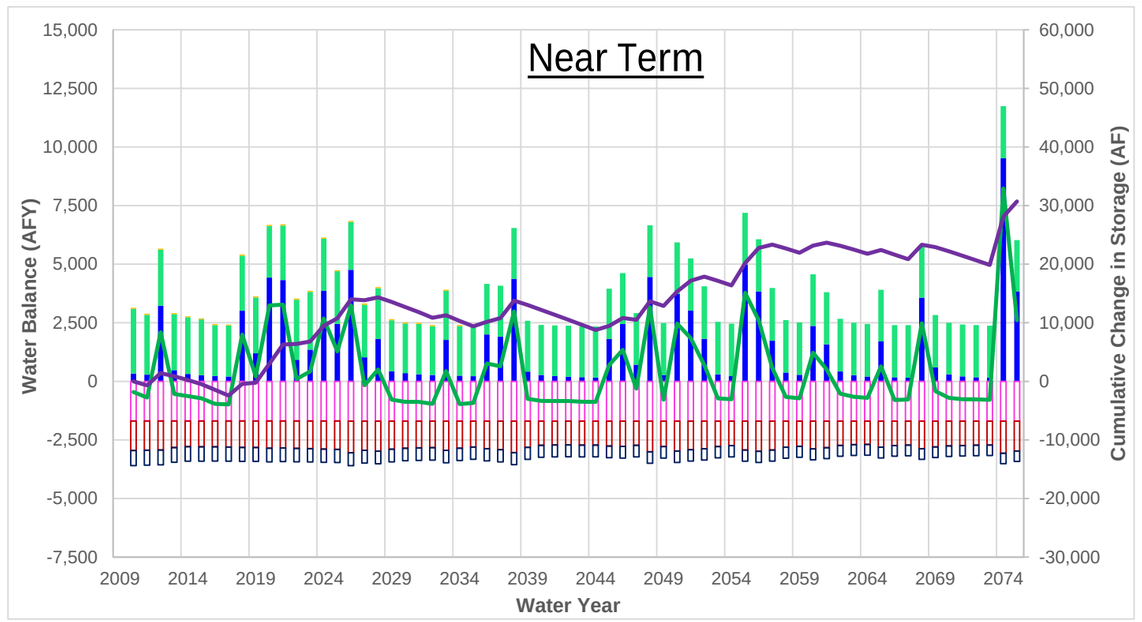
Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
MCSB = Mission Creek Subbasin
GHSA = Garnet Hill Subarea
SB = Subbasin
Wright RWRF = Nancy Wright Regional Replenishment Facility

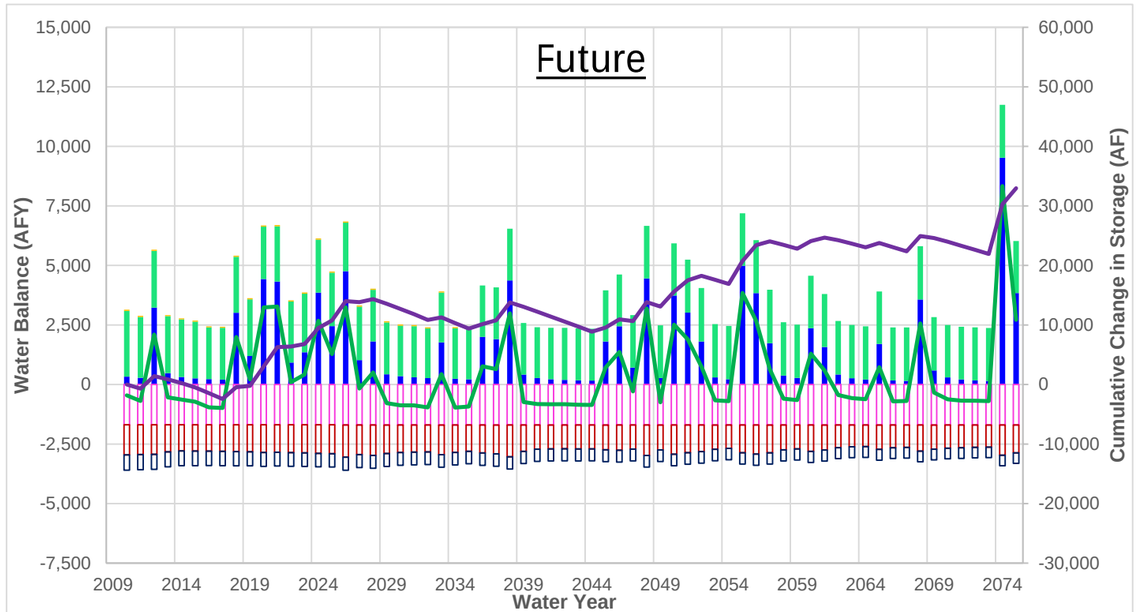
2009 - 2074 Simulated
Water Balances for GHSA
Forecast Scenarios CM5 RCP 4.5
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Figure 7-15



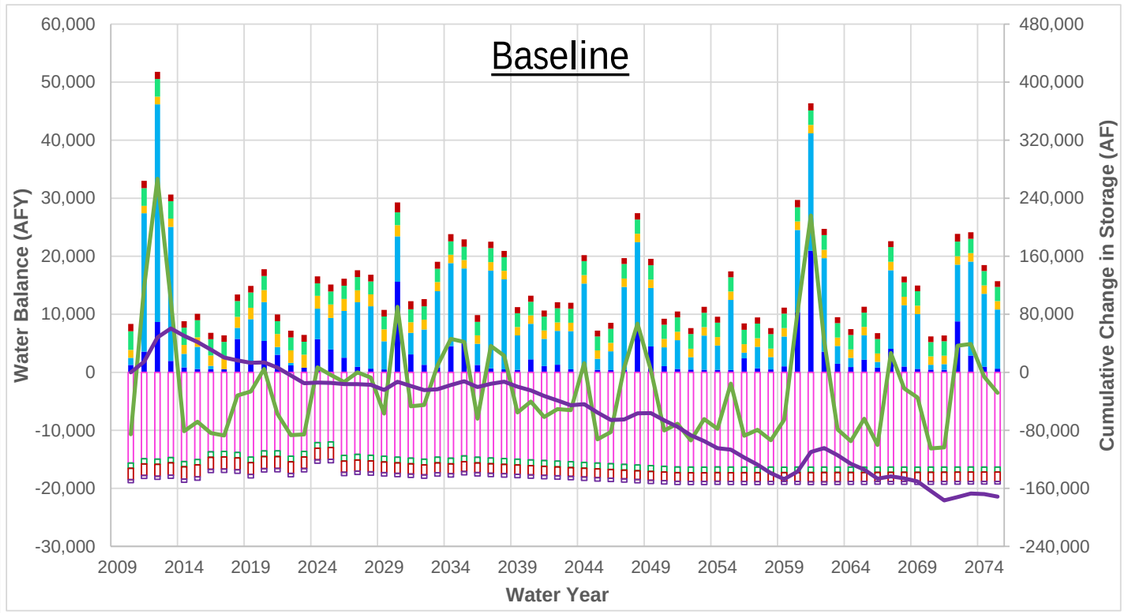



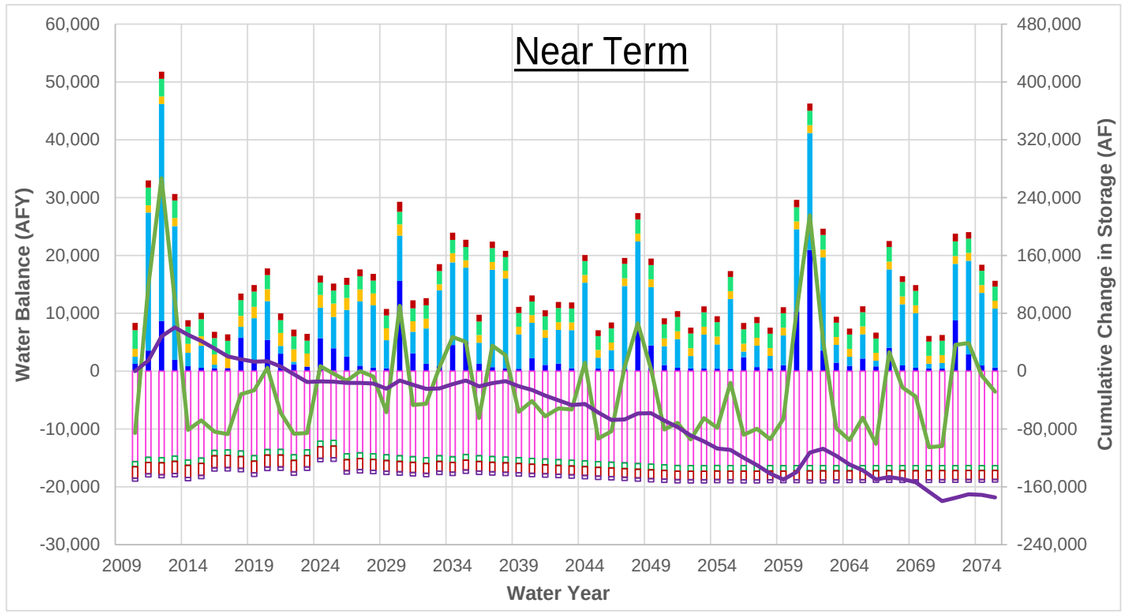



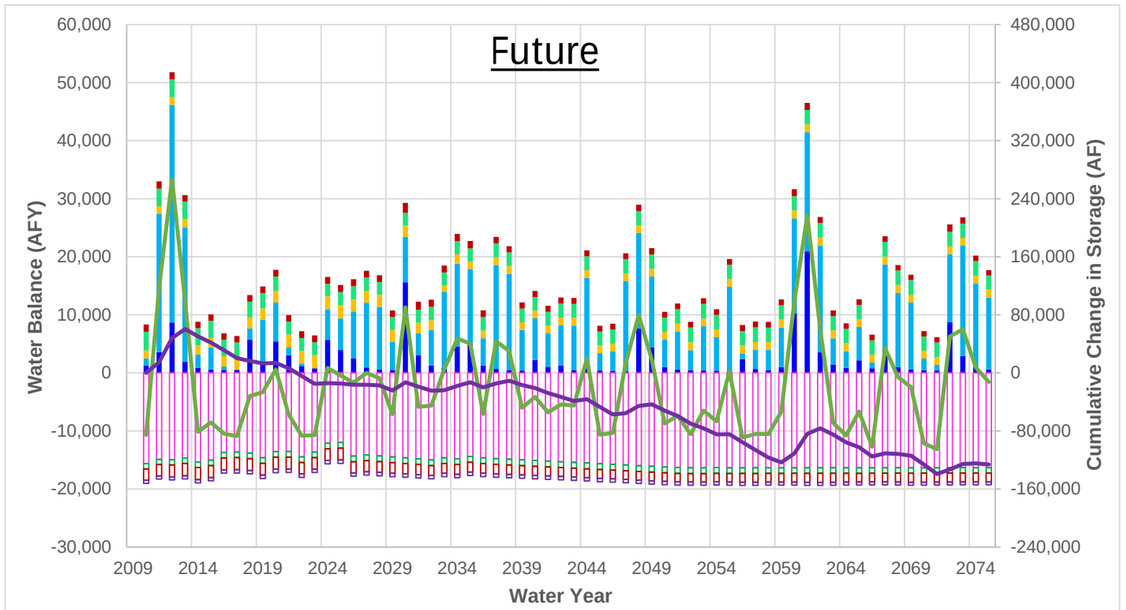

Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
MCSB = Mission Creek Subbasin
WWTP = Wastewater Treatment Plant

2009 - 2074 Simulated
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|---|---|---|
| WSP | | Figure 7-16 |



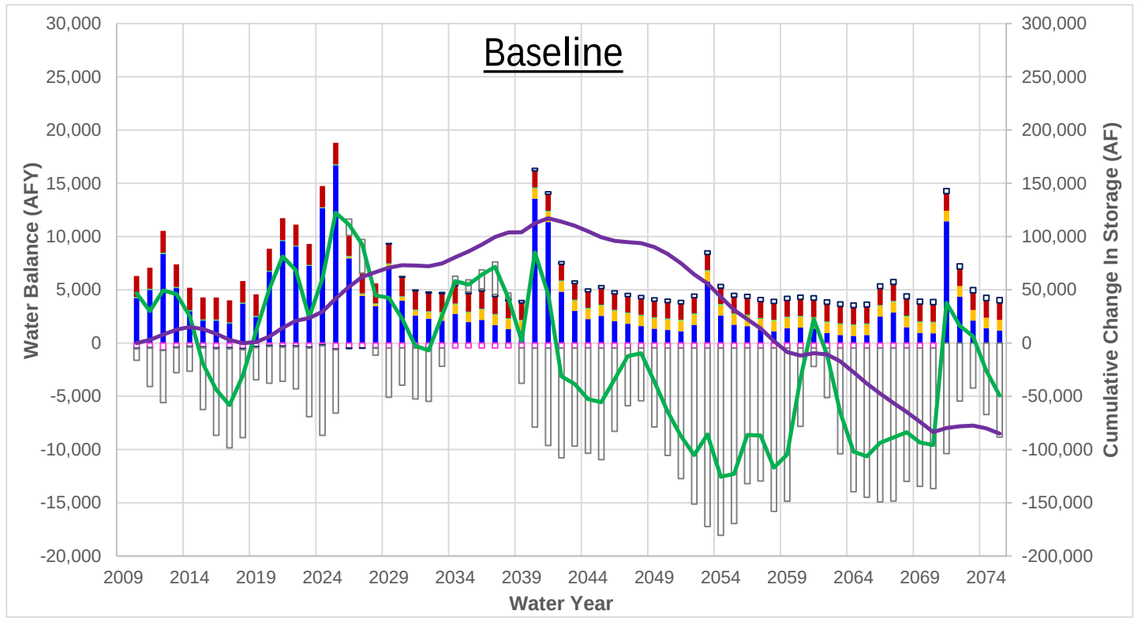



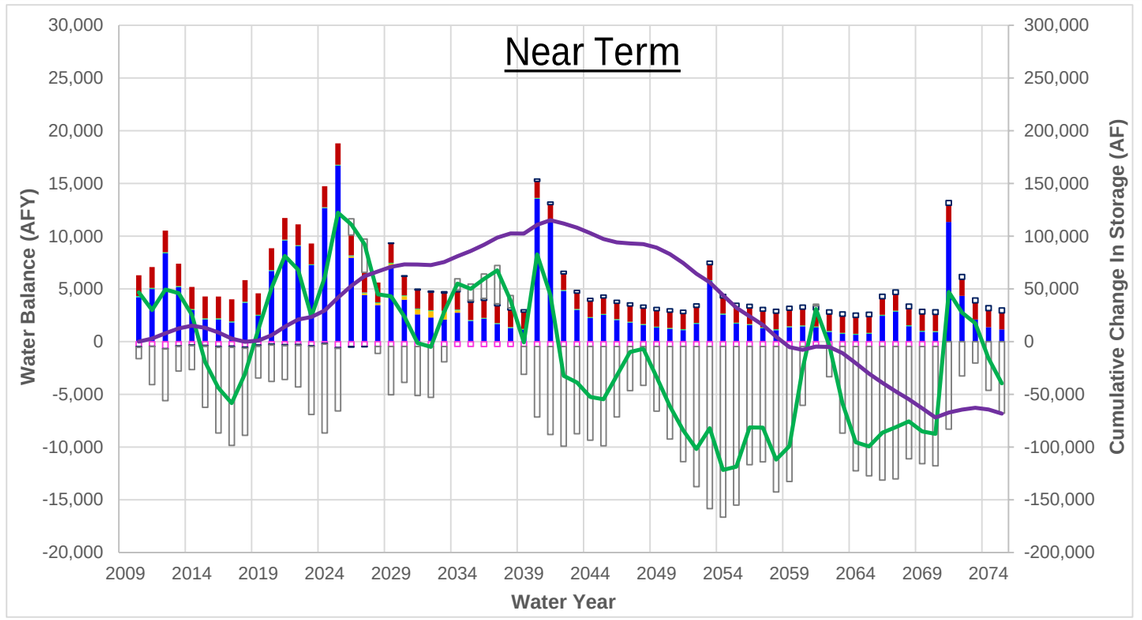

Abbreviations:
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GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin
GW = Groundwater

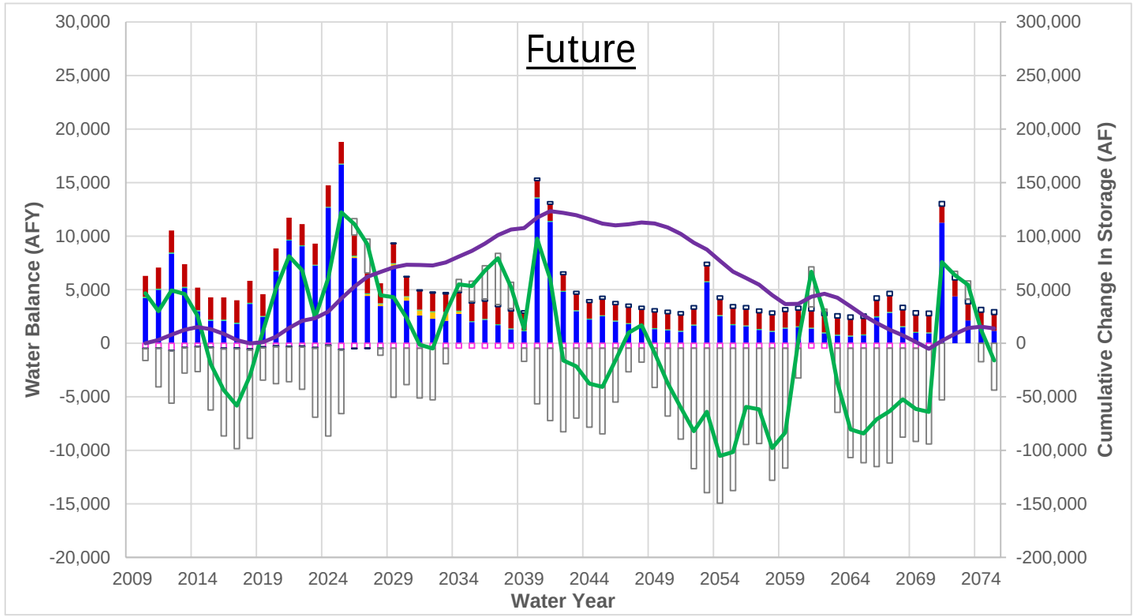
+ Natural Recharge
+ GW Replenishment
+ Wastewater Return
+ Other Return Flows
+ Underflow from DHSSB
- Pumping
- Evapo-transpiration
- Underflow to GHSA
- Underflow to Indio Hills
Change in Storage
Cumulative Change in Storage

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| wsp | | Figure 7-17 |



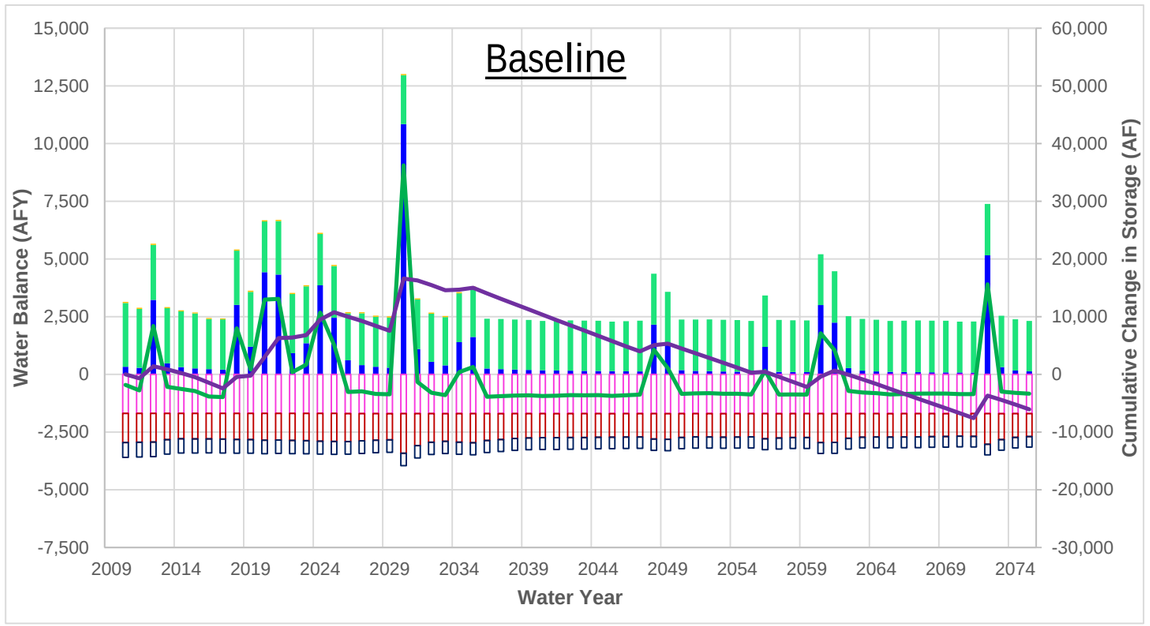



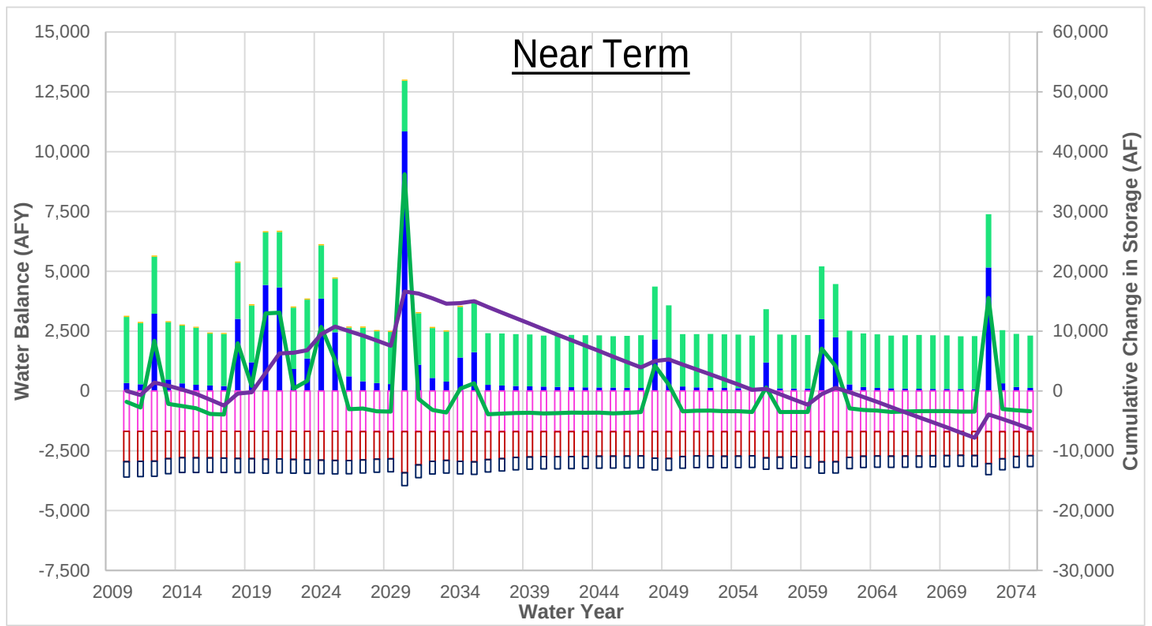

Abbreviations:
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GHSA = Garnet Hill Subarea
SB = Subbasin
Wright RWRF = Nancy Wright Regional Replenishment Facility

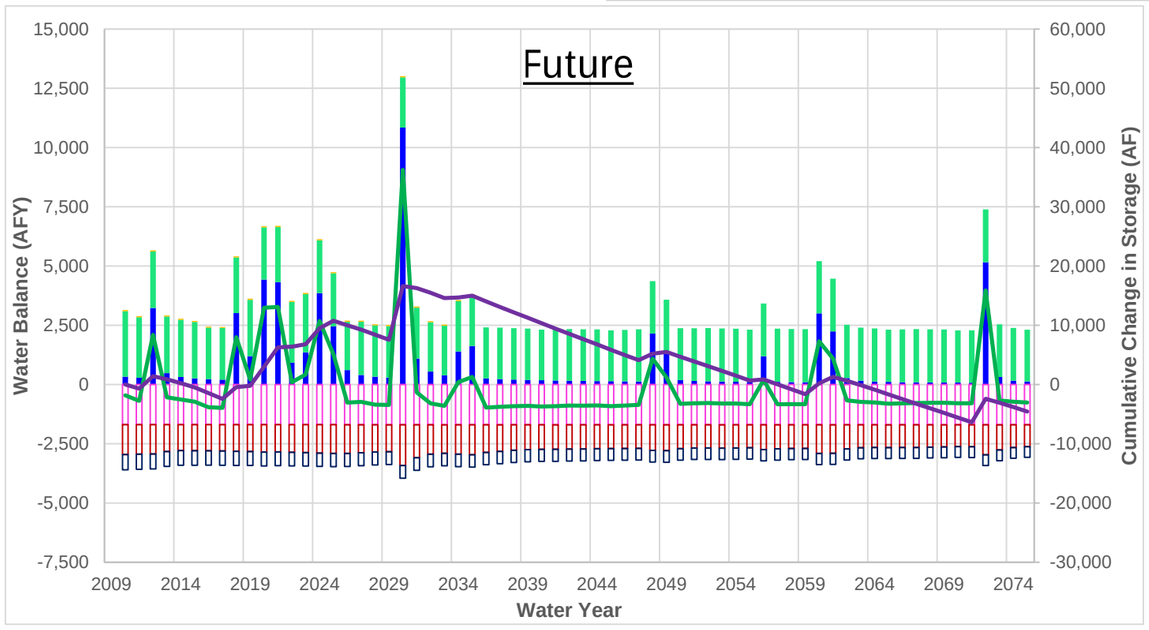
+ Natural Recharge
+ Wright RWRF
+ Other Return Flows
+ Underflow from MCSB
- Pumping
- Underflow to Indio Hills
- Underflow to Indio SB
Change in Storage
Cumulative Change in Storage

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| | | Figure 7-18 |



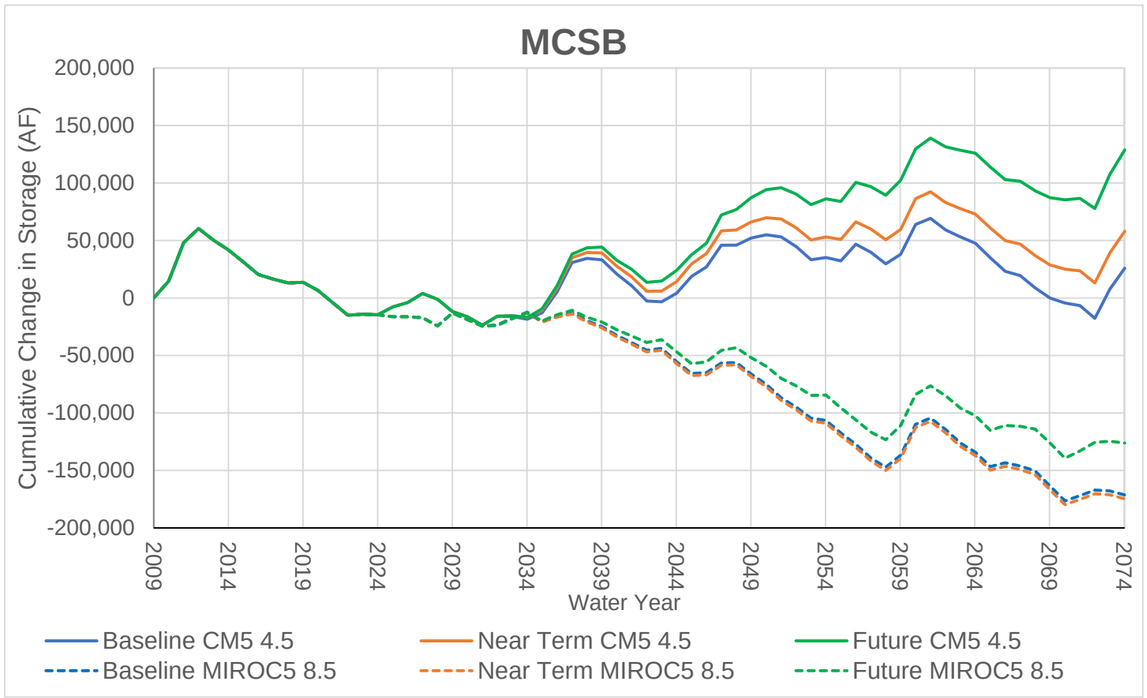



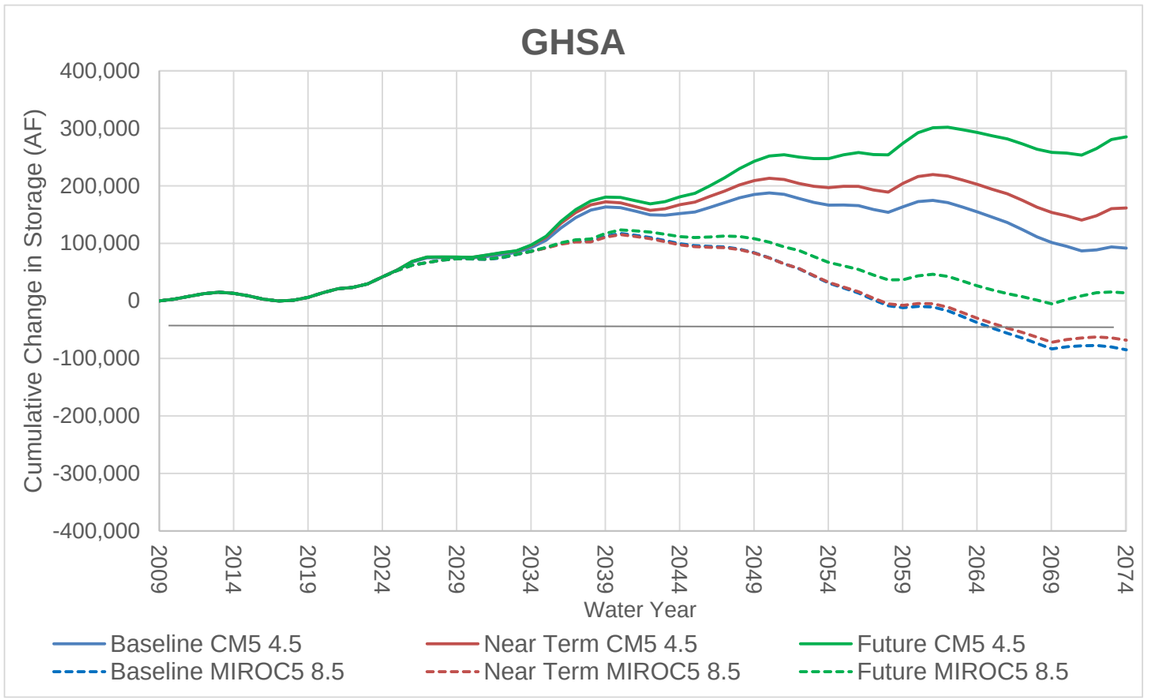

Abbreviations:
AF= Acre-feet
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
MCSB = Mission Creek Subbasin
WWTP = Wastewater Treatment Plant

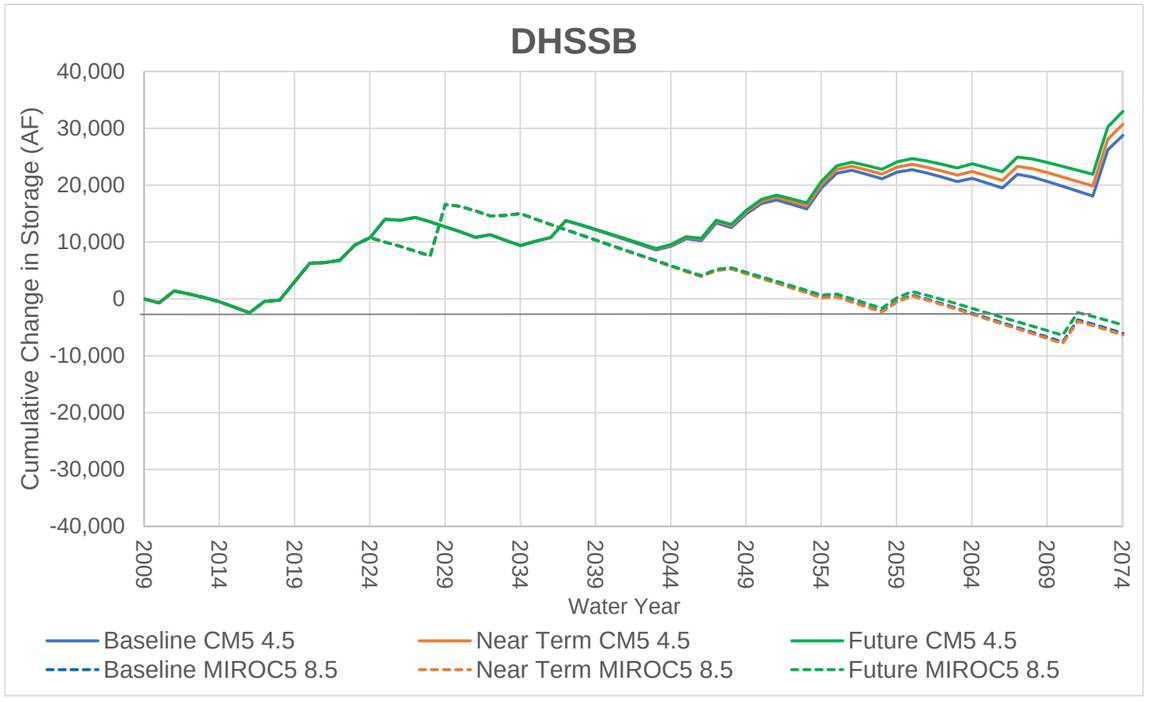
+ Natural Recharge
+ Other Return Flows
+ Desert Crest WWTP
- Pumping
- Underflow to MCSB
- Underflow to Indio Hills East
Change in Storage
Cumulative Change in Storage

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|---|---|---|
| wsp | | Figure 7-19 |




Abbreviations:
AF= Acre-feet
DHSSB = Desert Hot Springs Subbasin
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin

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Cumulative Change In Storage by Subbasin

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|---|---|---|
| wsp | | Figure 7-20 |

### Desert Hot Springs Subbasin

The cumulative change in storage in the DHSSB for all six scenarios are compared in **Figure 7-20**. The cumulative change in storage also diverges around WY 2025-2026 and again around WY 2045-2046. Under CM5 RCP 4.5 conditions, the cumulative change in storage is positive for the Baseline, Near-Term Projects, and Future Projects scenarios. Under MIROC5 RCP 8.5 conditions, the cumulative change in storage remains above zero for the three scenarios until WY 2055-2056 and stays negative through the end of the modeling horizon.

## 7.5.3 Inter-Subbasin Groundwater Underflow

The 2027 MCSB forecast model simulates inter-subbasin groundwater underflow across the boundaries between the DHSSB and MCSB, between the MCSB and GHSA, and between the GHSA and Indio Subbasin. These are shown in **Figure 7-21** and **Figure 7-22**, respectively. Simulated flow between the GHSA and Indio Subbasin is presented in **Figure 7-9** above.

The simulated water balance is summarized for each scenario in **Tables B4** through **B21** in **Appendix B.** The simulated water balance has positive values for inflows and negative values for outflows. To facilitate comparison among boundaries, the following discussion focuses on the average of the inter-subbasin groundwater underflow in the predominant direction of flow simulated between WY 2008-2009 and WY 2073-2074.

### DHSSB to MCSB

Inter-subbasin groundwater underflow across the Mission Creek Fault is primarily simulated from the DHSSB to the MCSB in all six scenarios (**Figure 7-21**). The average simulated inter-subbasin groundwater underflow from DHSSB to MCSB for each management and climate change scenario is summarized in **Table 7-10**.

**Table 7-10: Average Inter-Subbasin Groundwater Underflow of DHSSB to MCSB (AFY)**

| Management Scenario | CM5 RCP 4.5 | MIROC5 RCP 8.5 |
|---|---|---|
| **Baseline** | 1,170 | 1,120 |
| **Near-Term Projects** | 1,140 | 1,120 |
| **Future Projects** | 1,110 | 1,090 |

Note: Values are rounded to the nearest 10 AF.

Under both climate assumptions, the Future Projects scenario produces the lowest average inter-subbasin groundwater underflow from the DHSSB to the MCSB. Increased recharge and higher groundwater levels in the MCSB reduce the groundwater elevation difference across the Mission Creek Fault, thereby reducing the hydraulic gradient from the DHSSB toward the MCSB. This result is consistent with the management objective of limiting additional inflow of higher total dissolved solids in groundwater from the DHSSB.

## MCSB to GHSA

Inter-subbasin groundwater underflow between the MCSB and GHSA is simulated predominantly from the MCSB to the GHSA in all six scenarios (**Figure 7-22**). The annual magnitude varies in response to changing groundwater levels and recharge conditions in the two modeled areas. The average simulated inter-subbasin groundwater underflow from MCSB to GHSA for each management and climate change scenario is summarized in **Table 7-11**.

**Table 7-11: Average Inter-Subbasin Groundwater Underflow of MCSB to GHSA (AFY)**

| Management Scenario | CM5 RCP 4.5 | MIROC5 RCP 8.5 |
|---|---|---|
| **Baseline** | 1,530 | 1,710 |
| **Near-Term Projects** | 1,580 | 1,700 |
| **Future Projects** | 1,550 | 1,690 |

Note: Values are rounded to the nearest 10 AF.

Average inter-subbasin groundwater underflow from MCSB to GHSA only slightly varies between management scenarios under each climate assumption and is higher under MIROC5 RCP 8.5 conditions than under CM5 RCP 4.5 conditions. Although the project scenarios affect the timing and annual magnitude of the inter-subbasin groundwater underflow, they do not reverse its predominant direction over the modeling horizon. Therefore, inter-subbasin groundwater underflow from the MCSB remains an important inflow component of the GHSA inflow in all six scenarios.

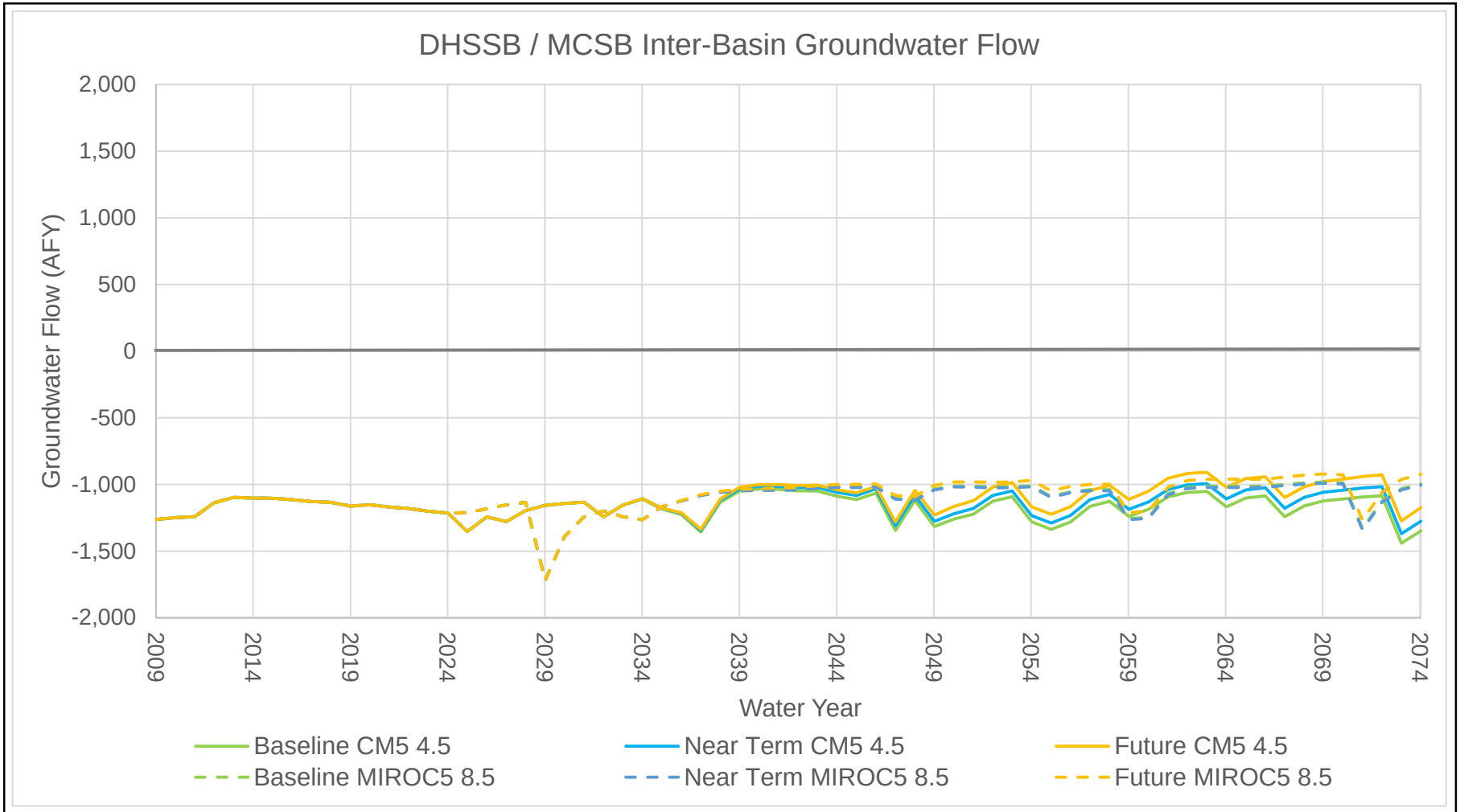
## GHSA to Indio SB

Inter-subbasin groundwater flow between the GHSA and the Indio Subbasin varies substantially by water year and reverses direction during portions of the modeling horizon. Negative values in **Figure 7-9** indicate flow from the GHSA to the Indio Subbasin, while positive values indicate flow from the Indio Subbasin into the GHSA. Although short-term reversals occur, the long-term average direction is simulated to be from the GHSA toward the Indio Subbasin for all six scenarios. The average simulated inter-subbasin groundwater underflow from GHSA to the Indio Subbasin for each management and climate change scenario is summarized in **Table 7-12.**

**Table 7-12: Average Inter-Subbasin Groundwater Underflow of GHSA to Indio Subbasin (AFY)**

| Management Scenario | CM5 RCP 4.5 | MIROC5 RCP 8.5 |
|---|---|---|
| **Baseline** | 5,850 | 7,140 |
| **Near-Term Projects** | 5,230 | 6,240 |
| **Future Projects** | 3,290 | 4,980 |

Note: Values are rounded to the nearest 10 AF.



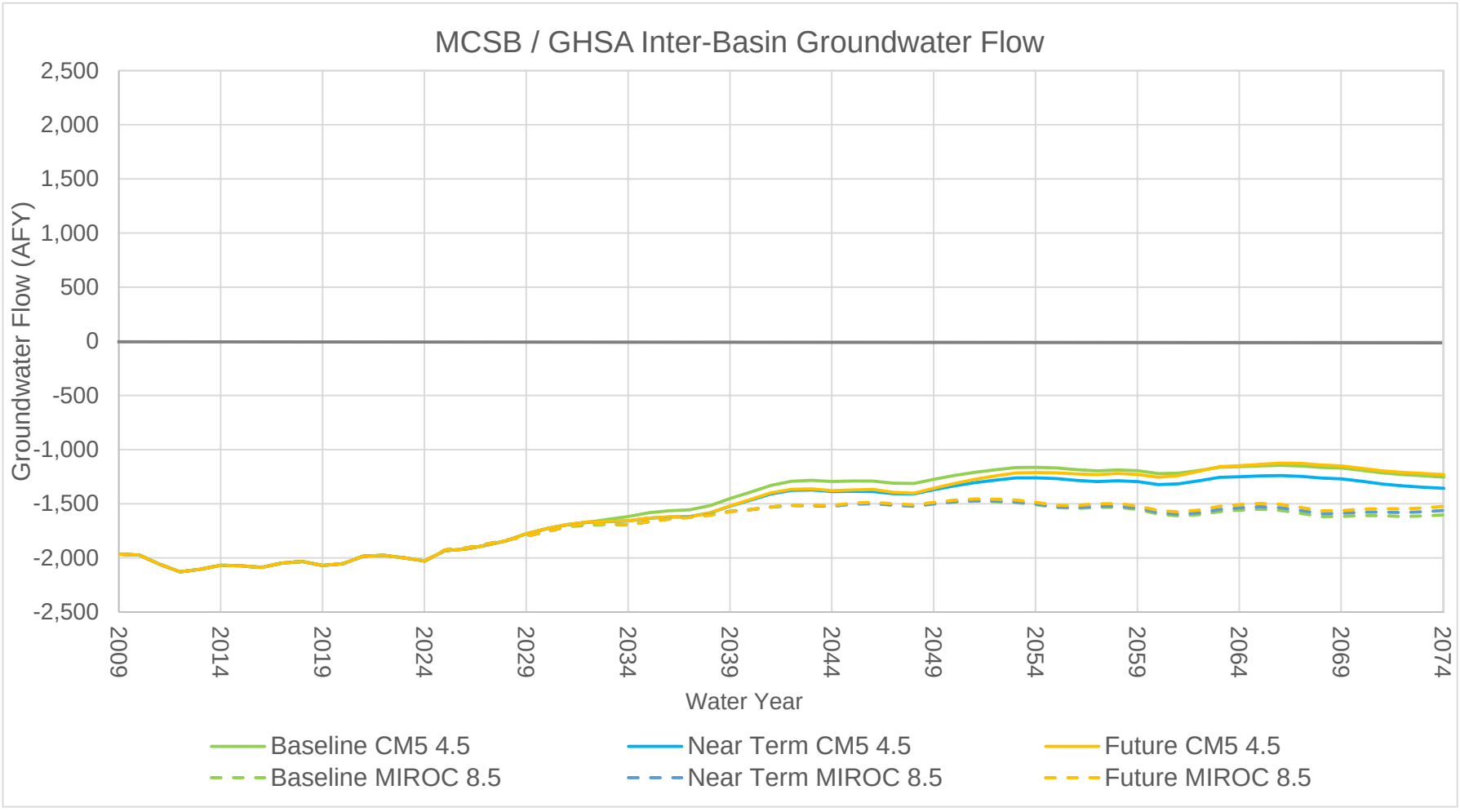

Abbreviations:
AFY = Acre-feet per Year
DHSSB = Desert Hot Springs Subbasin
MCSB = Mission Creek Subbasin

Note: (-) values indicate flow from DHSSB to MCSB
(+) values indicate flow from MCSB to DHSSB

2009 - 2074 Simulated
Inter-Subbasin Groundwater Underflow between DHSSB and MCSB
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|

Figure **7-21**




Abbreviations:
AFY = Acre-feet per Year
GHSA = Garnet Hill Subarea
MCSB = Mission Creek Subbasin

Note: (-) values indicate flow from MCSB to GHSA
(+) values indicate flow from GHSA to MCSB

2009 - 2074 Simulated
Inter-Subbasin Groundwater Underflow between MBSB and GHSA
Mission Creek Subbasin Alternative Update
Coachella Valley, California

| By: dmb | Date: 10/07/2026 | Project No.: US0043968.2616 |
|---|---|---|
| | | Figure 7-22 |

Average inter-subbasin groundwater underflow from the GHSA to the Indio Subbasin in the Near-Term Projects and Future Projects scenarios reduce average net outflow from the GHSA relative to the corresponding Baseline scenarios. The Future Projects scenario simulates the greatest reduction under both climate assumptions. Annual inter-subbasin groundwater underflow remains highly variable and includes periods of flow from the Indio Subbasin into the GHSA. This variability reflects changing groundwater conditions represented in both the MCSB and Indio Subbasin forecast models.

### 7.5.4 Summary and Conclusions

To evaluate selected water management options the calibrated 1936 through WY 2023-2024 2027 MCSB model was modified to forecast the 50-year period WY 2024-2025 through WY 2073-2074. Estimates of future population growth were utilized to estimate future groundwater pumping demand and WWTP effluent.

Three forecast scenarios were developed and simulated to evaluate selected water management options. The Baseline scenario simulates the status quo (no projects) scenario, while the Near-Term Projects scenario adds PMAs that will be implemented by WY 2034-2035 and the Future Projects scenario adds PMAs to be completed by WY 2040-2050. These three forecast scenarios were simulated under the cool-wet CM5 RCP 4.5 climate change assumptions and the hot-dry MIROC RCP 8.5 climate change assumptions. In total, six scenarios were evaluated:

1. **Baseline with CM5 RCP 4.5** climate change assumptions,
2. **Near-Term Projects with CM5 RCP 4.5** climate change assumptions,
3. **Future Projects with CM5 RCP 4.5** climate change assumptions,
4. **Baseline with MIROC5 RCP 8.5** climate change assumptions,
5. **Near-Term Projects with MIROC5 RCP 8.5** climate change assumptions, and
6. **Future Projects with MIROC5 RCP 8.5** climate change assumptions.

The Baseline forecast provides a useful and necessary benchmark, while the with-project forecasts represent a range of potential futures with a “new normal” of ongoing below-normal precipitation conditions in both local and imported water source watersheds. Therefore, all six scenarios are discussed in this section. Supporting tables and Key Well hydrographs for each of the six scenarios are also included in **Appendix B**. The forecasts were evaluated using simulated hydrographs for nine Key Wells in the MCSB and simulated water balances.

Under all six scenarios, groundwater levels in all nine Key Wells remain above their respective MOs and MTs through the end of the planning horizon (2050), indicating that conditions at the MCSB Key Wells are projected to remain sustainable through 2050. The scenarios are

discussed below to further evaluate Key Well performance relative to the MOs and MTs over the full modeling horizon (WY 2073–2074).

Under the Baseline with CM5 RCP 4.5 scenario, groundwater levels in three of the nine Key Wells fall below their MOs while all nine Key Wells remain above their respective MTs through the end of the modeling horizon (WY 2073-2074). The long-term cumulative water balance under CM5 RCP 4.5 climate change assumptions remains positive. Under the Baseline with MIROC5 RCP 8.5 scenario, four of the nine Key Wells fall below their respective MOs while all nine Key Wells remain above their respective MTs through the end of the modeling horizon (WY 2073-2074). The long-term cumulative water balance under the Baseline with MIROC5 RCP 8.5 is negative. Consequently, the Baseline with CM5 RCP 4.5 scenario is sustainable for all SMCs, while the Baseline with MIROC5 RCP 8.5 scenario is considered sustainable through the planning horizon (2050) based on groundwater levels. However, the negative storage trend suggests that conditions are likely not sustainable beyond the current planning horizon (2050). Note that the Baseline scenarios are only shown for comparison purposes and are not a scenario that is planned for implementation.

Under the Near-Term Projects with CM5 RCP 4.5 scenario, all nine Key Wells remain above their respective MOs and their MTs through the end of the modeling horizon (WY 2073-2074). The long-term cumulative water balance under CM5 RCP 4.5 climate change assumptions remains positive. Under the Near-Term Projects with MIROC5 RCP 8.5 scenario, five of the nine Key Wells fall below their respective MOs, but one well falls below its MT during near the end of the modeling horizon in WY 2073-2074. Similar to Baseline with MIROC5 RCP 8.5 scenario, the long-term cumulative water balance is negative. While the Near-Term Projects with CM5 RCP 4.5 scenario is sustainable for all SMCs, the Near-Term Projects with MIROC5 RCP 8.5 scenario may only be sustainable in the current planning horizon (2050) based on groundwater levels. The reduction in MRF and imported water replenishment under the MIROC5 RCP 8.5 climate change conditions significantly affects groundwater storage over the long term.

Under the Future Projects with CM5 RCP 4.5 scenario, all nine Key Wells remain above their respective MOs and their MTs through the end of the modeling horizon (WY 2073-2074). The long-term cumulative water balance under CM5 RCP 4.5 climate change assumptions remains positive. Under the Future Projects with MIROC5 RCP 8.5 scenario, all nine Key Wells remain above their respective MOs and MTs through the end of the modeling horizon (WY 2073-2074). However, the long-term cumulative water balance under MIROC5 RCP 8.5 climate change assumptions is negative. This negative trend in MCSB storage under the MIROC5 RCP 8.5 climate change assumptions emphasizes the importance of new supply acquisition for groundwater replenishment in order to ensure sustainability of the MCSB over the long-term.

# 8. Projects and Management Actions

## 8.1 Introduction

This section of the Mission Creek Subbasin Alternative Plan Update (Alternative Plan Update) identifies the Projects and Management Actions (PMAs) that are currently being implemented by the Mission Creek Subbasin (MCSB) Management Committee (Agencies) to effectively manage the groundwater resources of the MCSB Planning Area (Planning Area). In addition, this section describes future PMAs that will continue to provide sustainable groundwater management in the MCSB. This section reviews previous and ongoing PMAs and provides information on planned PMAs.

As discussed throughout this Alternative Plan Update, PMAs previously developed and implemented by the Agencies, described in the 2013 Mission Creek/Garnet Hill Water Management Plan (MWH, 2013 [2013 MC/GH WMP]) and the 2022 Mission Creek Subbasin Alternative Plan Update (Wood and Kennedy Jenks, 2021), resulted in groundwater sustainability for the MCSB as follows:

1. Groundwater replenishment at the Mission Creek Groundwater Replenishment Facility (MC-GRF) beginning in 2002 reversed the historical decline in groundwater levels and associated depletion of groundwater storage that began in the MCSB in the 1970s. Groundwater levels across most of the MCSB have recovered relative to historical lows, and current Key Well conditions are evaluated against the well-specific measurable objectives and minimum thresholds described in Section 6; and
2. The Agencies and other CV-SNMP partners are addressing salt loading in the MCSB through development of an updated Coachella Valley Salt and Nutrient Management Plan (CV-SNMP).

As described in Section 7, ongoing PMAs and implementation of planned PMAs will allow for sustainability as future demands increase, even under an assumption of climate change conditions that result in lower natural recharge and constraints on groundwater replenishment. To that end, this Alternative Plan Update section provides an overview of the adaptive management processes of the Agencies and the ongoing and planned PMAs.

## 8.2 Adaptive Management

An adaptive management strategy for groundwater management and PMA implementation has been employed by the Agencies to maintain sustainability of the MCSB. Since the 2013 MC/GH WMP, population growth projections have decreased with a corresponding reduction in the projected urban development and water demands in the MCSB. At the same time, the reliability of imported water supply from the State Water Project (SWP) and the Colorado River Aqueduct (CRA) has declined due to a combination of drought, climate change, and legal and environmental restrictions. The Agencies need flexibility to manage the uncertainties associated with shifting forecasted water demands and anticipated conservation legislation, climate change, and supply constraints. Adaptive management provides the flexibility needed to maintain a balanced MCSB and avoid significant and unreasonable undesirable results when conditions change. This Alternative Plan Update incorporates a flexible and adaptive approach to water resources management so the Agencies can adjust the implementation strategy as needed.

Adaptive management is the process of making water management decisions on an incremental basis in response to actual data that have been gathered. Adaptive management is used to balance the risk of over-investment in water supplies and infrastructure with the risk of unanticipated shortages due to inadequate action. Adaptive management involves five steps: monitoring, reporting, evaluating, adjusting, and implementing (see **Figure 8-1** below).

**Figure 8-1: Adaptive Management Cycle for PMA Implementation**



Following is a description of each step in the adaptive management cycle using compliance with the Sustainable Groundwater Management Act (SGMA) as an example:

1. **Step 1: Monitoring**. The Agencies will continue their ongoing monitoring programs, including the CV-SNMP groundwater monitoring program described in Section 8.6.7, to assess groundwater levels, climate and streamflow, groundwater production, subsidence, and water quality.
2. **Step 2: Reporting**. The Agencies will use the monitoring data to track conditions for the applicable sustainability indicators discussed in Section 6, Sustainable Management Criteria. These conditions will be reported in the MCSB Annual Report by Water Year (SGMA Annual Report (Project SGMA-4)).
3. **Step 3: Evaluating**. If any monitored condition approaches a Minimum Threshold, the Agencies will conduct an evaluation to determine whether there is a change in conditions that is locally driven, such as a change in local land use or pumping patterns, or a change in conditions that is long-term and/or regional. The evaluation will include steps such as analyzing pumping, imported water recharge, well logs, land use changes, well permit records, or climate/precipitation data to determine whether any recent changes occurred that may have affected monitoring results. This evaluation can be incorporated into the SGMA Annual Report.
4. **Step 4: Adjusting**. If a long-term regional trend may cause undesirable results, the Agencies may adjust the PMAs that are being implemented to manage the MCSB. The Agencies will select the relevant PMAs within their respective jurisdiction. Regional programs also may be developed and implemented with the agreement of the Agencies. Any changes to PMAs will be captured within the SGMA Annual Report or the Five-Year Alternative Plan Update described in Sections 8.7.4 and 8.7.5, respectively.
5. **Step 5**: **Implementing**. Following selection of new or refined PMAs, monitoring and management practices will be implemented to reflect the new activities. PMAs to be implemented will be reviewed during SGMA Annual Reports and Five-Year Alternative Plan Updates and adjusted as needed.
6. **Return to Step 1: Monitoring.** Ongoing monitoring data will be used to assess the results of PMA implementation and any changes to conditions. If monitoring indicates sustainable conditions have been restored (i.e., conditions satisfy the applicable sustainable management criteria), implementation of the PMAs may be scaled back and monitoring continued. If the exceedance is not addressed, the Agencies will identify and implement additional PMAs to avoid undesirable results.

This adaptive management approach allows the Agencies to adapt to changing conditions and accelerate existing PMAs, add PMAs, or delay or defer PMAs as needed.

The list of PMAs included in this Alternative Plan Update reflects the dynamic nature of groundwater management and the Agencies' ongoing commitment to adaptive decision-making. As new data becomes available, regulatory requirements evolve, funding opportunities emerge, and water management priorities shift, the Agencies regularly evaluate the effectiveness and relevance of existing PMAs and identify new opportunities to support sustainable groundwater management. As a result, the PMA portfolio is dynamic and is intended to evolve in response to changing conditions and management needs.

Consistent with this approach, several PMAs included in prior planning documents have been modified, deferred, consolidated, or removed based on updated technical evaluations, implementation status, agency priorities, and changing subbasin conditions. At the same time, new PMAs have been added to reflect projects and programs that were not previously contemplated or advanced sufficiently to warrant inclusion in the prior Alternative Plan Update. For example, the Horton Wastewater Treatment Plant (WWTP) recycled water program has re-emerged as an important project to enhance local water supply reliability and support long-term groundwater sustainability within the MCSB (See Section 8.5.3, WS-3: Recycled Water System at Horton WWTP). Similarly, completed projects that have achieved their intended objectives are no longer categorized as active PMAs, but remain important milestones in the Agencies' overall groundwater management program.

The evolution of PMAs over time demonstrates the Agencies' collaborative and proactive approach to groundwater management. Through ongoing coordination, monitoring, technical evaluation, and planning, the Agencies continue to refine implementation strategies to maintain groundwater sustainability while responding to supply uncertainties. Active PMAs are summarized below in **Table 8-1**. **Section 8.9** provides a summary of completed, deferred, and removed PMAs, illustrating how the Agencies' PMAs have evolved through the adaptive management process.

**Table 8-1: Categorized Projects and Management Actions**

| Water Conservation | Water Supply Development | Water Quality Protection | SGMA Implementation | Well Management |
|---|---|---|---|---|
| **WC-1:** Urban Water Conservation and Education Programs<br>**WC-2:** Turf Irrigation Reduction<br>**WC-3:** Implement WSCPs | **WS-1:** Imported Water Replenishment Program<br>**WS-2:** Recycled Water for Replenishment in MCSB<br>**WS-3:** Recycled Water System at Horton WWTP<br>**WS-4:** Delta Conveyance Project<br>**WS-5:** Sites Reservoir Project | **WQ-1:** Septic-to-Sewer Conversions in MSWD Area<br>**WQ-2:** Track Water Quality Regulatory Actions<br>**WQ-3:** Well Source Assessment and Protection<br>**WQ-4:** Planning Reviews to Protect Water Quality<br>**WQ-5:** Public Education on Groundwater Quality Issues<br>**WQ-6:** CV-SNMP Development Workplan<br>**WQ-7:** CV-SNMP Monitoring Workplan<br>**WQ-8:** Water Quality Monitoring Wells<br>**WQ-9:** Evaluate Occurrence and Risk of Uranium Migration | **SGMA-1:** Continue Existing Subbasin Management Committee<br>**SGMA-2:** Conduct Subsidence Evaluation<br>**SGMA-3:** Maintain and Manage Water Related Data<br>**SGMA-4:** SGMA Annual Report<br>**SGMA-5:** Five-Year Alternative Plan Updates<br>**SGMA-6:** Pursue Funding Opportunities | **WELL-1:** Well Construction, Abandonment, and Destruction<br>**WELL-2:** Expand Groundwater Production Reporting |

## 8.3 Project Review

The Agencies first established the list of PMAs in the 2013 MC/GH WMP and 2016 Bridge Document, which were adopted as the Alternative Plan. This list of projects is included and updated with each SGMA Annual Report.

For this Alternative Plan Update, Agencies reviewed the PMA lists from the 2022 Alternative Plan Update (Wood and Kennedy Jenks, 2021) and divided the PMA list into the following categories:

- Active Projects, which are further defined as:
  - Ongoing Projects that are currently underway or that Agencies anticipate implementing on a continual basis, and
  - Planned Projects that are in planning, design, or environmental phases for future implementation.
- Completed Projects are those that are fully completed;
- Deferred Projects are those that may not be currently needed or are not currently economically feasible; and
- Removed Projects are those that were incorporated into other Active projects or are no longer being pursued.

Collectively, the Active Projects will facilitate maintaining the sustainability of the MCSB now and over a range of potential future conditions. Therefore, the primary focus of this section is the Active Projects as detailed in Sections 8.4 through 8.8. The remaining project categories are described in **Section 8.9**.

### 8.3.1 Project Identification

This Alternative Plan Update modifies the project identification numbering system used in the 2022 Alternative Plan Update and subsequent SGMA Annual Reports. The numbering system incorporates a descriptive letter combination, listed below, followed by a sequential number (e.g., WC-1 is the first water conservation project).

- WC: Water Conservation
- WS: Water Supply
- WQ: Water Quality Protection, including CV-SNMP activities
- SGMA: SGMA Implementation
- WELL: Well Management

The following sections provide project descriptions for the projects included in the Alternative Plan Update grouped by project category.

## 8.4 Water Conservation

Active water conservation activities have supported the water management achievements in the Planning Area and are important to continue moving forward. The ongoing and future water conservation PMAs are:

- WC-1: Urban Water Conservation and Education Programs
- WC-2: Turf Irrigation Reduction
- WC-3: Implement Water Shortage Contingency Plans (WSCPs)

Some water-conservation savings in CVWD's and DWA's respective service areas are realized outside the Planning Area within the Indio Subbasin. While savings are not located within the MCSB, as the subbasins are collectively managed and intrinsically linked, demand reduction in their service areas helps to maintain groundwater sustainability across the larger Coachella Valley Groundwater Basin.

### 8.4.1 WC-1: Urban Water Conservation and Education Programs

For the past three decades, the local water purveyors have placed a significant focus on urban water conservation to address statewide drought conditions and uncertainty related to imported water availability. Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD) manage a suite of conservation programs and activities designed to increase efficiency, reduce per capita water demand, and support fulfillment of the requirements of the statewide water conservation regulations. Conservation efforts have been enhanced through regionally coordinated policy and regulatory measures. In recent years, conservation efforts have evolved toward broader implementation and strategy diversification.

The Agencies were participants (along with Coachella Water Authority [CWA], Indio Water Authority [IWA], and Myoma Dunes Mutual Water Company) in the 2025 Coachella Valley Regional Urban Water Management Plan (RUWMP) that provides detailed descriptions of each of the Agencies' water conservation programs (CVWD et al., 2026).

As described in the 2025 Coachella Valley RUWMP, the Agencies continue to implement demand management measures (DMMs) to accrue conservation savings and to encourage water use efficiency, such as:

- Water waste and landscape ordinances;
- Metering;
- Conservation pricing including water budget-based tiered billing;
- Strengthened public use-efficiency messaging via 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 program expansion for high efficiency appliances including toilets, washers, and dishwashers;
- Financial strategies to support rebate expansion, including municipalities cost-sharing partnerships and reinvestment of drought-related penalty revenues, and
- Staff support for water conservation activities.

The Regional Water Conservation Program (Regional Program) has been a cornerstone of water conservation in the Coachella Valley. The Regional Program implements conservation activities, whereas the RUWMP documents regional water supply and demand planning and the Agencies' conservation measures. Implemented in 2015 by the Coachella Valley Regional Water Management Group (CVRWMG), this multifaceted Regional Program has achieved a significant level of conservation through a suite of programs and activities designed to increase efficiency, reduce future water demand, and assist the Coachella Valley in meeting regulatory requirements. The Regional Program had an emphasis on coordination and collaboration between the member agencies of the CVRWMG. Together, under the Regional Program, the agencies developed and branded "CV Water Counts" (https://cvwatercounts.com/) to conduct education and outreach related to water conservation. The CV Water Counts website has informative links with educational resources, information on rebates for water saving devices, and upcoming water related events in the area. The CV Water Counts program uses surveyed data from Coachella Valley residents to guide its water conservation messaging to achieve maximum local impact. Part of the Regional Program also includes a "Water Counts Academy," which affords local residents an opportunity to learn more about water in our community.

To comply with conservation regulations and address supply shortfalls during dry conditions, the Agencies are committed to implementing the conservation programs that are in place (see sections below), including CV Water Counts. **Table 8-2** provides a summary of the demand management programs highlighted in the Agencies' 2025 Coachella Valley RUWMP, and the estimated annual increase in water savings from these programs, with the exception of turf rebate programs, which are described in **Section 8.4.2** below. The groundwater sustainability agencies (GSAs) will also continue to seek grant funding to support ongoing implementation and expansion of their conservation programs.

**Table 8-2: Conservation Program Summary**

| Water Provider | Average Annual Installations 2021-2025 | Estimated Annual Water Savings Per Unit (Gallons) | Estimated Annual Water Savings (Gallons/Year) |
|---|---|---|---|
| ***Coachella Valley Water District*** | | | |
| Landscape Plan Check | 506 | N/A[1] | N/A |
| Residential Smart Controller Rebates | 177 | 7,600[2] | 1,345,200 |
| Large Landscape Smart Controller Rebates | 133 | 7,600[2] | 1,010,800 |
| Water Waste Investigations | 447 | N/A[1] | N/A |
| Toilet Rebates | 405 | 1,572[3] | 636,660 |
| **Total Yearly Savings** | | | **2,992,660** |
| ***Desert Water Agency*** | | | |
| Residential Smart Controller Rebates | 179 | 7,600[2] | 1,360,400 |
| Toilet Rebates | 1,078 | 1,466[3] | 1,580,348 |
| Efficient Rotating Nozzles | 5,294 | 1,700[4] | 8,999,800 |
| Clothing Washer Rebates | 173 | 25,197[3] | 4,359,081 |
| Water Waste Investigations | 157 | N/A[1] | N/A |
| **Total Yearly Savings** | | | **16,299,629** |
| ***Mission Springs Water District*** | | | |
| Smart Controller Rebates | 7 | 7,600[2] | 53,200 |
| Toilet Rebates | 28 | 1,693[3] | 47,404 |
| Clothing Washer Rebates | 16 | 29,099[3] | 465,584 |
| **Total Yearly Savings** | | | **566,188** |

[1] Landscape Plan Checks and Water Waste Investigations are difficult to quantify water savings due to the variable results in savings by individual check and investigation.

[2] Source: EPA. *WaterSense Performance Overview: Weather-Based Irrigation Controllers.* 2022.

[3] Savings for Toilet and Clothing Washer rebates are calculated by multiplying estimated savings per person from "Chapter 3 Demand Projections" by average persons per household in the Agency's respective area

[4] Source: Dukes. *Sprinkler Nozzle Testing Report*. 2023

In addition to the assessment of their respective conservation programs, the Agencies will track compliance with the conservation standards promulgated by the State Water Resources Control Board (SWRCB) under the "Making Conservation a California Way of Life" legislation (AB 1668 and SB 606), including compliance with the urban water use objectives (UWUOs). Both MSWD and DWA have initiated the development of an Alternative Compliance Plan to support compliance with the UWUOs.

## Coachella Valley Water District

CVWD currently offers a variety of water-efficiency programs through its annual budget. CVWD also researches new incentives based on changing customer needs. Outreach and education, including K-12 schools, is also a large part of CVWD's efforts to spread the "Conservation as a

Way of Life" message to its customers. CVWD has a large section on its website (https://www.cvwd.org/conservation) devoted to water conservation and education. CVWD provides customers with a variety of indoor incentives (including Indoor Water Conservation Kits, Residential High Efficiency Toilet Rebates, Residential Efficient Washing Machine Rebates, Residential Hot Water Recirculation Pump Rebates, Commercial Water Efficient Toilet Rebates, Commercial Water Brooms, and Commercial Pre-Rinse Nozzles) and landscape/outdoor incentives (including Residential Landscape Rebates, Residential Smart Irrigation Controller Installations, Residential Rotary Nozzle Rebates, Homeowners' Association (HOA) & Commercial Landscape Rebates, HOA & Commercial Smart Irrigation Controller Rebates, HOA & Commercial Rotary Nozzle Rebates, HOA & Commercial Irrigation Upgrade Rebates, and Landscape Workshops).

CVWD's Landscape and Irrigation System Design Ordinance No. 1302.5 (Landscape Ordinance), last updated in July 2020, establishes annual maximum water allowances for new and rehabilitated landscape sites that are served by the domestic water system . The allowances are based on landscaped area, plant water use zone, low-moderate landscape plant water use rates, and high irrigation system application efficiency. In implementing the Landscape Ordinance, CVWD conducts plan checks and inspections.

CVWD utilizes a water budget-based tiered rate structure . Conservation pricing provides incentives to customers to reduce average or peak use, or both. CVWD uses water commodity rates for its domestic water, non-potable (including Coachella Canal and recycled) water, and groundwater replenishment services. Every residential customer is given a personalized water budget based on the number of people living in the home, the size of the home's landscaped area (budgeting more water to those with larger landscapes), and daily weather (budgeting more water during hotter months). Every landscape meter is given a personalized water budget based on the landscaped area served. Every commercial property is given a personalized water budget based on the demand the entity places on the sanitation system and may include an allotment for landscape area served. Customers pay the tier rate for all water used within that tier. In 2021, CVWD updated water rate studies for its domestic water, Coachella Canal water, and replenishment assessment charges. In 2026, CVWD is currently in the process of developing an updated water rate study.

CVWD's water loss program evaluates both apparent and real water loss. The programs and practices used to constitute water loss reduction efforts include Production Well Meter Testing; Customer Meter Testing, Leak Detection, and Repair; District Site Use Water Meters; Meter Reading; and Billing Reports.

CVWD's Large Landscape Irrigation Audit Program assists users in maximizing the efficient operation of their irrigation system by measuring performance, generating irrigation schedules, and recommending improvement actions. Audit sites are selected based on excessive water consumption, or in response to a request for audit services. The large landscape audit program operates continuously and completes approximately 20 landscape audits per year. The success

of this program will be measured by the annual water reduction achieved by large water users participating in the program.

CVWD hosts a Landscaper Certification Program (LCP) for professional landscapers that focuses on water use efficiency. CVWD partnered with College of the Desert (COD) (a local community college with an established Landscape Management Program), Coachella Valley Association of Governments (CVAG), and the cities, county, and neighboring water districts to implement the course and establish certification criteria for incorporation into each city's business license qualification requirements. CVWD developed the curriculum of the LCP using existing staff that hold licenses and certifications in irrigation efficiency, plant water use, horticultural practices, arboriculture, and landscape/golf course irrigation auditing.

CVWD also hosts a Qualified Water Efficient Landscaper (QWEL) certification class each year. The QWEL certification program was created by the Sonoma County Water Agency in partnership with the North Coast Chapter of the California Landscape Contractors Association and is nationally recognized by the U.S. Environmental Protection Agency (EPA) WaterSense program for Irrigation System Audits. The QWEL professional certification program provides landscape professionals with 20 hours of education on local water supply, sustainable landscaping, soils, water budgeting and water management, irrigation system components and maintenance, irrigation system audits, and scheduling and controller programming (QWEL, 2018). Upon completion of the course, an exam is given and participants will complete an irrigation system audit. Once all components have been successfully completed, certification is earned.

### Desert Water Agency

DWA continues to increase its investment in outreach related to water conservation. DWA has a large section on its website featuring conservation information and program links (www.dwa.org/save), and hosts regular information sessions, classroom curriculum, and advertising on conservation topics. To date, these investments account for significant water demand reduction within the community. DWA's current conservation programs include a Smart Irrigation Controller Program, Grass Removal Program, Efficient Nozzle Program, Residential Washing Machine Incentives, Commercial Toilet Program, Conservation Coupon Program, and Hospitality Conservation Program. The agency is also developing an Advanced Metering Infrastructure network to give staff and customers access to near real-time water use information.

DWA offers large-landscape customers water use evaluations and will perform them for residential customers upon request. Customers receive a report documenting system deficiencies and outlining water-saving recommendations.

DWA is working to reduce its own water losses through leak detection, water main replacement, proactive service line replacement, meter testing, and updated procedures.

In September 2026, DWA passed Ordinance No. 82 enacting its Water Shortage Contingency Plan. The Ordinance outlines water use restrictions to be implemented during various shortage scenarios.

### Mission Springs Water District

MSWD is dedicated to implementing water conservation measures, with sensible water conservation activities that complement the unique water resource characteristics of MSWD's service area. The goal is to implement practical, cost-effective, and efficient conservation programs which anticipate and serve the long-term needs of MSWD customers and facilitate MSWD's ability to provide a dependable, reliable source of water. MSWD's website (www.MSWD.org) provides a wide variety of conservation information including methods to reduce water use, watering restrictions, a dedicated conservation page, a water efficient planting database, an evaporative cooler maintenance program and primer, fines and surcharges associated with violation of watering restrictions, water rebates for installing certain water saving devices and turf removal, and other frequently asked questions regarding water use and conservation. There is also a section on the MSWD website to report water waste or unauthorized use to the Agency via a Survey123 form. In addition to the MSWD website, MSWD also leverages social media platforms, targeted mailers, and press releases to share conservation information, such as rebate opportunities and conservation tips.

MSWD's water system is fully metered, and MSWD completes annual checks on the accuracy and operation of production meters by either recalibrating and reinstalling meters, or by replacing meters that do not fall within the required operating range of the American Water Works Association (AWWA) standards. In 2020, MSWD completed a system-wide upgrade to advanced metering infrastructure (AMI), which allows for the direct transmission of water use data between the point of consumption and the utility. As such, AMI provides a higher level of accuracy, eliminates the need to manually read water meters, improves overall efficiency of operations, and allows for the identification of potential leaks. Additionally, MSWD conducts water audits and leak monitoring, replaces water lines, and updates reservoir and production well infrastructure to reduce system water loss.

MSWD has a tiered rate structure for water service within its service area, intended to discourage high water use. MSWD may also enact a drought surcharge, as required by Statewide drought measures.

MSWD regularly publishes the *Water Matters* newsletter, which features updates on rebate programs, conservation tips, and success stories. Notable editions from June, July, September, and December 2025 have spotlighted initiatives such as smart irrigation controllers and turf replacement incentives. Strategic billboard placements have been used to visually reinforce conservation messaging and direct residents to available rebates and resources.

MSWD has a number of available rebates and resources for residential, landscape, and commercial/industrial/institutional customers including water use surveys/audits, rebates or giveaways of plumbing fixtures and devices, evaporative cooler maintenance and assessment

program, and rebate programs including turf conversion (described further in **Section 8.4.2**), high efficiency toilets, smart irrigation controllers, and high efficiency washing machines.

Large landscape irrigation surveys are offered to cost-effectively achieve quantifiable water savings. The audits are performed in conjunction with MSWD's Efficient Landscaping Guidelines, adopted by the District board on December 20, 2004. The guidelines establish effective water efficient landscape requirements for newly installed and rehabilitated landscapes, as well as promote water conservation through climate appropriate plant material and efficient irrigation practices.

## 8.4.2 WC-2: Turf Irrigation Reduction

Turf irrigation reduction is a major avenue of conservation within the Coachella Valley, especially in affluent areas with larger landscapes. Turf irrigation can be reduced by replacing turf with desert friendly landscaping, and this reduction is implemented with a combination of incentives via rebates and ordinances.

### Turf Rebates

All three Agencies offer rebates to their customers for converting their outdoor turf areas to desert-friendly landscaping, which requires less water for irrigation. CVWD has offered a landscape conversion rebate since 2007. CVWD's landscaping guide, Lush & Efficient: Landscape Gardening in the Coachella Valley, provides guidelines on which plants work best in the hot, arid climate. For residential properties, the rebate consists of $2 per square foot of landscaping or turf, up to $20,000 per project. For HOAs and commercial properties, the rebate consists of $2 per square foot of landscaping or turf, up to $50,000 per project. Since 2010, 6,529 residential and 1,802 commercial/HOA rebates have been issued, amounting to a total of 26,523,482 square feet of turf conversion. CVWD performed a study of smart controllers using actual customers after having converted their landscaping and found that, on average, water savings amounted to 36% as a result of landscape conversion.

Since 2022, DWA has approved rebates for 799 turf removal projects for HOAs, businesses, and residents. The program continues to evolve as demands and community expectations shift. Two key examples are allowing backyard and private areas to be converted through the program, as well as allowing replacement with artificial turf. DWA currently offers a turf rebate of $2 per square foot, and the City of Palm Springs offers its residents a $1 match per square foot, resulting in up to $3 per square foot for Palm Springs customers.

MSWD first implemented its Turf Rebate Program in 2015 through 2016, and more recently reinitiated the program in May 2021. The program is available to all MSWD customers; including a residential component for single family homes, a commercial component for businesses and multi-family housing, and a public properties component for parks, medians, government buildings, schools and similar properties. The intent of the program is to both reduce water consumption and water runoff, as well as increase education about water conservation and desert friendly landscaping. Currently, residents can earn up to $3,000 in rebate per project, and

commercial property owners can receive up to $10,000 per project. Each project receives $2 per square foot of turf removed. Overall, from 2021 to 2025, the Turf Conversion Program issued a total of $87,152 in rebates and supported the conversion of over 40,000 square feet of turf. More than 21 projects were fully funded, with additional applications pending or in progress.

### Non-Functional Turf Ban

California's Non-Functional Turf Ban (AB 1572) prohibits the irrigation of non-functional turf with potable water. The compliance dates are January 1, 2027, for Department of General Services properties and applicable local government, public agency, and public water system properties outside disadvantaged communities; January 1, 2028, for other institutional, commercial, and industrial properties; and January 1, 2029, for common areas of homeowners' associations, common interest developments, and community service organizations or similar entities. For properties owned by local governments, local public agencies, and public water systems in disadvantaged communities, the deadline is January 1, 2031, or the date state funding becomes available for the required turf conversion, whichever is later. Additionally, the bill requires public water systems to revise regulations, ordinances, or policies by January 1, 2027, and to communicate those changes to customers.

DWA's Ordinance No. 80 implements the non-functional turf ban in its service area and requires entities to identify areas of non-functional turf six months prior to their respective compliance deadlines. The ordinance includes inspections to ensure compliance and up to $2,000 in fines per property for each verified violation. CVWD and MSWD will update their regulations by the January 1, 2027, deadline to include implementation of their respective non-functional turf bans.

The Agencies continue to monitor and evaluate the effectiveness of their urban water conservation programs through the Coachella Valley RUWMP, prepared at five-year intervals. Conservation efforts will continue to be enhanced through regionally coordinated policy and regulatory measures.

## 8.4.3 WC-3: Implement Water Shortage Contingency Plans (WSCPs)

The 2025 Coachella Valley RUWMP that was recently completed and adopted includes standalone WSCPs for each of the Agencies (see Appendices to the Final 2025 Coachella Valley RUWMP: https://www.cvrwmg.org/uwmp/). The WSCPs contain Annual Water Supply and Demand Assessment procedures, defines six standard shortage levels from up to 10% shortage to greater than 50% shortage, and identifies shortage response actions including demand reduction actions, mandatory use restrictions, and supply augmentation, as well as communication protocols for implementing the WSCP. **Table 8-3** summarizes the six shortage levels of the WSCPs and their respective response actions.

**Table 8-3: Water Shortage Contingency Plan Levels**

| Shortage Level | Percentage Shortage Range | Description | Shortage Response Actions |
|---|---|---|---|
| 1 | Up to 10% | Normal water supplies | Mandatory prohibitions defined by the State, ongoing rebate programs |
| 2 | Up to 20% | Slightly limited water supplies | Outdoor water use restrictions on time of day, increased water waste patrols |
| 3 | Up to 30% | Moderately limited water supplies | Outdoor water use restrictions on days per week, restrictions on filling swimming pools |
| 4 | Up to 40% | Limited water supplies | Limits on new landscaping, expanded public information campaign |
| 5 | Up to 50% | Significantly limited water supplies | Limits on watering of parks or school grounds |
| 6 | Greater than 50% | Severe shortage or catastrophic incident | No potable water use for outdoor purposes |

*Source: 2025 Coachella Valley RUWMP, WSCP Attachments (CVWD et al., 2026a)*

During the 2021-2022 statewide drought, Shortage Level 1 and Level 2 were temporarily implemented, triggering demand reduction measures and drought-related enforcement actions. As drought conditions improved, the shortage levels were subsequently lifted, and the Agencies returned to normal operating conditions. Agencies continue to monitor climate conditions, and the WSCP framework remains an active and ongoing tool for maintaining water supply reliability and supporting proactive management during times of shortage in the region.

## 8.5 Water Supply

Imported water is critical to groundwater sustainability in the MCSB. CVWD and DWA continue to invest in long-term, statewide water projects and are working with the Metropolitan Water District of Southern California (MWD) and the California Department of Water Resources (DWR) to improve the reliability of SWP water and acquire additional supplies. Ongoing and future water supply PMAs 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 Replenishment in the MCSB,
- Project WS-3: Recycled Water System at Horton WWTP
- Project WS-4: SWP-Delta Conveyance Project (DCP), and
- Project WS-5: SWP- Sites Reservoir.

SWP reliability within the Coachella Valley is expected to improve through participation in the Sites Reservoir and the DCP. SWP supplies to the region are expected to increase by approximately 11,500 acre-feet per year (AFY) following the construction of the Sites Reservoir by 2035, along with increased SWP reliability of 20,800 AFY following construction of the DCP assumed in 2047, for a grand total of 32,300 AFY of additional SWP supply available for recharge to MC-GRF and Whitewater River Groundwater Replenishment Facility (WWR-GRF)

in the Indio Subbasin. A portion of these supplies and increased SWP reliability will be provided to the MCSB.

## 8.5.1 WS-1: 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 allocations, as well as exchange and delivery through MWD's CRA operations. Annual SWP deliveries vary widely depending on hydrologic and climate conditions, and SWP reliability has declined over time as environmental, regulatory, and climate changes constrain available supplies (see Chapter 4, Water Resources). As opportunities arise, CVWD and DWA will consider making imported water purchases from programs such as the Yuba River Accord Dry Year Water Purchase Program (Yuba Accord).

CVWD and DWA intend to continue regular recharge activities at the MC-GRF to maintain sustainable groundwater levels. Between water years 2002 and 2024, CVWD and DWA have replenished a total of 176,410 acre-feet (AF) of SWP exchange water at the MC-GRF.

Previous years of SWP exchange water replenishment to the MC-GRF are quantified in the table below.

**Table 8-4 State Water Project Replenishment to MC-GRF**

| Water Year | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|
| Recharge at MC-GRF (AFY) | 1,341 | 427 | 0 | 5,275 | 5,432 |

While the larger regional imported water replenishment system includes multiple GRF's across the Coachella Valley, including the Thomas E. Levy, Palm Desert, and Whitewater River facilities, the MC-GRF is the primary groundwater infrastructure directly associated with recharge of the MCSB.

CVWD, DWA, and MSWD periodically review local and imported water supply availability and needs as part of the routine Management Committee activities per the 2004 Settlement Agreement. This review is conducted in coordination with preparation of the SGMA Annual Report described in Section 8.7.4. CVWD and DWA are pursuing acquisition of additional imported water supplies as needed and described in Section 8.5.3 through Section 8.5.5.

## 8.5.2 WS-2: Recycled Water for Replenishment in MCSB

MSWD has been making progress in the expansion of recycled water for replenishment in MCSB. These efforts include:

- Construction and commissioning of Nancy Wright Regional Water Reclamation Facility (RWRF) and evaporation/percolation ponds in the Garnet Hill Subarea (GHSA) of the Indio Subbasin (see Section 8.9.1: Completed Projects); and

- Evaluation of a future Groundwater Replenishment and Reuse Program (GRRP) to bring recycled water from the Regional WRF to the MCSB.

## Nancy Wright Regional Water Reclamation Facility

MSWD completed construction of the Nancy Wright RWRF in 2024, expanding regional wastewater treatment capacity and supporting future recycled-water replenishment in the MCSB. The Nancy Wright RWRF is a secondary treatment facility with nitrification and denitrification that began operations in 2025, currently treating 0.18 million gallons a day (MGD) and will be built out to the capacity of 1.5 MGD by 2030. The Nancy Wright RWRF currently discharges secondary-treated effluent to evaporation/percolation ponds in GHSA. More information about the Nancy Wright RWRF can be found in Section 8.9.1: Completed Projects.

## Groundwater Replenishment and Reuse

MSWD is evaluating opportunities to further expand the Nancy Wright RWRF to a tertiary treatment facility so that highly treated recycled water can be beneficially reused within the MCSB. Currently, the Nancy Wright RWRF collects and treats wastewater generated from the MSWD service area, but while much of these supplies originate from groundwater pumped from the MCSB, the Nancy Wright RWRF and percolation facilities are located in the GHSA of the Indio Subbasin, where treated water is returned to the groundwater system outside of the MCSB.

The future GRRP would convey highly treated recycled water from the GHSA back to the MCSB for groundwater recharge. This approach would create a new local water supply, support groundwater sustainability, and improve long-term water supply reliability. Planning for these improvements began through the Recycled Water Program Development Feasibility Study (Hazen, 2018), which evaluated the treatment, regulatory, infrastructure, and water quality requirements associated with implementing a GRRP. The proposed GRRP recharge facilities are planned for an 80-acre site in the MCSB owned by MSWD on 14$^{th}$ Avenue. The available recharge capacity of the 80-acre site amounts to approximately 78 MGD (Hazen, 2018).

The GRRP regulations were adopted on June 30, 2014, by the State Water Resources Control Board, Division of Drinking Water (SWRCB-DDW), which are found in Title 22 Code of Regulations, Division 4. Environmental Health, Chapter 3. Water Recycling Criteria, Article 5.1 Indirect Potable Reuse: Groundwater Replenishment - Surface Application. Implementation of a GRRP project will require additional treatment to achieve the virus, *Giardia*, and *Cryptosporidium* log reduction values identified in the regulations and diluent water will need to be blended with recycled water to meet the prescribed recycled water concentration. A GRRP project will also require, at a minimum, assessment of diluent water characteristics, as well as groundwater modeling and tracer tests to assess retention time to the nearest downgradient well.

In addition to supplemental treatment facilities for the GRRP to meet state water quality requirements, project success will also require conveyance pipelines, recharge facilities, and monitoring wells. Together, these improvements will allow recycled water generated from the MSWD service area to be returned to MCSB, helping replenish groundwater supplies and support long-term basin sustainability. Project WS-2 may be implemented in phases with additional planning in the near future.

### 8.5.3 WS-3: Recycled Water System at Horton WWTP

The Agencies continue to evaluate opportunities to expand recycled water use and reduce reliance on groundwater supplies. In 2018, MSWD, in collaboration with several Coachella Valley water purveyors, secured Proposition 84 grant funding to identify and evaluate recycled water opportunities throughout each agency's jurisdiction and collectively across the region. The 2018 Recycled Water Program Development Feasibility and Technical Memorandum No. 2 evaluated recycled water alternatives within the MSWD's service area (MSWD 2018).

The study identified the Alan L. Horton Wastewater Treatment Plant (Horton WWTP) as a key opportunity to expand recycled water within the MSWD service area. The Horton WWTP currently treats approximately 1.67-1.77 MGD and has a treatment capacity of up to 2.3 MGD. Under existing operations, the Horton WWTP provides secondary treatment and discharges effluent to on-site percolation ponds.

The study identified landscape irrigation as the most feasible initial beneficial use. The study estimated that with expansion of tertiary treatment, the Horton WWTP could ultimately serve at least 18 developments and irrigate approximately 1,086 acres with the new recycled water supply (MSWD, 2018). Use of recycled water for schools, parks, golf courses, and other developments will offset groundwater pumping. Identified near-term connections include users such as Desert Springs Middle School and Mission Springs Park.

Building on these findings, the 2020 Horton WWTP Tertiary Preliminary Design Report (MSWD 2020) identified infrastructure needed to support future water delivery. Planned improvements include Ultra Violet (UV) disinfection, flow-control facilities, and associated pump station that could direct recycled water to the future distribution network serving customers (MSWD 2020).

MSWD continues to pursue grant funding and financing opportunities through programs including SWRCB Proposition 1 funding, USBR WaterSMART and Title XVI grants, public-private partnerships, and Clean Water State Revolving Fund loans. Implementation of tertiary treatment at the Horton WWTP would support future non-potable reuse while improving local water supply reliability and reducing reliance on groundwater resources.

### 8.5.4 WS-4: SWP – Delta Conveyance Project

The Delta Conveyance Project (DCP) is led by DWR to improve SWP reliability. The DCP will modernize SWP conveyance facilities in the Delta for increased future deliveries related to projected long-term reliability. Existing natural channels currently used for SWP conveyance are

vulnerable to earthquakes, sea level rise, and pumping restrictions. The DCP 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 DCP is moving forward, and the final Environmental Impact Report (EIR) was certified in December 2023 (DWR, 2023b). After this certification was completed, other permitting and preconstruction activities took place including the submission of a Change in Point of Diversion Petition, receipt of an Incidental Take Permit, and refinement of project cost estimates, which were updated to approximately $20.12 billion for the tunnel.

CVWD and DWA approved participation in the DCP planning process and continue to support planning, permitting, and preconstruction activities intended to improve the long-term reliability of SWP supplies. CVWD and DWA's Boards have approved participation in the DCP at a level of 3.78%. While this is not a new or additional source of supply, CVWD and DWA anticipate that delivery of additional supplies will support existing replenishment programs and overall groundwater sustainability.

The DCP is currently in its pre-construction phase and in May 2024, interim funding for pre-construction costs for 2026-2027 was requested from participants. DWR continues to advance project development through regulatory coordination while also maintaining stakeholder engagement, tribal outreach, and community benefit progress toward implementation. Final construction and commissioning is projected for 2047.

### 8.5.5 WS-5: SWP – Sites Reservoir Project

The Sites Project Authority is developing the Sites Reservoir project to capture and store up to 1.5 million AF of excess water from snowmelt and winter runoff from the Sacramento River for use during dry periods. The Sites Reservoir will be located 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 has made significant advancements through the planning and permitting stages. In recent years, the Sites Project Authority has submitted applications for Water Rights, Clean Water Act, Incidental Take Permit, Biological Assessment, and the Section 106 Programmatic Agreement; subsequently determining overall project schedule and strategy, and developed the Mitigation Acquisition Master Plan. In November 2023, the Final EIR was certified and the Project was approved, which was then supported by Governor Newsom under Senate Bill 149.

Since approval, the Sites Reservoir project has been awarded over $230 million in federal grant funding from the WIIN Act, over $185 million in federal funding from the Department of the Interior, and over $218 million in State funding through Proposition 1. The Sites Project

Authority continues efforts of planning and coordination of engineering activities, environmental permitting, modelling, and community outreach and engagement. Following the first land purchase in late 2024, the Sites Project Authority made its first request for reservoir development and construction quote.

In 2019, during the planning and permitting process, CVWD and DWA entered into an agreement with the Sites Project Authority to support the next phase of planning for the Sites Reservoir (Sites Project Authority 2019; 2020). CVWD and DWA are participating members at 62,340 AF and 40,521 AF of reservoir capacity, respectively. Participation at this level will result in approximately 6,200 – 6,900 AFY and 4,000 – 4,500 AFY long term average deliveries, respectively, beginning in 2035, including assumed conveyance losses. In September 2026, the Sites Authority Board and Reservoir Committee adopted the Resolution to Offer Capacity, marking the beginning of the investor commitment period where CVWD and DWA will evaluate and confirm their respective participation and funding levels for the upcoming construction phase of the project.

The Sites Reservoir Project (Sites Project) is an off-stream reservoir, designed to capture winter runoff from uncontrolled streams below the existing reservoirs in the Sacramento Valley. As of late 2026, the Sites Project is in a planning and permitting phase, with the final State Water Board permit scheduled for review on November 4, 2026, and construction targeted to begin in 2027.

CVWD and DWA Boards authorized participation in the Sites Project at a level of 4.42% and 2.90% of total reservoir storage.

## 8.6 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. These include:

- WQ-1: Convert from Septic to Sewer in MSWD Area,
- WQ-2: Track Water Quality Regulatory Actions,
- WQ-3: Well Source Assessment and Protection,
- WQ-4: Engage in Planning to Protect Water Quality,
- WQ-5: Educate Public on Groundwater Quality Issues,
- WQ-6: Implement CV-SNMP Development Workplan,
- WQ-7: Implement CV-SNMP Groundwater Monitoring Program Workplan,
- WQ-8: Install Water Quality Monitoring Wells,
- WQ-9: Evaluate Occurrence and Risk of Uranium Migration.

The water quality protection PMAs are described below.

### 8.6.1 WQ-1: Septic-to-Sewer Conversions in MSWD Area

The purpose of WQ-1 is to protect groundwater quality by replacing aging onsite septic systems with centralized wastewater collection and treatment infrastructure. MSWD is expanding its wastewater collection system to serve areas that currently rely on septic systems. The program focuses on several identified sewer improvement areas throughout MSWD, including Subareas A, D-3, G, H, I, J-2, and K, as well as properties located along the North Indian Canyon Drive/I-10 corridor. MSWD Assessment District (AD) 15 and AD-18 will support septic-to-sewer conversions by providing local funding to match with grant funding opportunities.

Implementation of the program includes construction of approximately 146,200 linear feet of 8-inch sewer pipeline, installation of an estimated 2,500 service laterals, and connection of approximately 2,600 parcels to the MSWD wastewater collection system (MSWD 2026). Upon completion, the project is expected to facilitate the abandonment of more than 2,040 onsite septic systems. Construction is anticipated to occur on a phased basis over approximately 20 years, with individual sewer improvement areas being developed roughly every 30 months as schedules and budgets allow.

Project WQ-1 is closely linked to implementation of the Nancy Wright RWRF, which began operation in 2025 and provides the treatment capacity needed to accommodate wastewater flows generated by the expanding sewer system. As additional customers are connected to the network and septic systems are removed, wastewater is conveyed to the Nancy Wright RWRF for treatment rather than being discharged locally. These Projects form the foundation of MSWD's long-term groundwater quality protection strategy by reducing nitrogen loading to the aquifer, modernizing regional wastewater infrastructure, and creating future opportunities for recycled water production and groundwater replenishment.

### 8.6.2 WQ-2: Track Water Quality Regulatory Actions

The 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. The Agencies continue to track and evaluate potential regulatory actions by the SWRCB-DDW and USEPA that may impact compliance with drinking water within their respective boundaries and across the MCSB. Particular focus has been placed on hexavalent chromium (Cr(VI)) and per- and polyfluoroalkyl substances (PFAS), which have been identified as regulatory constrictions with implications for the MCSB.

In October 2024, SWRCB-DDW established a primary maximum contaminant level (MCL) of 10 microgram per liter (µg/L) for Cr(VI) in drinking water. Cr(VI) occurs naturally in the Coachella Valley aquifer, and monitoring data indicates that concentrations in some wells within the MCSB exceed the new MCL standard, requiring the Agencies to develop and implement compliance strategies. These strategies will be implemented in accordance with regulatory compliance timelines.

The Agencies continue to track PFAS regulatory requirements and evaluate available monitoring results. To address the new Cr(VI) standard, MSWD has initiated a series of well-rehabilitation, replacement, and equipment upgrade projects throughout its service area. Several wells are being returned to service or upgraded to offset production losses. Well 22, 30, 34, and 42 will return operational in 2026. In addition, Well 35 is planned for future conversion from a construction water source to a production well through installation of a new pump and motor system. Collectively, these projects represent an ongoing compliance strategy that combines groundwater quality management, infrastructure investment, and water supply planning to maintain reliable drinking water service while meeting increasingly stringent water quality standards.

### 8.6.3 WQ-3: Well Source Assessment and Protection

Project WQ-3 is necessary because of the potential for contaminating activities to 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 (DTSC). The Agencies 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. Consistent with regional planning efforts, these activities support broader groundwater quality protection and source water protection objectives within the MCSB.

### 8.6.4 WQ-4: Planning Reviews to Protect Water Quality

Project WQ-4 will be the responsibility of each Agency and is necessary to assess development proposals, during the entitlement process, for potential water quality and other impacts. 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 MCSB. As discussed in Section 3, the information gathered annually regarding upcoming development projects in the City of Desert Hot Springs will also facilitate identification of projects that could impact water quality.

The Agencies continue to review and evaluate proposed land development projects, environmental documents, and land use plans within the MCSB to assess potential water quality and related impacts. This review and coordination support early identification and mitigation of potential water quality impacts associated with future residential, commercial, and industrial development contributing to groundwater protection in the MCSB.

### 8.6.5 WQ-5: Public Education on Groundwater Quality Issues

The Agencies have steadily increased education and outreach opportunities available to the public. There is ongoing support for the Groundwater Guardian program initiatives developed by the Groundwater Foundation (see https://groundwater.org/groundwater-guardian/). Recently, MSWD has expanded partnerships with local schools, community organizations, and regional agencies to grow educational programming around water conservation and groundwater quality issues, including collaboration with Southern California Edison (SCE) and Southern California Gas Company (SCGC) to deliver in-school classroom education on water, energy, and gas conservation. New educational initiatives include the development of a student-built 3D aquifer model, an annual student art calendar contest, and a semester-based internship program serving 2-4 students. MSWD also continues to expand community outreach through programs such as Living Wise and free educator training opportunities offered through Project WET.

Other ongoing planning activities such as the CV-SNMP, the CVRWMG, and CV Water Counts provide opportunities for additional public outreach and education regarding groundwater quality and management strategies. Collectively, these efforts promote groundwater stewardship, and provide water education resources for students and teachers, while strengthening community awareness of local water resource challenges and management practices.

### 8.6.6 WQ-6: 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 found the 2015 CV-SNMP insufficient and made recommendations for improvements in 2020. In 2020 and 2021, the CV-SNMP partners – which include CVWD, Coachella Sanitary District, City of Palm Springs, CWA, DWA, IWA, MSWD, Myoma Dunes Mutual Water Company, and VSD – 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-7, to guide revisions to the plan.

The CV-SNMP agencies submitted a draft Development Workplan to the RWQCB which was approved in September 2021. The Development Workplan outlines the process for updating the 2015 CV-SNMP to address deficiencies identified by the RWQCB and to maintain consistency with the Recycled Water Policy. The Development Workplan establishes a collaborative approach for evaluating and managing salts and nutrients from all sources throughout the Coachella Valley Groundwater Basin, including importation of Colorado River water, in order to protect beneficial uses. The Development Workplan includes the Groundwater Monitoring Program Workplan (West Yost, 2020), which defines the updated SNMP monitoring network, and identifies monitoring wells needed to address network gaps. Implementation activities include, but are not limited to: public outreach, creation of a Technical Advisory Committee

(TAC), characterization of current groundwater quality and salt loading, development of nitrogen/total dissolved solids (N/TDS) forecasting methodologies, completion of forecasting for multiple scenarios, selection of a preferred scenario, establishing management zones, and recommending TDS objectives.

In support of implementation, the TAC developed and published a series of Technical Memoranda (TMs) that have been released for public review and comment, including:

- TM #1: Characterize TDS/N Mass Loading to the Coachella Valley Groundwater Basin,
- TM #2: Characterize Current Groundwater Quality,
- TM #3: Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection,
- TM #4: Develop Technical Approach for Forecasting TDS/N Concentrations in Groundwater, and
- TM #5: Construct TDS/N Forecasting Tools and Evaluate the Baseline. (CV-SNMP Agencies 2026)

Two additional TMs will precede completion of the final CV-SNMP:

- TM #6: Forecast of TDS/N Concentrations, and
- TM #7: Characterize and Compare the Costs, respectively.

The TAC has met regularly with CV-SNMP agency representatives and RWQCB staff to review technical work products and provide input on key assumptions, modeling approaches, and management strategies.

To support these efforts, the Agencies secured a $200,000 USBR WaterSMART Applied Science grant to help develop the MCSB fate and transport model. The Agencies have expanded stakeholder engagement through the development of a project website and public workshops. The Agencies will continue to support implementation of the CV-SNMP Development Workplan.

### 8.6.7 WQ-7: Implement CV-SNMP Groundwater Monitoring Program Workplan

With the other CV-SNMP partners, 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 determine whether concentrations of N/TDS in groundwater are consistent with water quality objectives. The Monitoring Workplan covers all subbasins within the Coachella Valley Groundwater Basin, including MCSB; includes sampling from the deep, shallow, and perched zones of the aquifer; focuses on critical areas near large water reclamation plants, 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. Monitoring data and progress toward filling data gaps will be reported to the RWQCB and to the SWRCB's Groundwater Ambient Monitoring and Assessment (GAMA) system annually starting in 2022.

Monitoring of the network wells is ongoing. Since 2021, the Agencies have completed five annual monitoring progress reports, as well as two triennial monitoring cycles. The Agencies continue to monitor and produce annual progress reports to the RWQCB.

### 8.6.8 WQ-8: Install Water Quality Monitoring Wells

The CV-SNMP Monitoring Workplan identified locations in the MCSB, Desert Hot Springs Subbasin (DHSSB), and GHSA 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.

CVWD, on behalf of the Agencies, received DWR Technical Support Services (TSS) to construct several water quality monitoring wells in the MCSB. Two monitoring wells (TSS_MC-2 and TSS_MC-5) were completed in the Planning Area in 2025. The Agencies continue to coordinate with DWR on construction of the remaining monitoring wells as funding becomes available.

### 8.6.9 WQ-9: Evaluate Occurrence and Risk of Uranium Migration

Uranium is a naturally occurring radionuclide in the Planning Area with a SWRCB maximum contaminant level (MCL) in drinking water of 20 picocuries per liter. In general, uranium activity appears to be stable over the long-term and below the MCL. A study by GSi/water (2011) indicates that the potential source of the uranium is subsurface alluvial materials derived from the Dry Morongo Creek and Big Morongo Creek watersheds. Other sources considered include shallow bedrock, rising fluids along the Mission Creek Fault, and anthropogenic sources.

MSWD plans to initiate a study to further evaluate the potential sources and migration risk of uranium. Available data from the 2025 Coachella Valley RUWMP indicate that uranium concentrations are generally stable and below applicable drinking water standards at a basin-wide scale. The study will evaluate whether the uranium source is associated with specific alluvial sediments so that future wells can be designed to avoid those sediments if necessary.

## 8.7 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 MC/GH WMP. The SGMA Implementation PMAs are:

- SGMA-1: Continue Existing Subbasin Management Committee,
- SGMA-2: Conduct Subsidence Evaluation,
- SGMA-3: Maintain and Manage Water Related Data,
- SGMA-4: SGMA Annual Report,
- SGMA-5: Five-Year Alternative Plan Updates, and
- SGMA-6: Pursue Funding Opportunities.

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

### 8.7.1 SGMA-1: Continue Existing Subbasin Management Committee

This project was initiated during the preparation of the 2013 MC/GH WMP and satisfies DWR's guidelines for a groundwater management planning committee. The Management Committee is a requirement of the 2004 Settlement Agreement and meets quarterly, bringing together agency GMs and staff to coordinate groundwater management activities throughout the year. In addition, staff have periodic coordination meetings for items like Alternative Plan Updates, Annual Reports, or other relevant topics that may come up and will meet at least once per year to specifically discuss the Annual Report. The Management Committee serves as the primary assembly for interagency coordination and implementation of the Alternative Plan Update and retains the governance structure established under the 2013 MC/GH WMP. Through ongoing collaboration, the Management Committee supports data sharing, evaluation of sustainability criteria, demand forecasting, and coordination with related regional planning efforts such as the Coachella Valley RUWMP in support of overall MCSB health.

### 8.7.2 SGMA-2: Conduct Subsidence Evaluation

No groundwater-extraction-related subsidence has been identified in the MCSB based on the available information, including the 2015–2024 DWR InSAR record discussed in Section 6.5. To further evaluate the potential for subsidence, the Agencies have engaged the United States Geological Survey (USGS) to conduct a more detailed evaluation of the potential for subsidence in the MCSB. If this initial evaluation identifies subsidence as a potential issue, the USGS will develop a subsidence monitoring workplan for the MCSB and conduct ground surface monitoring.

As a part of this effort, three additional benchmarks were installed in early 2023 to take precise GPS measurements in collaboration with USGS. Given these measurements of new and old benchmarks, USGS is conducting ongoing analysis of groundwater levels and land surface elevation data. As of 2025, data analysis is ongoing and USGS plans to publish a final report in late 2026. Results from this report will be incorporated into future SGMA reporting.

### 8.7.3 SGMA-3: Maintain and Manage Water Related Data

Each agency maintains a broad range of groundwater information such as groundwater pumping, groundwater levels, and groundwater quality. Project SGMA-3 continues the Agencies' current practice of compiling, combining, 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 integrated into regional planning efforts, support demand forecasting, scenario modeling, and assessment of broader MCSB conditions. Ultimately, data reported and collected will be used in support of developing Project SGMA-4: SGMA Annual Report and Project SGMA-5: Five-Year Alternative Plan Updates.

### 8.7.4 SGMA-4: SGMA Annual Report

The Management Committee will prepare and submit the SGMA Annual Report to DWR by the April 1 deadline of each year. The Annual Report is a comprehensive evaluation of water data that has been collected by each agency, per Project SGMA-3: Maintain and Manage Water Related Data. Each SGMA Annual Report will evaluate data for the prior water year period covering October 1 through September 30. The SGMA Annual Reports have been prepared since 2017 and follow this general structure:

1. Introduction
2. Coachella Valley Groundwater Basin Setting
3. Groundwater Elevation Data
4. Groundwater Extraction
5. Surface Water
6. Total Water Use
7. Groundwater Balance and Change in Groundwater Storage
8. Description of Progress of Implementing Projects
9. References

Data to be presented include groundwater elevation contour maps, hydrographs of key wells, precipitation, groundwater extraction by water use sector, surface and imported water supply, and change in groundwater storage. The SGMA Annual Reports include a section on Sustainable Management Criteria (SMCs) with subsections describing the state of the MCSB in relation to the four relevant sustainability indicators: groundwater levels, groundwater storage, subsidence, and groundwater quality, as well as the need for and progress toward implementing the Alternative Plan Update PMAs.

The Agencies have continued to compile, process, and evaluate water data to prepare SGMA Annual Reports in compliance with SGMA requirements. SGMA Annual Reports have been processed every year since WY 2016-2017. This is an ongoing activity.

### 8.7.5 SGMA-5: Five-Year Alternative Plan Updates

As required by SGMA, the MCSB Alternative Plan will be evaluated every five years (periodic evaluation) to assess changing conditions in the MCSB that may warrant modification of the plan or management objectives.

Alternative Plan Updates will also be prepared, and these will incorporate updated monitoring data, groundwater modeling, assessing groundwater conditions, and the status of PMAs to ultimately determine whether the SMCs and management objectives are meeting the sustainability goals of the MCSB. 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 Agencies prepared and submitted their first five-year Alternative Plan Update to DWR in December 2021 and will submit the second Alternative Plan Update by January 1, 2027.

### 8.7.6 SGMA-6: Pursue Funding Opportunities

The development of the 2022 Alternative Plan Update was funded, in part, through a Proposition 68 planning grant administered through DWR's Sustainable Groundwater Management (SGM) Grant Program. Costs of overall Alternative Plan implementation are shared by the Agencies. However, there is a need to seek funding opportunities to support PMAs and ongoing implementation.

Outside grants continue to be sought to reduce the cost of implementation to the Agencies and the communities of the MCSB. 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 Alternative 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:

- **SGM Grant Program** administered by DWR. DWR continues to administer grant funding to support GSAs and eligible entities implementing Groundwater Sustainability Plans (GSPs) and Alternative Plans. Proposition 4 authorized approximately $386 million statewide for groundwater sustainability, groundwater storage, groundwater banking, and SGMA implementation activities. Draft guidelines were released in August 2026 with the anticipation of the concept proposals due mid-2027. Eligible projects include recharge and conjunctive use projects, subsidence management actions, activities addressing DWR

Recommended Corrective Actions, agricultural land adaptation projects, conveyance improvements, groundwater storage projects, and other implementation measures.

- **Technical Support Services for Groundwater Sustainability Plans** administered by DWR. Technical Support Services provides direct technical assistance to GSAs to support GSP and Alternative Plan implementation. Available services may include monitoring well installation, geologic and geophysical logging, groundwater quality sampling, telemetry installation, groundwater level monitoring, modeling support, mapping, and related technical investigations.
- **Clean Water State Revolving Fund** and **Drinking Water State Revolving Fund** loan programs administered by SWRCB. The SWRCB administers low-interest financing programs for drinking water, wastewater, recycled water, groundwater recharge, treatment facilities, conveyance infrastructure, and related water supply reliability improvements. Financing is generally available year-round through a continuous application process, subject to State Revolving Fund (SRF) requirements and annual funding availability.
- **Water Recycling Funding Program** planning and construction grants from SWRCB. The program provides grants and low-interest financing for recycled water facilities, groundwater recharge, indirect potable reuse, surface water augmentation, distribution systems, treatment facilities, and storage infrastructure. Proposition 4 funding has added new funding opportunities for recycled water construction projects and large-scale recycled water programs. Groundwater recharge using recycled water may be particularly relevant when identified in the Alternative Plan as a groundwater sustainability action.
- **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. Eligible water-related projects may include water supply reliability, recycled water, conveyance improvements, treatment facilities, and other public infrastructure investments. Loans are generally available on a rolling basis.
- **Title XVI Water Recycling and Reclamation** and associated Water Infrastructure Improvements for the Nation Program administered by USBR provides funding for construction of water recycling and reuse projects. Projects must be supported by an approved Title XVI Feasibility Study and are generally eligible for federal cost-share funding subject to annual appropriations and program limits. Feasibility Study Grants are also administered by USBR. USBR periodically provides grants to evaluate water recycling and reclamation opportunities. Eligible studies may include engineering, environmental, institutional, economic, and feasibility analyses required to advance future recycled water projects toward implementation.
- **Watershed Resilience Program (WRP) Planning+ and Conservation Implementation** grants administered by DWR. The Coachella Valley Integrated Regional Water Management (IRWM) Region can pursue grant funding through DWR's Watershed Resilience Program (WRP) through their Proposition 4 Planning+ grant solicitation anticipated in 2027. The Coachella Valley IRWM Region will need to request planning funding to revise the IRWM

Plan to meet the new WRP requirements. The eligible projects for the WRP program may include watershed resilience, regional water management, climate adaptation, groundwater recharge, water supply reliability, ecosystem enhancement, and multi-benefit projects. The Conservation Implementation eligible projects may include watershed restoration, nature-based solutions, floodplain reconnection, and climate resilience strategies.

- **Multi-Benefit Land Repurposing Program** (MLRP) administered by the Department of Conservation (DOC). For areas facing agricultural transition, groundwater overdraft, or land fallowing, the MLRP can support alternative land uses that reduce groundwater demand while providing habitat, flood, recharge, or community benefits. This program often complements SGMA implementation efforts and should be considered. Draft Guidelines for the $200 million in Proposition 4 MLRP are expected in 2026 with grant solicitations in 2027. The MLRP projects can include, but are not limited to, agricultural land retirement and transition, groundwater recharge basins, habitat restoration, floodplain restoration, grazing conversion, solar-integrated recharge projects, wildlife corridors, pollinator habitat, and community open space and climate resilience projects.

While the identification and pursuit of funding opportunities for PMAs are ongoing, the Agencies have successfully secured regional, state, and federal funding through programs such as IRWM, Urban Community Drought Relief, and USBR WaterSMART to support groundwater sustainability objectives.

Other types of funding that are not loans or grants that agencies may pursue are further described in Section 8.10.2 and include revenue bonds and SGMA fees as is under consideration by CVWD as described in Project WELL-2 in Section 8.8.2.

## 8.8 Well Management

Well management activities will facilitate maintaining water quality in the MCSB, in addition to improving data collection regarding well locations and pumping. The well management PMAs are:

- WELL-1: Well Construction, Abandonment, and Destruction; and
- WELL-2: Expand Groundwater Production Reporting.

These PMAs are described below.

### 8.8.1 WELL-1: Well Construction, Abandonment, and Destruction

This project is an important management tool as RCDEH has regulatory authority over well construction, replacement, destruction, and abandonment. RCDEH administers a permitting process for new or replacement wells in the MCSB in accordance with 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 continue to work with RCDEH so that 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. This coordination also supports communication with permitting agencies regarding groundwater levels to help ensure that future wells are screened below minimum thresholds.

Historically, this management action consisted of cooperative efforts between the Agencies and RCDEH. During WY 2023–2024, CVWD reviewed two well permit applications and determined both to be consistent with the Alternative Plan Update, reflecting continued alignment with MCSB management objectives. However, following the Governor's Executive Order N-3-24m, issued September 5, 2024, the State rescinded prior requirements for GSA review and authorization of new well permits established under Executive Orders N-7-22 and N-3-23. As a result, GSAs discontinued their formal role in reviewing and approving RCDEH-issued well permits. Nevertheless, Agencies, local municipalities, and RCDEH continue to actively coordinate on well management issues to support groundwater sustainability.

### 8.8.2 WELL-2: 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). As described in Section 8.8.2, both CVWD and DWA already require metering and extraction reporting by groundwater producers pumping more than 25 AFY 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 Areas of Benefit (AOBs), to provide a description of the current GRF operations, and to recommend adjustments to the Replenishment Assessment Charge (RAC) that is levied on groundwater production (see CVWDs 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 threshold, but more than the de minimis threshold established by SGMA.

## 8.9 Completed and Deferred Projects

PMA implementation and management is a dynamic process, as described in detail in Section 8.2: *Adaptive Management.* Several PMAs proposed in the 2022 Alternative Plan Update were completed over the last five years, while some were deferred. Information on non-active PMAs is provided below.

## 8.9.1 Completed Projects

### Regional Conservation Study (formerly WC-3)

In October 2024, the Agencies completed a Regional Water Conservation Study (CVRWMG 2024). The Study was developed to determine how incentive and conservation programs could support regional water supplies by evaluating the effectiveness of existing turf replacement rebates across the Coachella Valley. Results were specific to the unique climate, soil, and occupancy conditions of the region. The Regional Water Conservation Study took an econometric analysis to estimate water savings from turf replacement rebates and was used to support evaluation of conservation cost-effectiveness, targeting strategies, and incentive amounts for residents and businesses.

The Study focused on outdoor irrigation to determine the water savings per square foot if grass was replaced by alternative landscapes such as artificial turf or desertscape. The Study analyzed information from ongoing programs and key analysis included:

- 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 water savings estimates through data quality screening, participant matching, agency interviews, and comparison of participant and non-participant water use patterns;
- Evaluation of potential spillover effects associated with customers that removed grass without receiving a rebate and/or replaced grass with private patios, side yards, and/or backyards; and
- Assessment of additional grass replacement among existing customers (i.e., percent saturation achieved by existing conservation programs).

With the Regional Water Conservation Study complete, the report can support more competitive water conservation implementation grant applications such as those funded by USBR and DWR. Additional grant funding for implementation will support expansion of water conservation programs to serve more customers, resulting in increased water savings, and reduce groundwater pumping.

### Construct Regional WRF (formerly WQ-2)

MSWD completed construction of the Nancy Wright RWRF in 2024, and the facility began operations in early 2025. Located in the GHSA, the Nancy Wright RWRF provides advanced secondary treatment with nitrification and denitrification, creating additional treatment capacity, while supporting septic-to-sewer conversion efforts throughout MSWD's service area.

The Nancy Wright RWRF diverts wastewater flows from existing treatment plants that are approaching capacity and receives flows from both existing sewered customers and future septic-to-sewer conversion areas within the DHSSB, MCSB, and GHSA. The facility currently

treats approximately 0.18 MGD, and is expected to reach 1.5 MGD by 2030 as additional sewer connections are completed, with the potential for future expansion to 3.0 MGD.

As part of the project, MSWD constructed a regional conveyance pipeline that directs wastewater to the Nancy Wright RWRF for treatment. Treated effluent is discharged to evaporation/percolation ponds in the GHSA, where it contributes to groundwater recharge while reducing hydraulic loading on older treatment facilities. Treated wastewater discharge shows measurable reduction in nitrogen in the effluent water quality samples in comparison to the existing septic system dischargers. The benefits of a treated Nancy Wright RWRF effluent rather than septic discharges are reduced contributions of nitrates and ammonia to the aquifer, which results in improved groundwater quality.

The Nancy Wright RWRF also establishes the foundation for future recycled water and groundwater replenishment projects. As discussed in Section 8.5.2 (Project WS-2), treated effluent from the facility could be further treated, conveyed, and reused through the construction of recycled water conveyance and groundwater recharge facilities, creating an additional local water supply for the MCSB.

### Subbasin Well Inventory (formerly Well-2)

The MCSB has a well inventory that has been compiled by CVWD and DWA to implement the RAC Programs for assessable groundwater production. CVWD levies and collects the RAC from groundwater producers that benefit from the GRFs and extract more than 25 AFY within the CVWD MCSB AOB. DWA levies and collects the RAC from groundwater producers that benefit from the GRFs and extract more than 10 AFY within DWA's MCSB AOB.

However, there is limited data on minimal pumpers who do not meet these criteria, and it was unclear how many wells producing less than the RAC criteria exist. To address this longstanding data gap regarding domestic and small water system wells throughout the Coachella Valley, the Domestic and Small Water System Well Inventory (Well Inventory) and Vulnerability Assessment was developed (see https://www.cvwaterresilience.org/). Completed in 2026, this initiative was led by CVWD in partnership with the Torres Martinez Desert Cahuilla Indians and Pueblo Unido Community Development Corporation, with support from CWA, DWA, IWA, MSWD, Leadership Counsel for Justice and Accountability, and Valley Sanitation District. The study was done to develop a better understanding of small, independent groundwater wells or small water systems across the Coachella Valley.

The Well Inventory compiled information from local agency well records, the RAC program, Riverside County permitting data, Tribal well records, and field verification efforts to identify independent groundwater users that are not typically represented in existing groundwater production reporting programs. The study identified approximately 1,184 known domestic and small water system wells and estimated that there are nearly 1,500 locations across the Coachella Valley that rely on self-supplied groundwater. In addition, field surveys were conducted at more than 100 locations to verify well locations, collect construction information, and document operational concerns and vulnerabilities. The Well Inventory supports expansion

and refinement of the monitoring network, allowing for improvement of groundwater extraction estimates, and improving the understanding of how private wells affect MCSB conditions and how MCSB management affect private wells.

Key efforts of the Well Inventory included the following:

- Review and organization of data management systems to incorporate well inventory components;
- Collection of water well drillers' reports with well construction information;
- Coordination with well owners to identify wells and obtain relevant information on location, construction, use, status, and monitoring, if any;
- Field visits to verify well location, use, and status; and
- Data entry of Well Inventory information into the management system.

The Well Inventory improves the Agencies' understanding of private well users and provides important information regarding well locations, construction characteristics, groundwater level vulnerability, flooding risks, and potential water quality concerns. The Well Inventory also identified areas where additional well information is needed and provides a framework for future refinement of groundwater extraction estimates associated with domestic and small water system users. This Well Inventory has been completed and findings from this study was used to support this Alternative Plan Update, groundwater monitoring programs, evaluation of SMCs, and assessment of how groundwater management actions may affect private well owners, particularly in areas that could experience groundwater level declines under future climate change conditions.

## 8.9.2 Removed Projects

### SWP – Lake Perris Dam Seepage Recovery Project

The Lake Perris Dam Seepage Recovery Project was originally developed by DWR to 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 downgradient from the face of the Lake Perris Dam that would include up to six (6) new seepage recovery wells and a conveyance pipeline connecting the wells to MWD's CRA. In 2021, DWR and MWD completed environmental reviews, prompting CVWD and DWA to participate in the project and commit to provide funding for the environmental analysis, planning, and preliminary design of the project. Subsequently, geotechnical investigations and groundwater modeling were completed. As these technical studies progressed, project findings revealed conditions that diverged from the original assumptions and underlying the project's scope, resulting in a reassessment of project feasibility and implementation considerations.

Arising scope complications, along with evolving regulatory considerations related to emerging contaminants, introduced further concern to implementation of the project. Based on these factors, MWD determined that it would not continue its participation in the Lake Perris Dam Seepage Recovery Project. After communication between MWD and both agencies, and reviewing technical findings and project considerations, staff from both DWA and CVWD agreed with MWD's assessment and supported the decision to discontinue the project.

## 8.10 Plan Evaluation and Implementation

This Alternative Plan Update describes the planning process for the Agencies to achieve a reliable and sustainable water supply while sustainably managing groundwater resources. This section provides an evaluation of how implementation of this Alternative Plan Update will achieve the dual goals of meeting projected demands and maintaining groundwater sustainability. This section also outlines the Alternative Plan Update implementation activities necessary to support those goals.

### 8.10.1 Plan Evaluation

This 2027 MCSB Update includes analysis of the range of uncertainties facing the Agencies in planning for a balance of future water demands and supplies. Section 3, Demand Projections, and Section 4, Water Resources, both address potential future conditions that are outside of the Agencies' control, including increased municipal demands, climate change, and regulatory changes. The planning process considered those uncertainties in the development of forecast scenarios described in Section 7, Water Management Forecasting, which analyzed a range of potential future conditions given those uncertainties and compares the results with the SMCs for water levels described in Section 6, Sustainable Management Criteria. Section 8.2 lays out an adaptive management process by which the Agencies can identify and select PMAs for implementation based on MCSB conditions. The PMAs are packaged in the modeling scenarios, as described in Section 7, Water Management Forecasting, and included Near-Term Projects and Future Projects scenarios. Future hydrology was evaluated under both moderate and severe climate change conditions. **Table 8-5** summarizes the active PMAs and their implementation status.

The Baseline scenarios are not considered in the plan evaluation because Baseline conditions are not part of the plan and are only provided to show potential conditions without the 2027 MCSB Update projects and management actions.

Under the Near-Term Projects, in which recycled water is brought back to the MCSB for recharge or re-use, with CM5 RCP 4.5 climate change assumptions, all nine Key Wells in the MCSB remain above their respective measurable objectives through WY 2073-2074. Under the Near-Term Projects scenario with MIROC5 RCP 8.5 climate change assumptions, six of the nine Key Wells fall below their respective measurable objective.

Under the Future Projects, where new reliability of SWP is added beginning in 2035 (Sites Reservoir) and again in 2040 (DCP), with CM5 RCP 4.5 and with MIROC5 RCP 8.5 climate change assumptions, all nine Key Wells remain above their respective measurable objectives during the planning horizon.

Across all Near-Term Projects and Future Projects Scenarios, all nine Key Wells remain above their respective minimum thresholds through WY 2073-2074. As described in Section 7, Water Management Forecasting, these modeling scenarios with PMAs included show increased water levels and changes in storage compared to the baseline scenarios, demonstrating the importance of PMAs for Subbasin sustainability.

## Table 8-5: Summary of Active Projects

| Project No. | Ongoing/Planned | Project/Program | Project/Program Description |
|---|---|---|---|
| **Water Conservation (WC)** | | | |
| WC-1 | Ongoing | Continue to implement urban water conservation and education programs | Agencies continue 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. |
| WC-3 | Ongoing | Implement WSCPs | Agencies continue to implement adopted WSCPs as needed to respond to water supply/demand imbalances. |
| **Water Supply (WS) Including Reliability and New Supply Development** | | | |
| WS-1 | Ongoing | Continue existing imported water replenishment program | CVWD and DWA to continue annual recharge activities at the MC-GRF with SWP Exchange water. |
| WS-2 | Planned | Recycled water for replenishment in MCSB | MSWD is continuing planning for a future Groundwater Replenishment and Reuse Program to further treat and convey recycled water from the Nancy Wright RWRF in the GHSA to the MCSB for groundwater replenishment. Future improvements would include supplemental treatment, conveyance, recharge facilities, and monitoring wells. |
| WS-3 | Planned | Recycled water system at Horton WWTP | MSWD is continuing planning and funding efforts for future tertiary treatment and recycled-water distribution improvements at Horton WWTP. Planned improvements include UV disinfection, flow-control facilities, a pump station, and distribution infrastructure to support non-potable recycled-water use. |
| WS-4 | Ongoing | SWP – Delta Conveyance Project | CVWD/DWA to continue participation in DCP, a SWP project to improve SWP reliability. |
| WS-5 | Ongoing | SWP – Sites Reservoir | CVWD/DWA to continue participation in Sites Reservoir, a SWP project to capture and store stormwater flows from the Sacramento River for release in dry years. |
| **Water Quality Protection (WQ)** | | | |
| WQ-1 | Ongoing | Convert from septic to sewer in MSWD area | Continue septic to sewer conversions within MSWD service area as a part of wastewater management (based on available funding). |
| WQ-2 | Ongoing | Track water quality regulatory actions | Agencies to continue ongoing effort to track potential regulatory actions of SWRCB-DDW and USEPA that could affect ability to comply with drinking water regulations. |
| WQ-3 | Ongoing | Well source assessment and protection coordination | Agencies to coordinate with the appropriate local, state, and federal regulatory agencies regarding potentially contaminating activities within well capture-zones and principal recharge zones. |
| WQ-4 | Ongoing | Engage in planning processes to protect water quality | Review and comment on proposed land developments, environmental documents and land use plans developed by local planning agencies. |

| Project No. | Ongoing/Planned | Project/Program | Project/Program Description |
|---|---|---|---|
| WQ-5 | Ongoing | Educate public on groundwater quality issues | Continue to support the Groundwater Guardian program, a community educational program developed by the non-profit Groundwater Foundation. Expanded educational resources include, but are not limited to: annual calendar contest, class room activities, and free teacher and community trainings through programs like Project WET and Living Wise. |
| WQ-6 | Ongoing | Implement CV-SNMP Development Workplan | Continue implementation of the CV-SNMP Development Workplan including salt and nutrient loading evaluations, forecasting, and development of management strategies. |
| WQ-7 | Ongoing | Implement CV-SNMP Groundwater Monitoring Program Workplan | Implement CV-SNMP Groundwater Monitoring Program Workplan which has been as approved by the RWQCB. |
| WQ-8 | Ongoing | Install water quality monitoring wells | Install wells to address water quality data gaps as described in the CV-SNMP Groundwater Monitoring Program Workplan. |
| WQ-9 | Planned | Evaluate occurrence and risk of uranium migration | MSWD to initiate a study to evaluate potential sources and migration risk of uranium and whether uranium is associated with specific alluvial sediments that could be avoided in future well design |
| **SGMA Implementation (SGMA)** | | | |
| SGMA-1 | Ongoing | Continue existing subbasin Management Committee structure | Agencies to maintain existing Management Committee to coordinate groundwater monitoring, reporting, and implementation of Alternative Plan. |
| SGMA-2 | Ongoing | Conduct subsidence evaluation | The Agencies continue working with USGS on a multi-phase subsidence monitoring program. |
| SGMA-3 | Ongoing | Maintain and manage water related data | Agencies to maintain existing agency-specific data management systems to be combined annually to prepare SGMA Annual Reports. |
| SGMA-4 | Ongoing | SGMA Annual Report | Assemble, process, and evaluate water data for the MCSB Annual Report for SGMA compliance for each water year. |
| SGMA-5 | Ongoing | Five-Year Alternative Plan Updates | Review SGMA requirements such as Sustainable Management Criteria and progress towards achieving sustainability, and review/update demand projections and available water supplies; groundwater model and calibration and forecasts. |
| SGMA-6 | Ongoing | Pursue funding opportunities | Agencies will identify and pursue funding opportunities for projects and management actions as applications become available. |
| **Well Management (WELL)** | | | |
| WELL-1 | Ongoing | Well construction, abandonment, and destruction management | Continue coordination and support with RCDEH on well construction, replacement, abandonment, and best destruction practices. |
| WELL-2 | Ongoing | Expand Groundwater Production Reporting | Consider expansion of requirements for reporting of groundwater extraction to any pumpers that extract more than the de minimis user threshold of 2 AFY or less established by SGMA. |

# 9. Periodic Evaluation

## 9.1 Purpose and Basis

The Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and Mission Springs Water District (MSWD), collectively the Agencies, have prepared this Periodic Evaluation as part of the 2027 Mission Creek Subbasin Alternative Plan Update (2027 MCSB Update). The Periodic Evaluation supports the five-year resubmittal of the 2022 Mission Creek Subbasin Alternative Plan Update (2022 MCSB Update) required by California Water Code Section 10733.6(c) and California Code of Regulations, Title 23, Section 358.2, and the California Department of Water Resources (DWR) review under Section 358.4. It evaluates implementation of the 2022 MCSB Update, groundwater conditions, new information, and whether revisions are needed to continue meeting the sustainability goals for the Mission Creek Subbasin (MCSB).

The 2022 MCSB Update incorporated the preceding evaluation of groundwater management and established the sustainable management crit 9eria (SMCs) used in subsequent Annual Reports. DWR approved that update through its June 2024 periodic review and identified three Recommended Corrective Actions, summarized in Section 1.2.2. This Periodic Evaluation provides the next assessment of implementation and documents the basis for the revisions incorporated in the 2027 MCSB Update, including changes to SMCs at selected Representative Monitoring Sites (RMS), referred to in this 2027 MCSB Update as Key Wells.

Sections 1 through 8 provide updated technical information supporting the Periodic Evaluation. The principal groundwater-condition dataset covers the five water years (WYs) from WY 2019–2020 through WY 2023–2024. Later information is incorporated where identified in the supporting sections (e.g., WY 2024–2025 Annual Report information, updated well surveys, and project and management action (PMA) updates supporting groundwater level forecast modeling).

The Periodic Evaluation addresses the MCSB. Although the Garnet Hill Subarea (GHSA) of the Indio Subbasin is included in cooperative water management planning, its Sustainable Groundwater Management Act (SGMA) evaluation is addressed in the 2027 Indio Subbasin Water Management Plan Update prepared by others (Todd/Rincon, 2026). The GHSA and other adjacent subbasins are considered here for inter-basin coordination and potential effects of MCSB groundwater management.

**Table 9-1** uses the evaluation topics in Title 23, Sections 356.4 and 354.38 as an organizing framework. DWR's implementation guidance distinguishes the five-year resubmittal and review of approved Alternative Plans from the Groundwater Sustainability Plan (GSP)-specific Periodic Evaluation requirements (DWR, 2023). This section provides the Agencies' substantive evaluation supporting the 2022 MCSB Update resubmittal; it is separate from the Elements

Guide, which provides navigation and cross-references to SGMA requirements and the contents of the 2027 MCSB Update.

## 9.2 Evaluation Findings and Continued Sustainability Through 2050

The Periodic Evaluation supports continuation of the 2022 MCSB Update's sustainability goals and management approach, with targeted revisions to the technical basis, SMCs, and PMAs. Groundwater replenishment and other management actions have countered historical groundwater-level declines and supported maintenance of groundwater levels relative to 2009 conditions across much of the MCSB. Available information has not identified groundwater extraction-related land subsidence. These findings support continued implementation of the 2022 MCSB Update, rather than a change in its foundational management objective.

New information since the 2022 MCSB Update was completed and includes five additional WYs of monitoring and water use information, DWR airborne electromagnetic (AEM) data, updated mountain-front recharge estimates, and coordinated Indio Subbasin boundary-flow information. The demand analysis now uses updated housing, employment, and conservation projections for 2025–2050. The DWR AEM data are generally supportive of the hydrogeologic conceptual model (HCM), and the model domain, grid, layering, and hydraulic parameters remain as established for the 2022 MCSB groundwater model.

The revised groundwater-level criteria retain 2009 as the reference year and the existing nine Key Wells. Updated surveys improve elevation accuracy, a longer monitoring record supports recalculation of groundwater-level variability, and contour-based estimates of 2009 groundwater levels improve the provisional 2009 groundwater elevations at Key Wells 03S04E04P001S (4P01) and 03S05E15R001S (15R01) where these data are unavailable. For the 2022 MCSB Update, the minimum (low) 2009 groundwater levels at wells 4P01 and 15R01 were estimated based on the calibrated groundwater model, which is expected to be less accurate in areas without data constraints. Therefore, groundwater level contouring using 2009 data provides a more defensible estimate of 2009 low groundwater levels. Consequently, the changes refine the historical estimates and operational flexibility without replacing the 2009 benchmark. Groundwater storage is evaluated using the Key Well proxy, and the associated storage criteria were therefore revised to reflect the groundwater-level criteria changes. The technical basis and consideration of effects on beneficial uses and users, other sustainability indicators, and neighboring subbasins are presented in Section 6.3.2. Following adoption of the 2027 MCSB Update by the Agency Boards, the Agencies will review and update the SGMA Portal Monitoring Network Module to reflect the adopted 2027 MCSB Update. The review will address Key Well survey elevations, adopted SMCs, and inclusion of the water quality monitoring sites identified in the adopted 2027 MCSB Update, including those that are not Key Wells.

For groundwater quality, nitrate and uranium criteria are retained. Hexavalent chromium (Cr(VI)) is evaluated in the context of historical groundwater quality, applicable drinking-water requirements, and potential groundwater-management-related degradation, without establishing

separate numeric Cr(VI) SMCs. TDS management, salt-loading evaluation, and associated monitoring are being addressed together through the separate Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) effort. Completion of the CV-SNMP is anticipated in 2027. Associated monitoring results are not evaluated in this 2027 MCSB Update, and relevant findings will be considered in a subsequent periodic evaluation of the 2027 MCSB Update.

Continued interferometric synthetic aperture radar (InSAR) review supports assessment of the interim groundwater-level proxy for land subsidence. An additional evaluation of land subsidence by the United States Geological Survey (USGS), anticipated in 2027, will inform the assessment of land subsidence potential and the interim proxy.

The principal management-planning period for this 2027 MCSB Update is 2025 through 2050. Section 7 and Appendix B evaluate the Baseline, Near-Term Projects, and Future Projects scenarios under CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions. Under both climate assumptions, the Near-Term Projects and Future Projects scenarios indicate that implementation of planned PMAs can maintain groundwater levels above the minimum thresholds (MTs) at all nine Key Wells through 2050. These groundwater-level findings are considered together with the modeled water budget and PMA implementation in evaluating continued sustainable management. Baseline scenarios provide comparison cases without the additional PMAs, and they are not the Agencies' selected implementation strategy. Continued and planned PMA implementation, rather than an assumption that no further action is needed, is the basis for the forward-looking finding.

At 2050, simulated cumulative change in groundwater storage relative to 2009 conditions is positive under the CM5 RCP 4.5 scenarios and negative under the MIROC5 RCP 8.5 scenarios. Under MIROC5 RCP 8.5, the Future Projects scenario reduces cumulative storage loss relative to the Baseline and Near-Term Projects scenarios but does not eliminate it by 2050. These modeled basin-wide storage changes are evaluated separately from the Key Well groundwater-level proxy used for the groundwater storage sustainability criteria and inform continued project evaluation and adaptive management.

Maintaining sustainability through 2050 depends on continued replenishment and water conservation, development of the planned recycled water and imported water projects, continued water quality protection, and monitoring of actual conditions. Changes in demands, project timing, supply availability, and monitoring results will be evaluated through the adaptive management process described in Section 8.2. The Agencies will evaluate conditions approaching MTs and adjust management and monitoring as warranted, rather than waiting for the full duration of an undesirable result criterion. Beyond 2050, some Baseline and Near-Term Projects hydrographs show groundwater levels falling below measurable objectives (MOs). At Key Well 03S05E17J01 (17J01), the Near-Term Projects scenario under MIROC5 RCP 8.5 also indicates a MT crossing late in the extended forecast period. These longer-term results inform future project evaluation and adaptive management decisions. The 2025–2050 planning focus is distinct from the 50-year planning and implementation horizon defined in Water Code Section 10721(r) and does not end the commitment to sustainable groundwater management.

**Table 9-1** presents the Periodic Evaluation findings, the 2022 MCSB Update provisions retained or revised, and the continuing implementation and monitoring actions. The "Supporting sections/evidence" column identifies the supporting technical sections, reference documents, and PMAs. Together, the narrative and table constitute the Periodic Evaluation for the 2027 MCSB Update.

## Table 9-1: Periodic Evaluation Findings

| Framework/ criterion reference | Evaluation topic | Evaluation findings and 2027 Plan revisions | Supporting sections/ evidence |
|---|---|---|---|
| **PART A — PERIODIC EVALUATION BY AGENCY \| §356.4** | | | |
| **§356.(a)** | Groundwater conditions and SMC performance.<br>A description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones, and minimum thresholds. | • Groundwater levels: For groundwater levels in the Mission Creek Subbasin (MCSB) periodic review period (water year (WY) 2019-2020 through WY 2023–2024, or the Review Period), all nine groundwater-level representative monitoring sites (RMS) or Key Wells were above the then-applicable minimum thresholds; well 03S04E04P001S (4P01) was only 0.3 foot above its provisional minimum threshold in WY 2023-2024. All of the other eight Key Wells were above their measurable objectives. Note that the provisional minimum threshold for well 4P01 was revised based on new information and a different approach to estimated 2009 groundwater levels at this location as described in **§356.4(c)** below.<br>• Groundwater storage: Groundwater levels for the nine Key Wells are the monitoring proxy for storage. The groundwater-level proxy for storage remained above the measurable objective throughout the Review Period.<br>• Groundwater quality: Nitrate and uranium results in the selected WY 2019–2020 through WY 2023–2024 dataset were below the maximum contaminant level (MCL)-based criteria. Hexavalent Chromium (Cr[VI]) was added based on the State Water Resources Control Board (SWRCB) promulgation of a 10 micrograms per liter MCL for Cr(VI) effective October 1, 2024. This constituent occurs naturally in the MCSB at concentrations above the new MCL. Consequently, Cr(VI) is evaluated against historical conditions and for potential management-related degradation, without separate numeric sustainable management criteria (SMC). Total Dissolved Solids (TDS) management, salt-loading evaluation, and associated monitoring are being addressed together through the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) process. Completion of the CV-SNMP is anticipated in 2027. Associated monitoring results are not evaluated in this 2027 Mission Creek Subbasin Alternative Plan Update (2027 MCSB Update), and relevant findings will be considered in a subsequent Alternative Plan update.<br>• Land Subsidence: Available information has not identified groundwater-extraction-related land subsidence in the MCSB historically. Interferometric synthetic aperture radar (InSAR) review and minimum thresholds for groundwater levels that are related to 2009 groundwater levels, and are nominally lower than historical groundwater levels, are used to evaluate the potential for land subsidence pending a United States Geological Survey (USGS) evaluation expected to be completed in 2027.<br>• Seawater intrusion and depletion of interconnected surface waters remain excluded.<br>• No interim milestones or Sustainable Groundwater Management Act (SGMA) Management Areas are established because the MCSB has met all of its sustainability criteria through the Review Period. | 4.5–4.6; 6.2–6.6; Tables 6-2 through 6-6; WY 2023–2024 Annual Report, as summarized in 6.3.1. |
| **§356.4(b)** | PMA implementation and effects.<br>A description of the implementation of any projects or management actions, and the effect on groundwater conditions resulting from those projects or management actions. | Imported-water replenishment continued at the Mission Creek Groundwater Replenishment Facility (MC-GRF) as supplies became available during the Review Period, including 5,275 acre-feet (AF) in WY 2022–2023 and 5,432 AF in WY 2023–2024. Recharge has countered historical groundwater-level declines and supports maintenance of groundwater levels relative to 2009 conditions. The Agencies plan to continue groundwater replenishment at the MC-GRF with existing and future agreements.<br>Conservation, septic-to-sewer conversion, water-quality monitoring, annual reporting, and interagency coordination continued. Completed work includes the Regional Conservation Study in October 2024, construction of the Nancy Wright Regional Water Reclamation Facility (Nancy Wright RWRF) in 2024 and startup in early 2025, and completion of the regional Domestic and Small Water System Well Inventory and Vulnerability Assessment in 2026. The Nancy Wright RWRF currently returns treated water to the Garnet Hill Subarea (GHSA) of the Indio Subbasin, not the MCSB. Additional treatment and conveyance back to the MCSB, and the Horton Wastewater Treatment Plant (WWTP) recycled-water system, remain planned supply components in the near-term. Future additional sources of water for groundwater replenishment include the Delta Conveyance Project and the Sites Reservoir Project, with forecast implementation assumptions described in Section 7 and Appendix B. The Lake Perris Dam Seepage Recovery Project was removed from consideration. Under both CM5 RCP 4.5 and MIROC5 RCP 8.5 climate assumptions, the Near-Term Projects and Future Projects forecasts indicate that planned PMAs can maintain groundwater levels above the minimum thresholds at all nine Key Wells through 2050. Negative cumulative modeled storage change under MIROC5 RCP 8.5 and groundwater-level declines beyond 2050 reinforce the importance of continued project implementation, monitoring, and adaptive management. | 4.5; 7.5; Appendix B; 8.2–8.9; 8.10.1; WS-1 through WS-5; WQ-1; SGMA-1 through SGMA-5. |

| Framework/ criterion reference | Evaluation topic | Evaluation findings and 2027 Plan revisions | Supporting sections/ evidence |
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| **§356.4(c)** | Reconsideration of 2022 MCSB Update elements and criteria.<br>Elements of the Plan, including the basin setting, management areas, or the identification of undesirable results, and the setting of minimum thresholds and measurable objectives, shall be reconsidered and revisions proposed, if necessary. | The existing nine Key Wells and the 2009 groundwater-level reference year are retained. A resurvey of all Key Wells to the North American Vertical Datum of 1988 (NAVD88) by CVWD for its wells in 2023, DWA for its well in 2024, and MSWD for its wells in 2025, improved the survey accuracy. The measurable objective basis of 2009 minimum groundwater levels is retained for all Key Wells. However, the provisional groundwater-model-derived minimum water-level estimates for Key Wells 4P01 and 03S05E15R001S (15R01) were replaced with minimum groundwater level estimates at these locations using groundwater contour interpretation of the MCSB using all wells with 2009 water level data. This change is considered an improvement on the method of estimating the minimum groundwater level. The revised measurable objectives remain provisional because there are no groundwater-level measurements for these wells in 2009. Minimum thresholds for all nine Key Wells are recalculated using the extended groundwater-level record. This is also considered an improvement on the method to estimate groundwater level variability, as Well 4P01 now uses its own variability record rather than the average of the other Key Wells. The measurable objective for 4P01 changes from 732.3 to 708.0 feet above mean sea level (msl) NAVD88 (24.3 feet lower) and its minimum threshold changes from 724.4 to 703.4 feet above msl NAVD88 (21.0 feet lower). The well 15R01 measurable objective changes from 698.7 to 690.1 feet above msl NAVD88 (8.6 feet lower), and its minimum threshold changes from 692.0 to 686.6 feet above msl NAVD88 (5.4 feet lower). Groundwater-storage and interim land subsidence proxies continue to use the groundwater-level criteria as a basis, and therefore, also were modified based on the revisions to groundwater level measurable objectives and minimum thresholds described above.<br>Cr(VI) was added as a constituent of concern to groundwater quality. However, because it exists naturally above its MCL in the MCSB, no separate numeric measurable objective, minimum threshold, or undesirable-result criterion is added. | 6.1–6.6; particularly 6.3.2 and Tables 6-2 through 6-4. |
| **§356.4(d)** | Basin setting, new information, and water balance.<br>An evaluation of the basin setting in light of significant new information or changes in water use, and an explanation of any significant changes. If the Agency's evaluation shows that the basin is experiencing overdraft conditions, the Agency shall include an assessment of measures to mitigate that overdraft. | The updated basin setting incorporates five additional water years of monitoring and water-use information, California Department of Water Resources (DWR) airborne electromagnetic (AEM) data, updated mountain-front recharge estimates, and coordinated Indio Subbasin boundary-flow information. The demand analysis now uses updated housing, employment, and conservation assumptions for 2025–2050.<br>The hydrogeologic framework is retained, with new information providing improved support for the hydrogeologic conceptual model. For the historical simulation, the updated groundwater model indicates that, although groundwater storage recently declined, it is roughly in balance over the long-term (i.e., 20 years or more). Note that the groundwater modeled budget is not interchangeable with annual-report budgets or the Key Well storage proxy because the MCSB is much larger than the area monitored and because mountain front recharge for annual reporting of the water balance was estimated based on long-term averages (to avoid running the groundwater model for each annual report). Sustainability is assessed using the applicable SMC together with the water budget and PMA implementation, rather than assuming that all storage trends are positive. The MCSB is not in overdraft. Continued replenishment, conservation, recycled-water development, and imported-supply reliability projects address future supply-demand pressures. At 2050, forecast cumulative change in groundwater storage relative to 2009 conditions is positive under the CM5 RCP 4.5 scenarios and negative under the MIROC5 RCP 8.5 scenarios. Under MIROC5 RCP 8.5, the Future Projects scenario reduces cumulative storage loss relative to the Baseline and Near-Term Projects scenarios but does not eliminate it by 2050. | 2.6; 3.1–3.5; 4.4–4.7; 5.3–5.4, 5.7.3.1; 6.3–6.4; 7.5; 8.4–8.5; Appendix B. |
| **§356.4(e)** | Monitoring network overview.<br>A description of the monitoring network within the basin, including whether data gaps exist, or any areas within the basin are represented by data that does not satisfy the requirements of Sections 352.4 and 354.34(c). The description shall include the following: | The monitoring program combines the nine groundwater-level Key Wells with other Agency groundwater-level and production records, water-quality monitoring, and InSAR and benchmark information. These networks serve different purposes and are not interchangeable. The Key Well network is retained; the remaining information needs concerning the separate CV-SNMP effort and the USGS land subsidence evaluation are described in the following entries and in the assessment under **§354.38** below. | 4.4–4.6; 6.3, 6.5–6.6; 8.6–8.8. |
| **§356.4(e)(1)** | Network function, gaps, and improvements.<br>An assessment of monitoring network function with an analysis of data collected to date, identification of data gaps, and the actions necessary to improve the monitoring network, consistent with the requirements of Section 354.38. | Additional observations and updated measuring-point elevations improve the reliability of groundwater-level comparisons. The remaining information needs are completion of the separate CV-SNMP effort, including associated monitoring and consideration of potential TDS SMC, and the USGS evaluation of land subsidence potential. | 5.3; 6.3.2, 6.5; 8.6, WQ-7/WQ-8; 8.7, SGMA-2/SGMA-3; 8.9.1. |
| **§356.4(e)(2)** | Additional data acquisition and timing.<br>If the Agency identifies data gaps, the Plan shall describe a program for the acquisition of additional data sources, including an estimate of the timing of that acquisition, and for incorporation of newly obtained information into the Plan. | Agency groundwater-level and pumping records continue to be collected under the existing monitoring program and incorporated into Agency data systems and annual reports. The separate CV-SNMP effort includes associated monitoring, with completion of the CV-SNMP anticipated in 2027. The USGS land subsidence evaluation is also anticipated in 2027. Relevant findings from these efforts will be considered in subsequent evaluation of the MCSB Alternative Plan. | 6.6.2; 8.6, WQ-7/ WQ-8; 8.7.2–8.7.5. |

| Framework/ criterion reference | Evaluation topic | Evaluation findings and 2027 Plan revisions | Supporting sections/ evidence |
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| **§356.4(e)(3)** | Monitoring priorities.<br>The Plan shall prioritize the installation of new data collection facilities and analysis of new data based on the needs of the basin. | Priorities are to continue the existing groundwater-level and water-quality monitoring, complete the USGS land subsidence assessment, and consider the CV-SNMP and its associated monitoring findings in a subsequent Alternative Plan update. The existing water-quality, land subsidence, data-management, and well-management PMAs provide the implementation mechanisms. | 6.3.2, 6.5–6.6; 8.6–8.8. |
| **§356.4(f)** | Significant new information and resulting revisions.<br>A description of significant new information that has been made available since Plan adoption or amendment, or the last five-year assessment. The description shall also include whether new information warrants changes to any aspect of the Plan, including the evaluation of the basin setting, measurable objectives, minimum thresholds, or the criteria defining undesirable results. | Since the 2022 MCSB Update, significant additions include: DWR AEM products; five additional water years of Agency records and updated NAVD88 surveys; an expanded calibration dataset of 8,554 groundwater-elevation observations from 64 wells; updated Basin Characterization Model (BCM) mountain front recharge and Indio Subbasin-model boundary inputs; Southern California Association of Governments (SCAG) Connect SoCal 2024 housing and employment projections; region-specific conservation estimates; revised imported- and recycled-water supply assumptions; new Cr(VI) regulatory context; subsequent CV-SNMP technical work; and completed or revised PMAs. These additions support the SMC refinements, forecast updates, and implementation changes in this report. The model domain, grid, layering, and hydraulic parameters remain as established for the 2022 MCSB groundwater model. | 1.2.3; 3; 4.2–4.6; 5.3–5.8; 6.3.2, 6.6; 8.3–8.9. |
| **§356.4(g)** | Agency actions, regulations, and ordinances.<br>A description of relevant actions taken by the Agency, including a summary of regulations or ordinances related to the Plan. | Relevant Agency actions include continuing imported-water replenishment, conservation incentives and ordinances, implementation of Water Shortage Contingency Plans, water-use-efficiency planning, drinking-water compliance measures, and coordination with well-permitting and land-use agencies. Section 8 distinguishes measures already implemented from future policy updates and project development.<br>The 2025 Third Amendment to the delivery and exchange agreement between CVWD and the Metropolitan Water District of Southern California (MWD) updated delivery, billing, and payment terms and included a commitment to work toward a long-term extension. | 4.2; 8.4; 8.6.2–8.6.4; 8.8; Agency adoption records. |
| **§356.4(h)** | Enforcement and legal actions.<br>Information describing any enforcement or legal actions taken by the Agency in furtherance of the sustainability goal for the basin. | Temporary implementation of Shortage Levels 1 and 2 during the 2021–2022 statewide drought, including demand-reduction measures and drought-related enforcement actions. The shortage levels were subsequently lifted as drought conditions improved. | 8.4.3. |
| **§356.4(i)** | Completed or proposed Plan amendments.<br>A description of completed or proposed Plan amendments. | The 2027 MCSB Update incorporates updated demand and supply forecasts, an updated historical groundwater model and revised inputs, groundwater-level resurvey for accuracy and SMC refinements, the clarified Cr(VI) evaluation approach, and revisions to the PMA portfolio and numbering. The sustainability goal and the 2009 groundwater-level reference year are retained.<br>These proposed revisions are distinguished from completed projects and from changes to monitoring measurements or survey metadata. Adoption of the 2027 MCSB Update will be documented by the Agencies' resolutions included in an appendix. The adopted report and associated monitoring information will provide the basis for subsequent annual reporting and the next five-year periodic evaluation. | 1.2–1.3; 3–8; Tables 6-2 through 6-6; Appendix G. |
| **§356.4(j)** | Interagency and inter-basin coordination.<br>Where appropriate, a summary of coordination that occurred between multiple Agencies in a single basin, Agencies in hydrologically connected basins, and land use agencies. | CVWD, DWA, and MSWD continue to coordinate through the Management Committee, data sharing, annual reporting, and joint planning. The Desert Hot Springs Subbasin (DHSSB) is a very low-priority subbasin and does not have a Groundwater Sustainability Agency (GSA) with which to coordinate. Coordination with the Indio Subbasin modeling team includes groundwater-flow representation, Garnet Hill fault fluxes, and Whitewater River recharge seepage inputs into the Garnet Hill Subarea (GHSA) of the Indio Subbasin (GHSA is the common overlap area of the two groundwater models used in the MCSB and Indio Subbasin). The 2027 MCSB Update evaluates potential effects of MCSB groundwater-level and water-quality management on adjacent subbasins. Regional demand and imported-water planning, the Regional Urban Water Management Plan (RUWMP), and CV-SNMP development provide additional coordination. The GHSA of the Indio Subbasin remains part of cooperative water-management planning but is evaluated for SGMA purposes under the Indio Subbasin Alternative Plan. These activities support DWR Recommended Corrective Action 2; the supporting boundary-specific information includes SMC relationships, monitoring, aquifer/HCM descriptions, and water-budget assumptions. | 1.4–1.6; 5.2–5.3, 5.6-5.8, 5.7.2–5.7.3; 6.3.2, 6.5–6.6; 8.6, WQ-4/WQ-6/WQ-7; 8.7.1. |

| Framework/ criterion reference | Evaluation topic | Evaluation findings and 2027 Plan revisions | Supporting sections/ evidence |
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| **§356.4(k)** | DWR recommendations and other information.<br>Other information the Agency deems appropriate, along with any information required by the Department to conduct a periodic review as required by Water Code Section 10733. | The 2024 DWR review identified three Recommended Corrective Actions.<br>1. Salt loading/CV-SNMP: Workplans, monitoring, and technical memoranda have advanced the evaluation. The final approved CV-SNMP is not available for this 2027 MCSB Update; completion is anticipated in 2027. The CV-SNMP and its associated monitoring are being addressed together as a separate effort; associated monitoring results are not evaluated here. Relevant findings will be considered in a future Alternative Plan update. The recommendation remains in progress.<br>2. Inter-basin coordination: Updated modeling coordination and the cross-boundary evaluations are documented in the 2027 MCSB Update, with continuing Management Committee and regional coordination. Boundary-specific consistency remains a continuing implementation responsibility.<br>Monitoring-network/Portal consistency: Following adoption of the 2027 MCSB Update by the Agency Boards, the Agencies will complete a comprehensive review and update of the SGMA Portal Monitoring Network Module to reflect the adopted 2027 MCSB Update. The review will verify Key Well survey elevations, update SMC entries to match the adopted values, and confirm inclusion of the water-quality monitoring sites identified in the adopted 2027 MCSB Update, including those that are not Key Wells. | 1.2.2–1.2.3; 5.2–5.3; 6.3.2, 6.6.2; 8.6–8.7; DWR (2024). |
| **PART B — ASSESSMENT AND IMPROVEMENT OF MONITORING NETWORK \| §354.38** | | | |
| **§354.38(a)** | Network uncertainty and sustainability assessment.<br>Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin. | The retained Key Well network supports evaluation of regional groundwater-level conditions and the adopted proxy framework. The longer record and updated surveys for accuracy reduce uncertainty in reported elevations and SMC comparisons. The 2009 groundwater-elevation contour map improves the provisional 2009 groundwater-level estimates at wells 4P01 and 15R01; these estimates remain subject to further evaluation as additional information becomes available.<br>The broader monitoring assessment also considers private-well vulnerability, water-quality coverage, and land subsidence potential. Improvements and remaining limitations are evaluated according to their effect on the sustainability assessment, rather than treating completion of a study or installation of a well as resolution of all uncertainty. | 6.3.2, 6.5–6.6; 8.6–8.9. |
| **§354.38(b)** | Identification of monitoring gaps.<br>Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency | Remaining information needs concern the CV-SNMP, including associated monitoring and consideration of TDS management criteria, and the USGS land subsidence evaluation. Completion of the CV-SNMP and the USGS land subsidence evaluation is anticipated in 2027. Relevant CV-SNMP findings will be considered in a subsequent Alternative Plan update. No other data gaps were identified that prevent use of the existing monitoring network for the overall sustainability assessment. The monitoring network and frequency of monitoring appear to be sufficient for the overall sustainability assessment. | 6.3.2, 6.5–6.6; 8.6, WQ-7/WQ-8; 8.9.1. |
| **§354.38(c)** | Description of identified gaps.<br>If the monitoring network contains data gaps, the Plan shall include a description of the following: | The following entries describe the locations, reasons, and local circumstances associated with the identified gaps. | 6.3.2, 6.5–6.6. |
| **§354.38(c)(1)** | Gap locations and reasons.<br>The location and reason for data gaps in the monitoring network. | Basin-wide – TDS management, salt-loading evaluation, associated monitoring, and evaluation of related data gaps are being addressed together under the CV-SNMP scope and schedule approved by the Colorado River Regional Water Quality Control Board. Completion of the CV-SNMP is anticipated in 2027.<br>Basin-wide – The USGS is conducting an evaluation of potential land subsidence in the MCSB, with completion anticipated in 2027. | 6.5–6.6; 8.6–8.7. |
| **§354.38(c)(2)** | Local limitations on monitoring.<br>Local issues and circumstances that limit or prevent monitoring. | There are no local limitations on monitoring. | |
| **§354.38(d)** | Steps to improve monitoring before the next evaluation.<br>Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites. | No new monitoring is proposed under the 2027 MCSB Update. Monitoring associated with the CV-SNMP is being addressed as part of that separate effort. Completion of the CV-SNMP is anticipated in 2027. | 8.6, WQ-7/WQ-8; 8.7, SGMA-2 through SGMA-6; 8.8–8.9. |

| Framework/ criterion reference | Evaluation topic | Evaluation findings and 2027 Plan revisions | Supporting sections/ evidence |
|---|---|---|---|
| **§354.38(e)** | Adaptive monitoring frequency and density.<br>Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following: | The adaptive-management process evaluates monitoring results, investigates changes in conditions, and adjusts PMAs and monitoring as warranted. Site-specific follow-up is based on the nature of the condition and the information needed to determine its cause and evaluate the management response. The following circumstances guide that review. | 8.2; 6.3.4, 6.5–6.6. |
| **§354.38(e)(1)** | MT exceedances.<br>Minimum threshold exceedances. | Conditions approaching a minimum threshold warrant evaluation under the adaptive-management process, without waiting for a basin-wide undesirable result. A groundwater-level undesirable result requires the same four or more Key Wells to have annual-average elevations below their minimum thresholds in each of three consecutive water years. A groundwater-storage undesirable result occurs when the arithmetic mean of the nine Key Well annual-average groundwater elevations is below the average minimum threshold in each of three consecutive water years. For water quality, nitrate and uranium are assessed under the retained framework reference of their respective drinking water MCLs. A Cr(VI) MCL exceedance is handled under drinking-water requirements and is not an exceedance of a separately adopted Cr(VI) minimum threshold because Cr(VI) is naturally occurring above the MCL in the MCSB. Evidence of management-related worsening prompts investigation and consideration of additional actions or SMCs. | 6.3.1–6.3.4; 6.4; 6.6.2–6.6.4; 8.2. |
| **§354.38(e)(2)** | Spatial and temporal variability.<br>Highly variable spatial or temporal conditions. | The WY 2023–2024 Annual Report describes generally limited seasonal groundwater-level variability, with greater fluctuations near the MC-GRF in response to replenishment and in areas of greater groundwater pumping. InSAR data identify localized downward displacement near the former Edom Hill Landfill, interpreted as landfill settlement rather than groundwater-withdrawal-related land subsidence. | 4.5–4.6; 5.4.4, 5.7.3; 6.3.2, 6.5; 8.2; WY 2023–2024 Annual Report, Sections 3.2–3.3 and 8.4.1. |
| **§354.38(e)(3)** | Beneficial uses and users.<br>Adverse impacts to beneficial uses and users of groundwater. | Section 6 reports no dry or failed wells and no identified groundwater-extraction-related land subsidence damage. The groundwater-level criteria were reviewed in relation to available well-construction and pump-setting information. A potential pump-setting limitation is identified at one groundwater production well, for which lowering the pump is identified as mitigation. These findings support continuation of the management approach but do not establish complete characterization since private well pump setting data are limited.<br>The regional domestic/small-system inventory provides additional information for identifying MCSB users and residual vulnerabilities. | 2.6; 6.3.1–6.3.2, 6.5–6.6; 8.2, 8.8, 8.9.1. |
| **§354.38(e)(4)** | Effects on adjacent basins.<br>The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin. | The updated model represents exchange across the Mission Creek, Banning, and Garnet Hill faults, including coordinated Indio Subbasin-model inputs. The potential for MCSB management to affect groundwater levels, groundwater quality, storage, and land subsidence conditions in neighboring subbasins is evaluated and does not indicate any known potential impacts.<br>Changes near a boundary that may impair an adjacent subbasin's sustainability warrant joint evaluation of monitoring data, boundary-flow assumptions, and the relevant management criteria. Monitoring and modeling coordination continue through the Agencies and the Indio Subbasin team. The GHSA's own SGMA sustainability findings remain within the Indio Subbasin Alternative Plan rather than this MCSB Periodic Evaluation. | 1; 5.2–5.3, 5.6-5.8, 5.7.2–5.7.3; 6.3.2, 6.5–6.6; 8.7.1. |

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