2021-2022 Engineer's Report on Water Supply and Replenishment Assessment

Prepared for:

Coachella Valley Water District

Prepared by:

West Yost Associates

April 2021

FINAL REPORT | APRIL 2021

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PREPARED FOR

Coachella Valley Water District

COACHELLA VALLEY WATER DISTRICT

PREPARED BY

WEST YOST
Water. Engineered.

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Project No. 943-80-20-02

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LIST OF ACRONYMS AND ABBREVIATIONS

af	Acre-Feet
afy	Acre-Feet Per Year
Annual Report	SGMA Annual Report
AOB	Area of Benefit
Basin	Coachella Valley Groundwater Basin
CEQA	California Environmental Quality Act
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CVWMP	Coachella Valley Water Management Plan
CWA	Coachella Water Authority
CY	Calendar Year
DCP	Drought Contingency Plan
DWA	Desert Water Agency
DWR	Department of Water Resources
EIR	Environmental Impact Report

ft	Feet
FY	Fiscal Year
GLC	Glorious Lands Company
GRF	Groundwater Replenishment Facility
GRP	Groundwater Replenishment Program
GSP	Groundwater Sustainability Plan
IWA	Indio Water Authority
MSWD	Mission Springs Water District
MVP	Mid-Valley Pipeline
MWD	Metropolitan Water District of Southern California
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PEIR	Programmatic Environmental Impact Report
PPR	Present Perfected Rights
QSA	Quantification Settlement Agreement
RAC	Replenishment Assessment Charge
Rosedale	Rosedale Rio Bravo Water Storage District
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
TEL	Thomas E. Levy
WRP	Water Reclamation Plant
WRSC	Whitewater River Stormwater Channel
WY	Water Year

2021 Engineer's Report
Water Supply and Replenishment Assessment

EXECUTIVE SUMMARY

This 2021-2022 Engineer's Report on Water Supply and Replenishment Assessment (Engineer's Report) was prepared for the Coachella Valley Water District (CVWD) to comply with State Water Code Sections 31630-31639 (Water Code). The Water Code allows CVWD to conduct groundwater replenishment programs (GRPs) and levy and collect water replenishment assessments from non-exempt groundwater producers that benefit from the GRPs. Groundwater pumpers that produce 25 acre-feet per year (afy) or less are considered Minimal pumpers and are exempt from assessments.

Pursuant to the Water Code, the Engineer's Report must provide a summary of the groundwater supply conditions, the need for continued replenishment, a description of current GRPs, and recommendations for Replenishment Assessment Charges (RAC) to be levied upon groundwater production from the three defined areas that benefit from the GRP: the Mission Creek Subbasin Area of Benefit (AOB), the West Whitewater River Subbasin AOB, and the East Whitewater River Subbasin AOB.

The GRPs are essential to the water management plans that were developed to prevent conditions of overdraft and any associated undesirable results in all three AOBs. Groundwater replenishment is accomplished through two mechanisms: direct replenishment, by which imported surface water is percolated directly into the aquifer, and in-lieu replenishment, by which imported surface water or recycled water is provided to groundwater pumpers for irrigation purposes, thus reducing or eliminating their use of pumped groundwater.

Mission Creek Subbasin Area of Benefit

Historical declines in groundwater levels in the Mission Creek Subbasin led to a joint management agreement between CVWD and Desert Water Agency (DWA) to cooperatively conduct the Mission Creek Subbasin Management Area GRP in 2003.

In calendar year (CY) 2020, total assessable production in the management area was 14,244 acre-feet (af), an increase of 9 percent from 2019. The assessable production in CVWD's Mission Creek Subbasin AOB was 4,655 af, which was approximately 33 percent of total production within the management area.

Replenishment of the Mission Creek Subbasin Management Area is currently accomplished via the artificial recharge of State Water Project (SWP) water exchanged for Colorado River water at the Mission Creek Groundwater Replenishment Facility (GRF). In CY 2020, a total of 1,768 af of Colorado River water was delivered to the Mission Creek GRF for direct replenishment.

Since 2003, groundwater levels have risen and stabilized throughout the subbasin, which is evidence that implementation of the GRP has effectively abated the overdraft that preceded it. Continued artificial replenishment is necessary to maintain these positive trends and prevent a return to overdraft in the future.

To fund the costs associated with the GRP in the Mission Creek Subbasin AOB, CVWD staff recommend no change to the $135.52/af RAC that became effective on July 1, 2017.

West Whitewater River Subbasin Area of Benefit

Historical declines in groundwater levels in the western portion of the Whitewater River Subbasin led to a joint management agreement between CVWD and DWA to cooperatively conduct the West Whitewater River Subbasin Management Area GRP in 1976.

In CY 2020, total assessable production and surface water diversions in the management area totaled 153,979 af, which represents a 6 percent increase from CY 2019. Assessable production in CVWD's West Whitewater River Subbasin AOB was 117,770 af, which was approximately 76 percent of the total assessable production and diversions within the management area.

Direct replenishment of the West Whitewater River Subbasin Management Area is currently accomplished via artificial recharge of Colorado River water at the Whitewater River GRF and artificial recharge of Colorado River water conveyed through the Mid-Valley Pipeline (MVP) to the Palm Desert GRF. In CY 2020, a total of 126,487 af of SWP water exchanged for Colorado River water was delivered to the Whitewater GRF, and a total of 9,700 af of Colorado River water was delivered to the Palm Desert GRF for direct replenishment. CVWD also provides imported Colorado River water directly from the MVP or a blend of Colorado River water and recycled water to 22 golf courses in the AOB to offset groundwater production as a form of in-lieu replenishment.

Future planned replenishment projects include the completion of Phase II of the Palm Desert GRF and the connection of approximately 23 additional golf courses to the non-potable water system between 2021 and 2031.

Since 1976, groundwater levels across most of the AOB have stabilized or are rising, which is evidence that implementation of the GRP has effectively abated the overdraft that preceded it. Groundwater levels have continued to gradually decline in a localized area of the northeastern portion of the AOB near Sun City/Palm Desert and north of the Bermuda Dunes. Continued artificial replenishment is necessary to maintain the increasing trends in groundwater levels, slow or reverse the declining trends in some areas, and prevent conditions of overdraft in the future.

To fund the costs associated with the GRP in the West Whitewater River Subbasin AOB, CVWD staff recommend that the $143.80/af RAC that became effective on July 1, 2017 be increased by $21.57/af, to $165.37/af, effective July 1, 2021.

East Whitewater River Subbasin Area of Benefit

Historical declines in groundwater levels in the eastern portion of the Whitewater River Subbasin led to CVWD's GRP for the East Whitewater River Subbasin AOB. Direct replenishment in the East Whitewater River Subbasin AOB began in 1997, at the Dike 4 Pilot Facility, and the GRP became effective in 2005.

In CY 2020, assessable production in the AOB was 117,925 af, which represents less than a one percent increase from 2019.

Direct replenishment of the AOB is currently accomplished via the artificial recharge of Colorado River water at the Thomas E. Levy (TEL) GRF. In CY 2020, a total of 37,536 af of Colorado River water was delivered for direct replenishment at the TEL GRF. CVWD delivers imported Colorado River water from the Coachella Canal to meet the agricultural irrigation needs in the East Valley. CVWD also provides imported Colorado River water to 32 golf courses in the AOB to offset groundwater production as a form

of in-lieu replenishment. Nine holes of one golf course in the AOB receive a blend of recycled water and Coachella Canal water from Wastewater Reclamation Plant (WRP) 7, and one golf course receives water from the Coachella Canal via the MVP.

Future planned replenishment-related projects include: (i) Phase 2 of the Oasis Project,[1] which is a source-substitution project that involves the construction of a canal water distribution system in the Oasis area to provide imported Colorado River water for agricultural irrigation on the Oasis slope; (ii) development of a recycled water project at WRP 4 for additional source substitution; and (iii) the connection of three additional golf courses to Coachella Canal water.

Since 2005, groundwater levels across most of the AOB have risen significantly, and historical artesian conditions have returned to a wide area of the AOB, which is evidence that implementation of the GRP has effectively abated the overdraft that preceded it. Continued artificial replenishment is necessary to maintain these positive trends and prevent a return to overdraft in the future.

To fund the costs associated with the GRP in the East Whitewater River Subbasin AOB, CVWD staff recommend that the $66.00/af RAC that became effective on July 1, 2016 be increased by $6.27/af, to $72.27/af, effective July 1, 2021.

[1] Phase 1 of the Oasis Project included two reservoirs to provide additional storage and operational improvements/flexibility in the Oasis area. Construction on this phase of the project was completed in December 2020.

1.0 INTRODUCTION

This report is the 2021-2022 Engineer's Report on Water Supply and Replenishment Assessment (Engineer's Report) for the three Coachella Valley Water District (CVWD) Areas of Benefit (AOBs) within the Coachella Valley Groundwater Basin (Basin): the Mission Creek Subbasin AOB, the West Whitewater River Subbasin AOB, and the East Whitewater River Subbasin AOB.

This section describes the purpose of the Engineer's Report, the Basin setting, the use of Sustainable Groundwater Management Act (SGMA) Annual Reports for describing the conditions of groundwater supplies, and the report's organization.

1.1 Purpose of the Engineer's Report

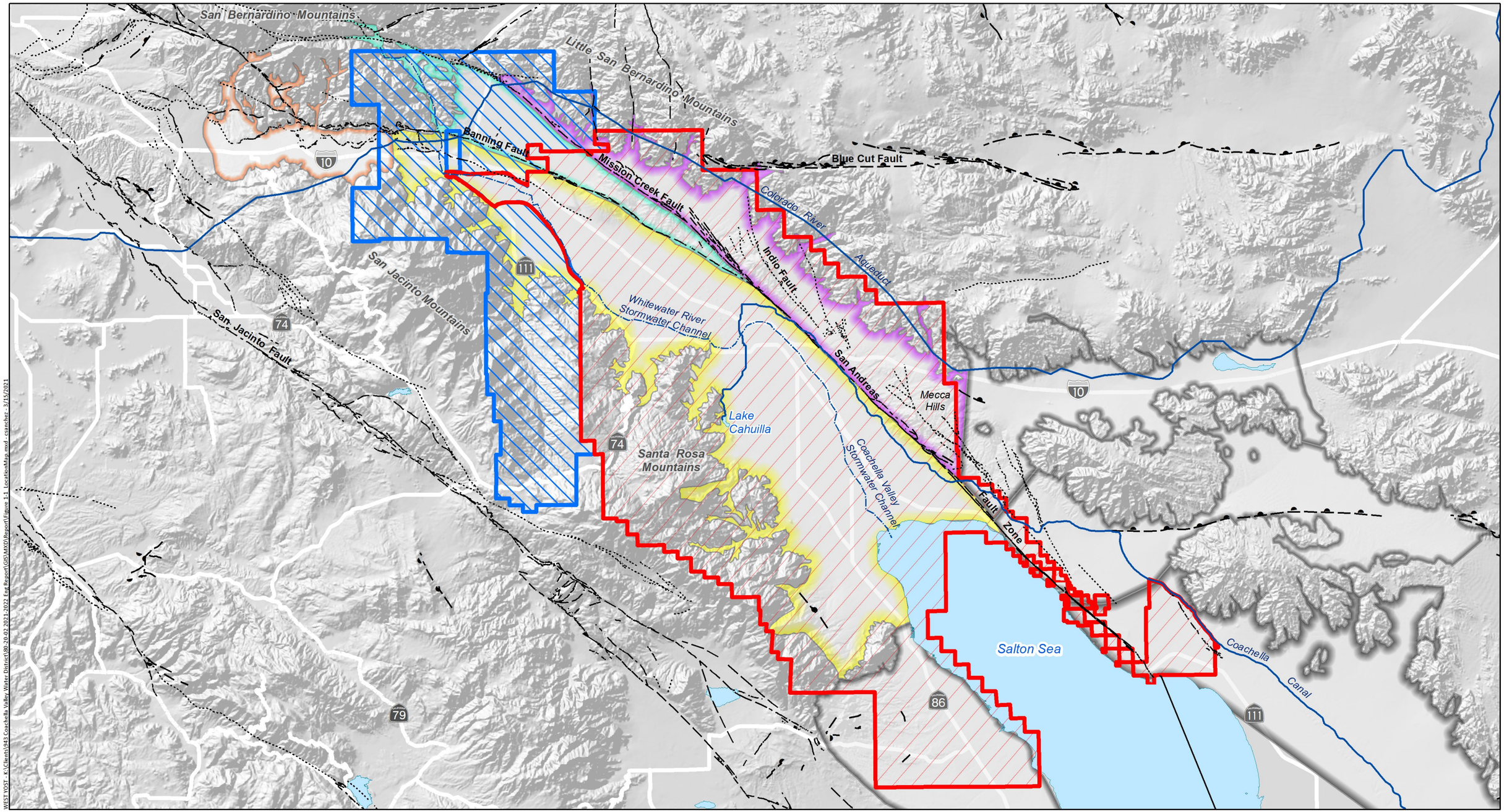
This report is prepared to comply with State Water Code Sections 31630-31639 (Water Code). The Water Code provides CVWD with the authority to levy and collect water replenishment assessments within its AOBs to implement groundwater replenishment programs (GRPs). Groundwater replenishment is necessary to mitigate overdraft of the Basin and associated undesirable results. To levy and collect these assessments, CVWD is required to prepare and present to its Board of Directors an annual Engineer's Report on the conditions of the groundwater supplies and recommended Replenishment Assessment Charges (RACs) to be levied upon groundwater production within each AOB.

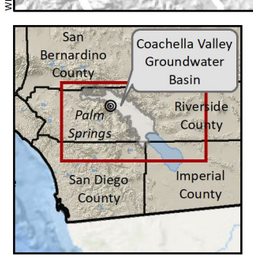
The Engineer's Report must include the following information:

- A summary of the groundwater supply conditions.
- An assessment of the need for replenishment.
- A description of the replenishment programs, including the source and amount of replenishment waters, the costs associated with the GRP, the areas directly and indirectly benefited by the GRP, and the amount of groundwater produced in each area during the prior year.
- A recommendation for the RAC to be levied on each AOB.

1.2 Basin Description and Setting

The Basin (Department of Water Resources [DWR] Groundwater Basin No. 7-021) resides in the northwestern corner of a great structural depression called the Salton Trough, which extends from the San Gorgonio Pass to the Gulf of California. The Basin is about 65 miles long on a northwest-southeast orientation and covers approximately 440 square miles. Figure 1-1 shows the Basin bounded on the southwest by the crystalline bedrock of the Peninsular Ranges (San Jacinto and Santa Rosa Mountains) and on the northwest by the crystalline bedrock of the Transverse Ranges (San Bernardino and Little San Bernardino Mountains). The Basin is located within the western portion of the Colorado Desert Hydrologic Area.





Subbasins of the Coachella Valley Groundwater Basin

- Whitewater River Subbasin**
- Mission Creek Subbasin
- San Gorgonio Pass Subbasin
- Desert Hot Springs Subbasin

- Coachella Valley Water District
- Desert Water Agency
- Water Body
- Other Groundwater Basin

Geology

Quaternary Fault Traces

- <150 Yrs
- <15,000 Yrs
- <130,000 Yrs
- <750,000 Yrs
- <1,600,000 Yrs

* The northern reach of the Whitewater River is referred to as the Whitewater River Stormwater Channel. The southern 23-mile reach is referred to as the Coachella Valley Stormwater Channel.

** The subbasin is indentified as the Indio Subbasin by DWR and the Whitewater River Subbasin by the USGS. This report will identify it as the Whitewater River Subbasin.

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Figure 1-1

Coachella Valley Groundwater Basin

Coachella Valley Water District
2021-2022 Engineer's Report

Precipitation on the Basin floor is typically less than five inches per year. Natural recharge to the Basin is primarily from the recharge of mountain-front runoff. The Whitewater River is the major drainage course in the Basin. Perennial flows exist in the portion of this drainage within the San Bernardino Mountains. Along the valley floor, these perennial flows become ephemeral in the northern reach of the drainage, referred to as the Whitewater River Stormwater Channel (WRSC). The constructed downstream extension of the channel, known as the Coachella Valley Stormwater Channel (CVSC), conveys storm water, groundwater entering subsurface drains, and discharge from National Pollutant Discharge Elimination System (NPDES)-permitted wastewater facilities to the Salton Sea. Recharge to the Basin occurs in the Whitewater River and other tributaries to the Basin, in the WRSC and CVSC, at constructed recharge facilities, through percolation of irrigation return flows, and as subsurface inflow from the surrounding mountains and groundwater basins.

The Basin is filled with up to 12,000 feet (ft) of sediments; the upper 2,000 ft constitute the aquifer system that is the main source of groundwater supply in the region. The aquifer-system sediments were eroded from the surrounding mountains and deposited in the Basin on alluvial fans, alluvial plains, and lacustrine (lake) environments as interbedded, discontinuous layers of gravels, sands, silts, and clays. The sediments tend to be finer-grained in the southeastern portions of the Basin due to the greater distance from the mountainous source areas and the lower-energy depositional environments, such as historical Lake Cahuilla.

The Basin is cross-cut by several geologic faults, which have displaced sediments and created low-permeability zones along the fault traces that act as barriers to groundwater flow. The DWR has defined four subbasins within the Basin that are separated by geologic faults, bedrock constrictions, or changes in formation permeability that limit and control the movement of groundwater: the Indio Subbasin (DWR Subbasin 7-021.01),[2] the Mission Creek Subbasin (7-021.02), the Desert Hot Springs Subbasin (7-021.03), and the San Gorgonio Pass Subbasin (7-021.04) (DWR, 1964). Figure 1-1 shows the locations of these subbasins.

While groundwater generally flows from northwest to southeast in the Basin, the structural features present result in groundwater conditions that vary significantly between subbasins. In the San Gorgonio Pass Subbasin, unconfined groundwater occurs throughout and flows generally west to east, where it flows over a bedrock constriction and into the Whitewater River Subbasin.

In the Whitewater River Subbasin, groundwater typically flows from the forebay areas along the surrounding mountain-fronts toward the valley floor and then southeast toward the distal portions of the Basin near the Salton Sea. The aquifer system is unconfined in the forebay areas. In the southeast portion of the Whitewater River Subbasin, the predominance of fine-grained sediments at depth has created three distinct aquifer systems:

- A semi-perched aquifer up to 100 ft thick that is persistent across much of the area southeast of the City of Indio. The fine-grain units that cause the perched conditions are likely a barrier to deep percolation of surface water.
- An upper aquifer up to 300 ft thick that is present across most of the area. The upper aquifer is unconfined except in the areas of the semi-perched aquifer where it is semi-confined.

[2] The subbasin is identified as the Indio Subbasin in DWR Bulletin 108 (1964) and Bulletin 118 (2003). However, the subbasin is identified as the Whitewater River Subbasin by the USGS. This report identifies the subbasin as the Whitewater River Subbasin for consistency with the naming of the East and West Whitewater River AOBs.

- A lower aquifer that is 500-2,000 ft thick and is the most productive portion of the Basin. In the southeast portion of the Basin, the lower aquifer is confined and is separated from the upper aquifer by a fine-grained unit that is 100-200 ft thick.

In the Mission Creek Subbasin, groundwater typically flows from northwest to southeast. The aquifer system is up to 2,000 ft thick and is predominantly unconfined. Portions of the aquifer along the Banning Fault northwest of the Seven Palms Ridge area are semi-confined as evidenced by historically flowing artesian wells in the area.

Overall, groundwater flow in the Desert Hot Springs Subbasin is to the southeast but is locally variable due to faulting. The aquifer system is poorly understood due to relatively poor water quality, which has limited the development of groundwater resources in the area. Faulting in the northern portion of the subbasin has resulted in thermal mineral waters in the aquifer with temperatures up to 250 degrees Fahrenheit. These thermal waters are used by several spas in the area.

1.3 The Sustainable Groundwater Management Act

California Senate Bills 1168 and 1319 and Assembly Bill 1739, signed by the Governor in September 2014, amended the California Water Code to establish the SGMA. The SGMA requires the development of groundwater sustainability plans (GSPs) for all basins designated medium- and high-priority by the DWR, mandates the creation of local groundwater sustainability agencies (GSAs) to develop and implement the plans, and outlines the guidelines and schedule for complying with the SGMA. The SGMA recognized the efforts many agencies had made in developing and implementing groundwater management by allowing existing groundwater management plans to be submitted as an alternative to preparing a GSP (Alternative Plan). Under the SGMA, medium- and high-priority basins must achieve groundwater sustainability within 20 years of implementing their GSPs.

The DWR has designated the Whitewater River, Mission Creek, and San Gorgonio Pass Subbasins as medium-priority subbasins not in critical overdraft. The Desert Hot Springs Subbasin was designated as a very low-priority subbasin.

On November 6, 2015, CVWD submitted a "Notice of Election to Become a Groundwater Sustainability Agency" to the DWR for the portions of the Whitewater River Subbasin and Mission Creek Subbasin that are within CVWD's service areas. As an exclusive GSA over these areas, CVWD collaborated with Desert Water Agency (DWA), Indio Water Authority (IWA), and Coachella Water Authority (CWA) as exclusive GSAs to submit the 2010 Coachella Valley Water Management Plan (CVWMP) Update (CVWD, 2012) as an Alternative Plan for the Whitewater River Subbasin. CVWD, DWA, and Mission Springs Water District (MSWD) collaborated to submit the 2013 Mission Creek/Garnet Hill Subbasins Water Management Plan (MC/GH Subbasins WMP) as an Alternative Plan for the Mission Creek Subbasin. Both Alternative Plans were submitted to the DWR on December 29, 2016 and approved on July 17, 2019. The respective agencies for each subbasin have since initiated the first five-year update mandated by DWR, due by January 1, 2022.

The SGMA placed significant new requirements on GSAs to collect and report water management information to the DWR to demonstrate sustainable groundwater management through implementation of GSPs or Alternative Plans. On February 1, 2018, the DWR notified all GSAs who submitted Alternative Plans that they would be required to submit annual reports pursuant to the SGMA by April 1, 2018 and every year thereafter. The first SGMA Annual Reports (Annual Reports) for the Indio (referred to herein as the Whitewater River) and Mission Creek Subbasins were submitted for Water Year (WY) 2016-2017 on

March 31, 2018. The Annual Reports include information on groundwater elevations, groundwater extractions, total water use, and change in groundwater storage. The most recent Annual Reports for WY 2019-2020 are utilized herein to describe groundwater supply conditions. Annual Reports are available through CVWD's SGMA webpage.[3]

1.4 Organization of Report

This Engineer's Report is organized into six sections:

- *Executive Summary* describes the main conclusions of the Engineer's Report
- *Section 1 – Introduction* describes the purpose of the Engineer's Report, the Basin setting, the use of the Annual Reports for describing the conditions of the groundwater supplies, and the organization of the report
- *Section 2 – Overview and History of Groundwater Replenishment and Assessment* summarizes the history and need for groundwater replenishment, the available sources of water for replenishment, and the groundwater replenishment and assessment programs in each of the AOBs
- *Section 3 – Mission Creek Subbasin AOB* describes the replenishment and pumping activities for CY 2020, the condition of groundwater supplies, and a recommended RAC rate for the Mission Creek Subbasin AOB
- *Section 4 – West Whitewater River Subbasin AOB* describes the replenishment and pumping activities for CY 2020, the condition of groundwater supplies, and a recommended RAC rate for the West Whitewater River Subbasin AOB
- *Section 5 – East Whitewater River Subbasin AOB* describes the replenishment and pumping activities for CY 2020, the condition of groundwater supplies, and a recommended RAC rate for the East Whitewater River Subbasin AOB
- *Section 6 – References* lists the publications referenced in this report

[3] CVWD SGMA webpage

2.0 OVERVIEW AND HISTORY OF GROUNDWATER REPLENISHMENT AND ASSESSMENT

CVWD provides artificial replenishment of the Basin through its GRP. Groundwater replenishment is accomplished through two mechanisms: direct replenishment, in which imported surface water is percolated directly into the aquifer; and in-lieu replenishment, in which imported surface or recycled water is provided to groundwater pumpers for irrigation purposes, thus reducing or eliminating their use of pumped groundwater.

This section summarizes the history and need for groundwater replenishment, the available sources of water for replenishment, and the groundwater replenishment and assessment programs.

2.1 Definition and General History of Overdraft Leading to the Groundwater Replenishment Program

This section describes the definition and general history of overdraft leading to the GRP in the Basin.

2.1.1 Definition of Overdraft

The principal goal of the GRP is to arrest, reduce, and ultimately eliminate groundwater overdraft. According to DWR Bulletin 118-80 (DWR, 1980):

> "Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long-term exceeds the amount of water that recharges the basin. Overdraft is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. Overdraft can lead to increased extraction costs, land subsidence, water quality degradation, and environmental impacts."

DWR Bulletin 118-80 states that overdraft conditions in a basin become "critical" when:

> "[…] continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."

DWR Bulletin 160-93 (DWR, 1994) expands on Bulletin 118-80's "period of years" as follows:

> "Such a period of time must be long enough to produce a record that, when averaged, approximates the long-term average hydrologic conditions for the basin."

DWR Bulletin 160-09 (DWR, 2009) synthesizes the definitions provided in Bulletins 118-80 and 160-93 as follows:

> "Overdraft is defined as the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years, during which the water supply conditions approximate average conditions."

The above is the definition of overdraft used herein. As noted in Bulletin 118-80, however, groundwater overdraft is characterized not only by a prolonged decline in quantities of groundwater in storage over

long-term average hydrologic conditions but also by secondary adverse effects, including decreased well yields, increased groundwater extraction costs, water quality degradation, sea-water intrusion, land subsidence, and environmental impacts.

2.1.2 General History of Overdraft in the Basin

The historical occurrence of overdraft in the Basin was caused by the rapid development of agriculture in the area during the early 1900s, followed by increasing urban and recreational development in the later 1900s. This growth led to increased water demands that were met by groundwater pumping, which exceeded the natural recharge to the Basin and caused overdraft conditions.

Figure 2-1 is a map with time-history charts of measured water levels at key wells within the Basin. This figure demonstrates the historical overdraft conditions characterized by the long-term declining trends in groundwater levels across the Basin that necessitated the development of the GRP. The time-history charts show the major milestones of the GRP. Note how groundwater levels stabilized or recovered after the implementation of the GRP activities. As Figure 2-1 demonstrates, the GRP has been effective at reducing or eliminating overdraft conditions in the Basin. Continuance of the GRP is necessary to combat future overdraft conditions and meet the sustainability goals of SGMA.

2.1.3 History of Water Management by CVWD

The Coachella Valley County Water District, predecessor to CVWD, was formed in 1918 as an independent special district with the primary responsibility of protecting local water resources. One of the first actions taken by the district was to claim the rights to the Whitewater River to ensure that natural inflows of water to the valley would stay in the valley and benefit the Basin.

Early settlers of the Coachella Valley also recognized that action was needed to address declining water levels resulting from groundwater extraction. Their concern led CVWD to enter into an agreement with the United States in 1934 for the construction of the Coachella Branch of the All-American Canal (Coachella Canal) to bring Colorado River water to the Coachella Valley. Since 1949, the Coachella Canal has been providing water for irrigation use in the eastern Coachella Valley as an alternate supply to groundwater pumping.

In 1962 and 1963, respectively, DWA and CVWD entered into separate contracts with the State of California to purchase water from the State Water Project (SWP). CVWD and DWA then entered into an agreement with the Metropolitan Water District of Southern California (MWD) to exchange water from MWD's Colorado River Aqueduct, which crosses the western portion of the Coachella Valley near Whitewater, for CVWD and DWA allocations of SWP water.

In 1967, as agriculture and urban development continued in the Basin, further increasing water demands, CVWD began a water reclamation program. The water reclamation program was created to provide a reliable source of local non-potable water for irrigation and supplement the imported Colorado River water brought into the East Valley via the Coachella Canal.

In 1973, artificial recharge of imported water from the Colorado River Aqueduct began at the Whitewater River GRF in the western portion of the Whitewater River Subbasin. In fiscal years (FYs) 1978-1979 and 1980-1981, DWA and CVWD, respectively, began assessing non-exempt producers to cover the costs of replenishment, thereby creating the GRP.

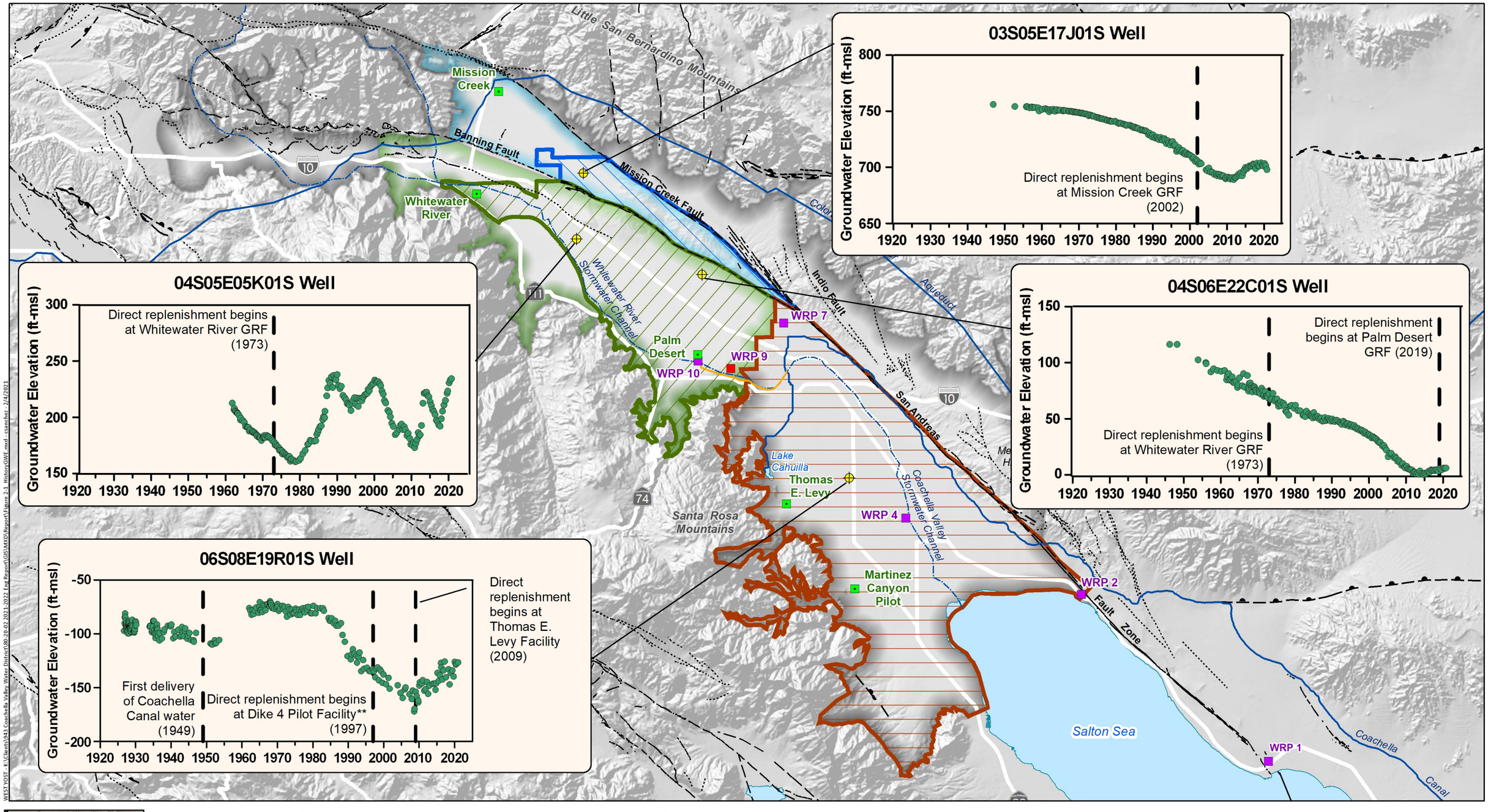


Figure 2-1

Areas of Benefit, Groundwater Replenishment,and the Response of Groundwater Levels

Coachella Valley Water District
2021-2022 Engineer's Report

The GRP has since been expanded to include: direct replenishment in the eastern portion of the Whitewater River Subbasin, beginning in 1997; direct replenishment in the Mission Creek Subbasin, beginning in 2002; and in-lieu replenishment, which is accomplished by providing supplemental waters to groundwater pumpers for non-potable uses (e.g., irrigation) to reduce or eliminate groundwater pumping.

2.2 Management Areas and Areas of Benefit

Both CVWD and DWA are permitted by the Water Code to replenish the Basin and to levy and collect groundwater replenishment assessments from any non-exempt groundwater producer or surface water diverter within their jurisdictions who benefits from groundwater replenishment. The two agencies are not required to implement assessment procedures jointly or identically.

The jurisdictional areas that benefit, either directly or indirectly, from the GRP and where CVWD or DWA levy replenishment assessments are termed Areas of Benefit (AOBs). There are three AOBs within CVWD's boundary: the Mission Creek Subbasin AOB, the West Whitewater River Subbasin AOB, and the East Whitewater River Subbasin AOB. CVWD and DWA have entered into water management agreements to implement the GRP in areas of the Basin that include both of their respective jurisdictional boundaries. Figure 2-1 shows the extent of CVWD's AOBs and the two management areas cooperatively managed by CVWD and DWA: the West Whitewater River Subbasin Management Area and the Mission Creek Subbasin Management Area.

2.2.1 Mission Creek Subbasin Management Area and Area of Benefit

The Mission Creek Subbasin Management Area covers the entirety of the Mission Creek Subbasin. It was initially formed on April 8, 2003 when CVWD and DWA entered into the Mission Creek Groundwater Replenishment Agreement for the cooperative management of groundwater replenishment in the area using SWP water exchanged for Colorado River water for direct replenishment. On December 7, 2004, the agreement was amended by the Mission Creek Settlement Agreement to include the MSWD. On July 15, 2014, CVWD and DWA executed a new Mission Creek Groundwater Replenishment Agreement to update and replace the 2003 agreement as amended.

Figure 2-1 shows CVWD's Mission Creek Subbasin AOB, the portion of the Mission Creek Subbasin Management Area residing within CVWD's boundary.

2.2.2 West Whitewater River Subbasin Management Area and Area of Benefit

The West Whitewater River Subbasin Management Area is in the western portion of the Whitewater River Subbasin. It was officially formed on July 1, 1976 when CVWD and DWA entered into an agreement to cooperatively manage and cost-share in the GRP for this area by using SWP water exchanged for Colorado River water for direct replenishment. The 1976 agreement was subsequently revised by the December 15, 1992 Water Management Agreement, which was later superseded by the July 15, 2014 Whitewater Water Management Agreement.

Figure 2-1 shows CVWD's West Whitewater River Subbasin AOB, the portion of the West Whitewater River Subbasin Management Area within CVWD's boundary.

2.2.3 East Whitewater River Subbasin Area of Benefit

Figure 2-1 shows the CVWD East Whitewater River Subbasin AOB, which covers the eastern portion of the Whitewater River Subbasin and extends from the eastern boundary of the West Whitewater River Subbasin AOB to the shoreline of the Salton Sea. Since this area is entirely within CVWD's service area, a management agreement was not necessary. While in-lieu replenishment in this area began in 1949 with the completion of the Coachella Canal and direct replenishment began in 1997 with the Dike 4 Pilot Facility, CVWD did not designate it as an AOB until 2004.

2.3 Replenishment Water Sources

The supplemental water sources used for replenishment in the GRP include:

- Imported Colorado River water delivered via the Coachella Canal
- SWP water exchanged for Colorado River water with MWD
- Recycled water from CVWD water reclamation plants (WRPs)
- Other non-SWP supplemental water

These sources of replenishment water are described in more detail below.

2.3.1 Colorado River Water

2.3.1.1 Coachella Canal

The 122-mile long Coachella Canal was completed in 1948 and began operating in 1949. Water delivered to the Coachella Valley via the Coachella Canal is diverted into the All-American Canal from the Imperial Dam, located 18 miles upstream of Yuma, Arizona. It is then diverted into the Coachella Canal at "Drop 1" of the All-American Canal, approximately 20 miles west of Yuma. The Coachella Canal conveys water northward into the eastern Coachella Valley along the east bank of the Salton Sea, continuing northerly past Mecca and Thermal to Indio, where it bends westerly, then continues southerly and southwesterly to La Quinta, where it flows into Lake Cahuilla (constructed by CVWD in 1968 to provide operational storage for Colorado River water). The Coachella Canal and Lake Cahuilla system distributes water for irrigation to approximately 65,000 acres of agricultural land in the eastern Coachella Valley through nearly 500 miles of buried delivery laterals (CVRWMG, 2010). The capacity of the Coachella Canal is approximately 1,500 cfs (CVWD, 2002a).

2.3.1.2 Colorado River Water Allocations

CVWD is part of the 1931 Seven Party Agreement that allocates California's apportionment of Colorado River water. CVWD was included in Priority 3(a) of the agreement in a group of California agricultural agencies, collectively allocated 3.85 million acre-feet per year (afy). In 2003, the Quantification Settlement Agreement (QSA) negotiated between CVWD, Imperial Irrigation District (IID), San Diego County Water Authority (SDWCA) and MWD was signed, which supplemented the 1931 agreement. Under the QSA, CVWD has a Colorado River water base allotment of 330,000 afy.[4]

[4] CVWD's effective allotment is equal to the base allotment of 330,000 afy minus 29,000 afy in reductions, as shown in Table 2-1.

In addition, CVWD has executed transfer agreements for additional block amounts of Colorado River water. The transfer agreements included the following:

- 1988 MWD/IID Approval Agreement for 20,000 afy
- IID to CVWD-First Transfer for 50,000 afy
- IID to CVWD-Second Transfer of 23,000 afy

Table 2-1 shows a breakdown of CVWD's total allocation of 394,000 afy of Colorado River water in 2020. The second transfer from the IID to CVWD will continue to increase from 23,000 afy in 2020 to 53,000 afy in 2026, for a total allocation of 424,000 afy by 2026. In 2021, CVWD's total allocation of Colorado River water is 399,000 af.

Table 2-1. CVWD Colorado River Water Supply under the QSA in 2020

Description	Total, af
Base Entitlement	330,000
Less Coachella Canal Lining (to SDCWA[a])	(26,000)
Less Miscellaneous/Indian PPRs[b]	(3,000)
1988 MWD/IID Approval Agreement[c]	20,000
First IID/CVWD Transfer	50,000
Second IID/CVWD Transfer	23,000
Total	**394,000**

(a) San Diego County Water Authority.
(b) Indian Present Perfected Rights.
(c) The 2019 Second Amendment to the Delivery and Exchange Agreement allows CVWD to receive 15,000 AF of the 20,000 AF 1988 MWD/IID Approval Agreement at the Whitewater River GRF through 2026; MWD retains 5,000 AF. In CY 2020, CVWD received delivery of 15,000 AF at the Whitewater River GRF.

2.3.1.3 QSA SWP Transfer

The QSA provides CVWD with a 35,000 afy transfer of SWP water from MWD. This SWP water is exchanged for Colorado River water and can be delivered at Imperial Dam for delivery via the Coachella Canal to the eastern portion of the Whitewater River Subbasin or can be delivered via the Colorado River Aqueduct for delivery to the western portion of the Whitewater River Subbasin.

2.3.1.4 Drought Contingency Plan

Colorado River supplies face threats to reliability from the long-term drought and increasing variability in snowpack, which have greatly reduced storage in the Colorado River system. On March 19, 2019, the Governors' representatives of the seven Colorado River Basin States and key water districts formally submitted Drought Contingency Plans (DCPs) to Congress for immediate implementation. The DCPs are intended to safeguard the reliability of Colorado River supplies and arrest declining water elevations at both Lake Mead and Lake Powell. On April 8, 2019, the United States House and Senate both approved the DCP, and on April 16, 2019 it was signed into law by the president. On May 20, 2019 the lower basin

parties[5] agreed to the Lower Basin DCP, which requires lower states to forgo deliveries beyond the levels agreed to in the 2007 Interim Guidelines. Basin-wide cutbacks would go into effect if Lake Mead drops to an elevation of 1,075 ft, with California's cutbacks beginning when Lake Mead elevation drops to 1,045 ft. Forgone water deliveries would remain in Lake Mead. Under the MWD/CVWD Interagency Agreement, CVWD would contribute seven percent of the required water contribution from California, and MWD would contribute the majority of the remaining contribution. In WY 2019, above average stream flows were observed throughout much of the Colorado River Basin and, as a result, cutbacks were not implemented for WY 2020.

2.3.2 State Water Project

The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants operated by the DWR. The SWP delivers water from the Sierra Nevada Mountains through the Sacramento-San Joaquin Delta to 29 SWP water-supply contractors throughout California who serve over 27 million Californian homes, businesses, and farms. The SWP was designed to deliver about 4.2 million afy. CVWD and DWA are two of the 29 SWP contractors who entered into a Water Supply Contract with the DWR in 1963 providing a base (Table A) allocation of SWP water. There is currently no infrastructure to physically deliver SWP water to CVWD or DWA. To exercise SWP deliveries, CVWD and DWA exchange SWP water with MWD for an equal amount of Colorado River water, which can be delivered via the Colorado River Aqueduct.

2.3.2.1 Table A Allocations

CVWD and DWA's original contracted Table A allocations were 23,100 afy and 38,100 afy, respectively. CVWD and DWA have since executed agreements for additional block amounts of SWP water, increasing their total Table A allocations:

- In 2003, the agencies executed a Delivery and Exchange Agreement with MWD for 100,000 afy as a permanent transfer—88,100 afy for CVWD and 11,900 afy for DWA
- In 2004, CVWD purchased an additional 9,900 afy of SWP Table A water from the Tulare Lake Basin Water Storage District
- In 2007 (effective in 2010), the agencies executed two water transfer agreements for SWP Table A water with:
  - The Berrenda Mesa Water District for 16,000 afy—12,000 afy for CVWD and 4,000 afy for DWA
  - The Tulare Lake Basin Water Storage District for 7,000 afy—5,250 afy for CVWD and 1,750 afy for DWA

Together, the original allocations and additional block amounts result in a total allocation of 194,100 afy of SWP Table A water available to CVWD and DWA—138,350 afy for CVWD and 55,750 afy for DWA.

[5] As defined in the Colorado River Compact of 1922, the "States of the Lower Division" means the States of Arizona, California, and Nevada.

2.3.2.2 SWP Supplemental Water

CVWD and DWA also purchase supplemental water, as available, from the SWP on the spot market, including through the Dry Year Transfer Program and the Turn-Back Water Pool Program (Pool A and Pool B).

In 2008, CVWD and DWA executed agreements to augment their SWP water supplies with water made available from the Yuba River Accord. CVWD and DWA executed separate Dry Year Water Purchase Program participation agreements with the DWR to acquire SWP supplemental water available through the DWR's Yuba Water Purchase Agreement under the Yuba River Accord. The DWR initiated Yuba Dry Year Water Purchase Programs to augment water supplies in anticipation of decreased water availability to SWP Contractors resulting from dry hydrologic conditions and/or regulatory constraints. The amount of water available for purchase varies each year and is based on the DWR's determination of the Water Year Classification. It is estimated that CVWD and DWA may be able to purchase up to 4 percent (5,600 afy) and 1.3 percent (1,820 afy) of Yuba Water Purchase Agreement water, respectively, under their participation agreements. These agreements provide for the exchange of these supplies with MWD for Colorado River water in accordance with existing exchange agreements.

2.3.2.3 SWP Exchange to MWD

Table 2-2 lists CVWD and DWA allocations of SWP delivered to MWD in 2020. The final allocation of SWP Table A amounts in 2020 was 20 percent.

Table 2-2. State Water Project Exchange Delivery to Metropolitan Water District in 2020

Description	CVWD, af	DWA, af	Total, af
Table A[(a)]	27,670	11,150	38,820
Article 21	-	-	-
Turnback Pool A and B	-	-	-
Multi-Year Pool	-	-	-
Dry Year (Yuba)	973	167	1,140
Flex Storage Payback	-	-	-
Article 56 (c) "Carryover" from 2019 delivered in 2020[(b)]	69,175	27,875	97,050
GLC/Rosedale[(c)]	19,000	0	19,000
CVWD QSA Transfer[(d)]	35,000	0	35,000
Total Delivered to MWD	**151,820**	**39,192**	**191,012**

(a) CVWD and DWA's Table A allocation includes the original Table A allocation quantity as well as additional block amounts of SWP that they have purchased or exchanged with other agencies, as described in Section 2.3.2.1, for a total of 194,100 af. The 2020 SWP Allocation was 20 percent, resulting in 27,670 af for CVWD and 11,150 af for DWA, for a total of 38,820 af of Table A.

(b) In 2019, MWD was able to take delivery of 48,526 of the 145,576 af Table A water, and the remainder was stored in CVWD's and DWA's San Luis Reservoir Carryover Accounts. MWD took delivery of the 97,050 af balance in 2020.

(c) MWD was unable to take delivery of CVWD's 2019 purchase of 9,500 af of Glorious Lands Company (GLC)/Rosedale water during CY 2019. That 9,500 af was stored in CVWD's San Luis Reservoir Carryover Account until CY 2020. In CY 2020, MWD delivered the CY 2019 GLC/Rosedale water to CVWD along with CVWD's 2020 purchase of an additional 9,500 af of GLC/Rosedale water.

(d) The QSA provided CVWD a transfer of MWD Table A water in the amount of 35,000 afy. This SWP water is exchanged for Colorado River water and can be delivered at Imperial Dam for delivery via the Coachella Canal to the eastern portion of the Whitewater River Subbasin or can be delivered via the Colorado River Aqueduct for delivery to the western portion of the Whitewater River Subbasin.

2.3.2.4 Advance Delivery Agreement

In 1984, CVWD and DWA entered into an Advance Delivery Agreement with MWD whereby MWD could store up to 600,000 af of Colorado River water in the Basin as an advance delivery of SWP exchange water. This agreement was later amended to increase the maximum pre-delivery amount to 800,000 af. MWD can deliver SWP exchange water to CVWD and DWA as wet water or as a deduction from its Advance Delivery storage account. The existing Exchange and Advance Delivery Agreements were updated and consolidated in 2019 into a single amended and restated agreement. At the end of 2020, MWD's balance in its Advance Delivery storage account was 313,400 af.

2.3.2.5 Apportionment of State Water Project Exchange Water

In accordance with the 2014 Mission Creek Groundwater Replenishment Agreement, CVWD and DWA proportionally distribute SWP Exchange Water between the West Whitewater River Subbasin and Mission Creek Subbasin Management Areas based on the calculated annual groundwater production and surface water diversions within each area.

Since deliveries to the Mission Creek Subbasin Management Area began in 2002, an average of 92 percent of the SWP Exchange Water received by CVWD and DWA has been delivered to the West Whitewater River Subbasin for replenishment with the remaining 8 percent delivered to the Mission Creek Subbasin Management Area. However, the production comparison between these management areas since 2002 is currently 93 percent to 7 percent, respectively. Cumulative replenishment water deliveries between the Mission Creek Subbasin and West Whitewater Subbasin Management Areas will be balanced as determined by CVWD, DWA, and MSWD Management Committee, but no later than 20 years from December 7, 2004.

2.3.2.6 SWP Reliability

Each year, the DWR allocates a percentage of the total Table A amounts that it will be capable of delivering to SWP contractors based on variable hydrologic conditions, environmental constraints in the Sacramento-San Joaquin Delta, and operational constraints, among other factors. In 2020, SWP contractors received 20 percent of their Table A allocations.

Every two years, the DWR publishes a SWP Delivery Capability Report that estimates the long-term average deliverability of SWP water. In August 2020, DWR issued its 2019 Delivery Capability Report, which includes an evaluation of deliveries through CY 2018. The 2019 Report uses the same 82-year hydrologic record used for the 2017 Report (1922 through 2003) for its computer model simulations of potential hydrologic conditions (e.g., runoff and precipitation patterns) for long-term average delivery and deliveries during typical wet years and typical dry years. However, the analysis accounts for the land use, upstream flow regulations, and sea levels characteristic of 2019. The DWR judges this 82-year period to be sufficient to provide a reasonable range of potential hydrologic conditions from wet years to critically dry years. The 2019 Report estimates the long-term average deliverability at 58 percent of maximum Table A amounts—four points lower than the figure presented in the 2017 Report. Additionally, the 2019 Report shows that there is a decreasing trend in the long-term average deliverability of maximum Table A amounts, from 58 percent under current (2019) conditions to 52 percent under future (2040) conditions.

2.3.2.7 Delta Conveyance

On April 29, 2019 under Executive Order N-10-19, Governor Gavin Newsom directed his administration to develop a climate-resilient water portfolio to meet California's water needs through the 21st century,

including modernizing conveyance through the Bay Delta. Under this direction, the DWR launched an environmental review and planning process for the Delta Conveyance Project (DCP), a single tunnel to convey water from the Sacramento River to existing State and federal pumping facilities. The DWR will lead the environmental planning process, which is estimated to last two-and-a-half to three years and will provide ongoing oversight of the Delta Conveyance Design and Construction Authority (DCA).

The original plan was to build two tunnels under what was termed the California WaterFix. In May 2019, DWR rescinded its approval of the WaterFix project and began planning for a single tunnel. As of 2020, the capital cost of the full, two-tunnel DCP was estimated at about $15.9 billion (2017 estimate adjusted to 2020 dollars using a 4 percent inflation factor).

In November 2020, CVWD and DWA agreed to continue participation in DCP and to advance funds for planning costs during 2021 and 2022.

2.3.2.8 Sites Reservoir Project

The proposed Sites Reservoir Project would be a large off-stream reservoir in the Sacramento Valley. Its operation will be integrated with the SWP to provide more flexibility to meet both demands and environmental needs, especially in dry and critical years. The project would collect unregulated winter flood flows from the Sacramento River, diverting the water upstream of the Sacramento-San Joaquin River Delta and pumping it into an artificial lake (Sites Reservoir).

The proposed 1.3 to 1.8 million af project, which is divided into four phases, has an anticipated online date of 2032 and an estimated total construction cost between $3.2 billion and $5.2 billion. On July 21, 2018, the state awarded $816 million in Proposition 1 funding to build the reservoir. The $4 billion balance of construction costs will be funded by more than two dozen water agencies that have shown interest in the project.

CVWD contributed a total of $1.11 million to work completed in Phase 1 of the Sites Reservoir Project. On January 22, 2019, the CVWD Board of Directors authorized participation in the first year of Phase 2 based on a 10,000-af volume subscription, and on August 11, 2020, authorized continuing participation in Phase 2 through December 31, 2021. Participation in Phase 2 includes authorization to provide a total of $1.0 million for Phase 2 tasks (environmental documents, preliminary engineering, state and federal permits). Sites Reservoir was originally estimated to cost $5.1 billion, but after a value engineering analysis was completed in 2020, the estimated project cost was reduced to about $3.0 billion. At the close of 2020, President Trump signed the 2021 federal spending bill authorizing $13.7 million of federal funds for the Sites Reservoir Project. This funding, authorized by the Water Infrastructure Improvements for the Nation (WIIN) Act, was appropriated to the Bureau of Reclamation to advance the Sites Reservoir. With the passage of this legislation, Congress has now appropriated roughly $23.7 million in WIIN Act funding to the Bureau of Reclamation for the Sites Reservoir. The Sites Reservoir Project previously received a $449 million loan from the USDA in 2018, and a grant for $816 million from the State of California through the Proposition 1 Water Storage and Investment Program (WSIP). The Sites Reservoir Project is also included in Governor Newsom's 2020 Water Resilience Portfolio.

2.3.3 Other Supplemental Water

In 2003, CVWD and MWD entered into a one-time agreement for MWD to return 32,000 af of the Colorado River water received because of water conservation measures taken by CVWD in Palo Verde

prior to the execution of the QSA. From 2007-2009, MWD delivered this volume of Colorado River water to CVWD for direct replenishment at the Whitewater River GRF.

In 2008, CVWD executed an Agreement with the Rosedale Rio Bravo Water Storage District (Rosedale) for a one-time transfer of 10,000 af of banked Kern River flood water. From 2008-2012, CVWD exchanged this water with MWD for the delivery of Colorado River water.

In 2008, DWA executed an Exchange Agreement with MWD for the delivery of non-SWP supplemental water to replenish water extracted by CPV-Sentinel Energy, Inc. From 2008-2011, about 8,350 af of Colorado River water was directly replenished at the Mission Creek GRF in conjunction with this agreement.

In 2010, CVWD executed an agreement with DMB Pacific, Inc. for a one-time transfer of 8,393 af of Nickel water made available through the Kern County Water Agency's Kern River Restoration and Water Supply Program. In 2010, CVWD exchanged this water with MWD for delivery of Colorado River water.

In 2012, CVWD executed an Assignment Agreement with the Glorious Lands Company (GLC), which transferred the existing Amended Water Supply Agreement between GLC and Rosedale to CVWD. CVWD will receive up to 9,500 afy from Rosedale through 2035. CVWD will exchange this water with MWD for the delivery of Colorado River water. MWD delivered CVWD's 2019 and 2020 GLC/Rosedale water purchases during CY 2020, for a total delivery of 19,000 af in 2020 (9,500 af for each 2019 and 2020). The 2021 delivery schedule provides for MWD to deliver the 2021 GLC/Rosedale water purchase to CVWD in CY 2021.

2.3.4 Recycled Water

Wastewater originating within the CVWD service area is conveyed to and treated at five CVWD WRPs. Currently, recycled water from two of the WRPs (WRPs 7 and 10) is used for golf course and green-belt irrigation. The water treated at the remaining three WRPs (WRPs 1, 2, and 4) is discharged to percolation/evaporation ponds or the CVSC. WRP 9, which produced recycled water, was formally decommissioned in 2016. Because recycled water is a local, reliable water supply, CVWD plans to expand its use in the Basin.

2.4 Direct and In-Lieu Replenishment

CVWD conducts replenishment through the following mechanisms:

- Direct replenishment through the delivery and infiltration of imported water at recharge basins overlying the Basin
- In-lieu replenishment, which occurs when groundwater users in the Basin are provided alternative water sources (Colorado River water from the Coachella Canal or a blend of Colorado River water and recycled water from WRPs 7 and 10) to meet non-potable demands that would have otherwise been met from groundwater extractions

Figure 2-1 shows the facilities used for replenishment. Additional GRP details are provided in Sections 3 to 5.

2.4.1 Mission Creek Subbasin Management Area and Area of Benefit

Direct replenishment with imported water from the Colorado River Aqueduct began in 2002 at the Mission Creek Groundwater Replenishment Facility (GRF). Figure 2-1 shows the location of the Mission Creek GRF

at the base of the Little San Bernardino Mountains. From 2002-2020, a total of 167,044 af of Colorado River water was delivered to the Mission Creek GRF for replenishment of the management area.

There are no existing facilities for in-lieu replenishment in the Mission Creek Subbasin AOB.

2.4.2 West Whitewater River Subbasin Management Area and Area of Benefit

Direct replenishment with imported water from the Colorado River Aqueduct began in 1973 at the Whitewater River GRF and from the MVP in 2019 at the Palm Desert GRF. Figure 2-1 shows the locations of the two facilities in the northern and southern ends of the AOB. From 1973-2020, a total of approximately 3.8 million af of imported water from the Colorado River has been delivered to the West Whitewater River Subbasin AOB facilities for replenishment of the management area.

The West Whitewater River Subbasin AOB is also replenished via in-lieu methods by delivering water to customers for non-potable uses to offset groundwater production. Non-potable water delivery to golf courses in the AOB began in 1967. In 2009, CVWD completed the first portion of the Mid-Valley Pipeline (MVP). The MVP currently conveys imported Colorado River water from the Coachella Canal to users along its reach. The MVP terminates at WRP 10 where it delivers Coachella Canal water to supplement the recycled water supply for customers in the AOB. Figure 2-1 shows the locations of the Coachella Canal, the MVP, and WRP 10 in the southern portion of the AOB. At full build-out, the MVP will have the potential to supply non-potable water to over 50 golf courses in the Palm Desert/Rancho Mirage/Indian Wells area.

While it is located in the East Whitewater River Subbasin AOB, WRP 7 has served a blend of canal water and recycled water to two golf courses in the West Whitewater River Subbasin AOB since 1997. Figure 2-1 shows the location of WRP 7.

2.4.3 East Whitewater River Subbasin Area of Benefit

Direct replenishment with imported water from the Coachella Canal began in 1997 at the Dike 4 Pilot Facility, predecessor to the Thomas E. Levy (TEL) GRF. Direct replenishment of imported water from the Coachella Canal also occurred at the Martinez Canyon GRF from 2005 to 2013 as a pilot replenishment program. Figure 2-1 shows the locations of the TEL and Martinez Canyon GRFs at the base of the Santa Rosa Mountains. From 1997-2020, a total of 450,425 af of Colorado River water was delivered to the TEL and Martinez Canyon GRFs for replenishment of the AOB.

The East Whitewater River Subbasin AOB is also replenished via in-lieu methods by delivering imported water for non-potable uses to customers to offset groundwater production. CVWD delivers imported Colorado River water from the Coachella Canal for irrigation to farmers, golf courses, and other non-potable water users as a substitute for groundwater pumping. Since 1997, WRP 7 has served a blend of canal water and recycled water to 9 holes of one golf course in the AOB. Figure 2-1 shows the locations of the Coachella Canal and WRP 7 in the northern portion of the AOB.

2.5 Groundwater Replenishment Program Assessment

This section describes CVWD's authority to assess and the funding mechanisms for the GRP, and the methods of determining production. It also describes cost of services studies used to develop fair and equitable rates and recommendations for potential rate adjustments and how conservation has impacted the RAC rates.

2.5.1 Authority to Assess

Water Code Sections 31630-31639 authorize CVWD to levy and collect water replenishment assessments for the purpose of replenishing groundwater supplies within CVWD boundaries. The Water Code defines production, producer, and Minimal pumper for replenishment and assessment purposes as follows:

> "Production" or "to produce" means the extraction of groundwater by pumping or any other method within the boundaries of the district or the diversion of surface supplies within the district that naturally replenish the groundwater supplies within the district and are used therein.
>
> "Producer" means any individual, partnership, association or group of individuals, lessee, firm, private corporation, or any public agency or public corporation, including, but not limited to, CVWD.
>
> "Minimal pumper" means any producer who produces 25 af or less in any year. Production by Minimal pumpers is exempt from assessment.

The Water Code states that assessments may be levied upon all water production within an AOB (other than that produced by Minimal pumpers), provided that the assessment charge is uniform throughout said AOB.

2.5.2 Funding Mechanisms

2.5.2.1 Replenishment Assessment Charge

The RAC is a monetary assessment per af of groundwater extracted authorized by the Water Code. The RAC is uniformly applied within each AOB to producers who extract more than 25 afy of groundwater. The RAC for each AOB is determined based on the costs and revenues of the GRP for the AOB. RACs are limited to certain specified costs, as explained below.

In the initial 12 years of operation of the West Whitewater River Subbasin AOB GRP, only the Variable Operation, Maintenance, Power, and Replacement component of the Transportation Charge, and the Delta Water Charge for the SWP could be included in the calculation. However, in 1991, the Legislature passed, and the Governor signed into law AB 1070. This bill continues to limit the charges assessable against production but includes an additional component of the Transportation Charge: the Off-Aqueduct Power component. Under the Water Code, CVWD has also been allowed to include in its calculations surplus or excess water charges, payments to DWA for similar payments by DWA to the State, the cost of importing and recharging water from sources other than the SWP, and the cost of treating and distributing recycled water.

The RACs considered in this report are based on the most recent and reliable information available with respect to applicable costs. The costs included in the calculation of the RAC for each AOB are included in their respective sections of this report.

2.5.2.2 Coachella Valley Water District State Water Project Tax

In 1959, the voters of California approved and adopted the Burns-Porter Act (DWR Bond Act-Water Code Section 12930) and, in so doing, approved the use of local taxes when a local agency's board of directors determines such use to be necessary to fund that agency's water contract obligations. CVWD's Board of Directors determined that such a tax was necessary to carry out those obligations, which were incurred

pursuant to CVWD's long-term plan to eliminate groundwater overdraft through replenishment that would benefit the entire Coachella Valley. This property tax has been levied on all property within the CVWD boundary since 1967.

Imported water supplies delivered through the SWP are an important component in helping CVWD to fulfill the dual needs of meeting customer supply demands and meeting the goal of a sustainable aquifer. Since the last Board-approved tax increase to $0.10/$100 of assessed valuation (AV) in 2013, additional funding is needed to ensure the reliability of the SWP. In addition to routine maintenance needs, additional funding is also necessary for unanticipated repairs (e.g. Oroville spillway). Other expenditures include projects to improve supply reliability, including the Delta Conveyance Project and other water augmentation projects that use the SWP system. In order to fulfill the financial commitments for these additional costs, CVWD's Board approved the total SWP tax to $0.11/$100 of AV on April 13, 2021.

2.5.3 Methods for Determining Groundwater Production

In accordance with Section 31638.5 of the Water Code, producers who produce greater than 25 afy, including artesian flowing groundwater, are required to have water-measuring devices installed on all wells or other water producing facilities and report the total amount produced from all wells to CVWD on a monthly basis. Minimal pumpers are exempt from this provision.

Producers submit a water production statement on a CVWD-approved form with their RAC payment each month or enter into a Water Production Metering Agreement with CVWD to have CVWD staff measure and report groundwater production. If no statement of production is furnished, CVWD calculates production based on energy consumption records (in kilowatt-hours) and the results of well pump tests, indicating unit energy consumption per af of production (in kilowatt-hours per af).

If no energy consumption records are available, CVWD computes the groundwater production based on the consumptive use of water. Consumptive use is computed by multiplying the irrigated acreage for each crop type using CVWD's crop report (conducted semiannually) by a water consumption factor for each crop. The water consumption factor is based on published crop evapotranspiration requirements, an allowance for leaching, and an irrigation efficiency factor. Other water consumption factors are used to compute production for water not used for irrigation. Production is computed by subtracting any metered deliveries of Coachella Canal water or recycled water.

If the total metered, estimated, or computed annual amount of production for any producer is 25 af or less, that entity is designated a Minimal pumper and is exempt from the RAC for that year. Minimal pumpers are reevaluated as necessary.

2.5.4 Cost of Service Study

In early 2020, the Board of Directors authorized Carollo Engineers, Inc. to conduct a five-year Cost of Service Study to develop fair and equitable rates and recommendations for potential rate adjustments necessary to cover operating cost increases and critical investment in CVWD infrastructure. The Cost of Service Study for the Mission Creek Subbasin AOB, West Whitewater River Subbasin AOB, and East Whitewater River Subbasin AOB was completed in April 2021. The RACs recommended herein are in line with the 2021 Cost of Service Study. This is available on CVWD's rate changes web page.

2.5.5 Effects of Conservation

Water conservation may also become an important driver for future RAC rates. Reduced groundwater production, associated with water conservation, benefits the groundwater basin and is an important element of the 2010 CVWMP Update and the MC/GH Subbasins WMP. The cost of this benefit is reflected in increasing RAC rates that result from ongoing GRP costs that must be divided by lower groundwater production amounts.

Governor Brown's executive order, dated April 1, 2015, responded to drought conditions in California and mandated a 25 percent reduction in water used by public water systems in California. To achieve this mandate, CVWD was initially tasked with reducing water use by 36 percent (later by 32 percent), as were several other local public water systems. In addition, the Governor recommended that golf courses using groundwater reduce their water use by 25 percent. Together, these changes would have equated to an approximately 20 percent reduction in groundwater production throughout the CVWD service area. These reductions were overridden by the May 18, 2016 State Water Resources Control Board (SWRCB) "stress test" approach. However, should such mandatory reductions be reinstated in the future, it would require increases in the RAC to continue funding ongoing GRP expenses, as described in the three Rate Study Reports which comprise the 2016 Cost of Service Study.

On May 31, 2018, Governor Brown signed Assembly Bill (AB) 1668 and SB 606, which are jointly designed to overhaul California's approach to conserving water. The measures impose a number of new or expanded requirements on state water agencies and local water suppliers and provide for significantly greater State oversight of local water suppliers' water use, even in non-drought years. They were adopted in response to Governor Brown's May 2016 executive order, which called to make water conservation a "way of life" in California.

AB 1668 and SB 606 require the SWRCB, in coordination with the DWR, to establish long-term urban water use efficiency standards by June 30, 2022. Those standards will include components for indoor residential use, outdoor residential use, water losses, and other uses.

3.0 MISSION CREEK SUBBASIN AREA OF BENEFIT

This section describes the replenishment and groundwater production activities for CY 2020, the condition of the groundwater supplies, the expenses and revenue of the GRP, and the recommended RAC rate for FY 2021-2022 for the Mission Creek Subbasin AOB.

3.1 Definition of Area of Benefit

The Mission Creek Subbasin AOB is the portion of the Mission Creek Subbasin Management Area located within the boundary of CVWD. Its boundary description is as follows:

> "Beginning approximately 1/6 mile west of the center of Section 10, Township 3 South, Range 5 East, San Bernardino Meridian; then southeasterly, along the North Branch of the San Andreas Fault (Mission Creek Fault), to the intersection of the South Branch of the San Andreas Fault; then northwesterly, along the South Branch of the San Andreas Fault (Banning Fault), to the intersection of Avenue 20 and Palm Drive; then north, along Palm Drive, to Avenue 18; then west, along Avenue 18, to Little Morongo Road; then north, along Little Morongo Road, to Avenue 16; then east, along the north line of Section 12, Township 3 South, Range 4 East, to the northeast corner of said section; then south, along the east line of Section 12, Township 3 South, Range 4 East, to the east-west mid-section line, which is Dillon Road; then east, along Dillon Road, to the point of beginning."

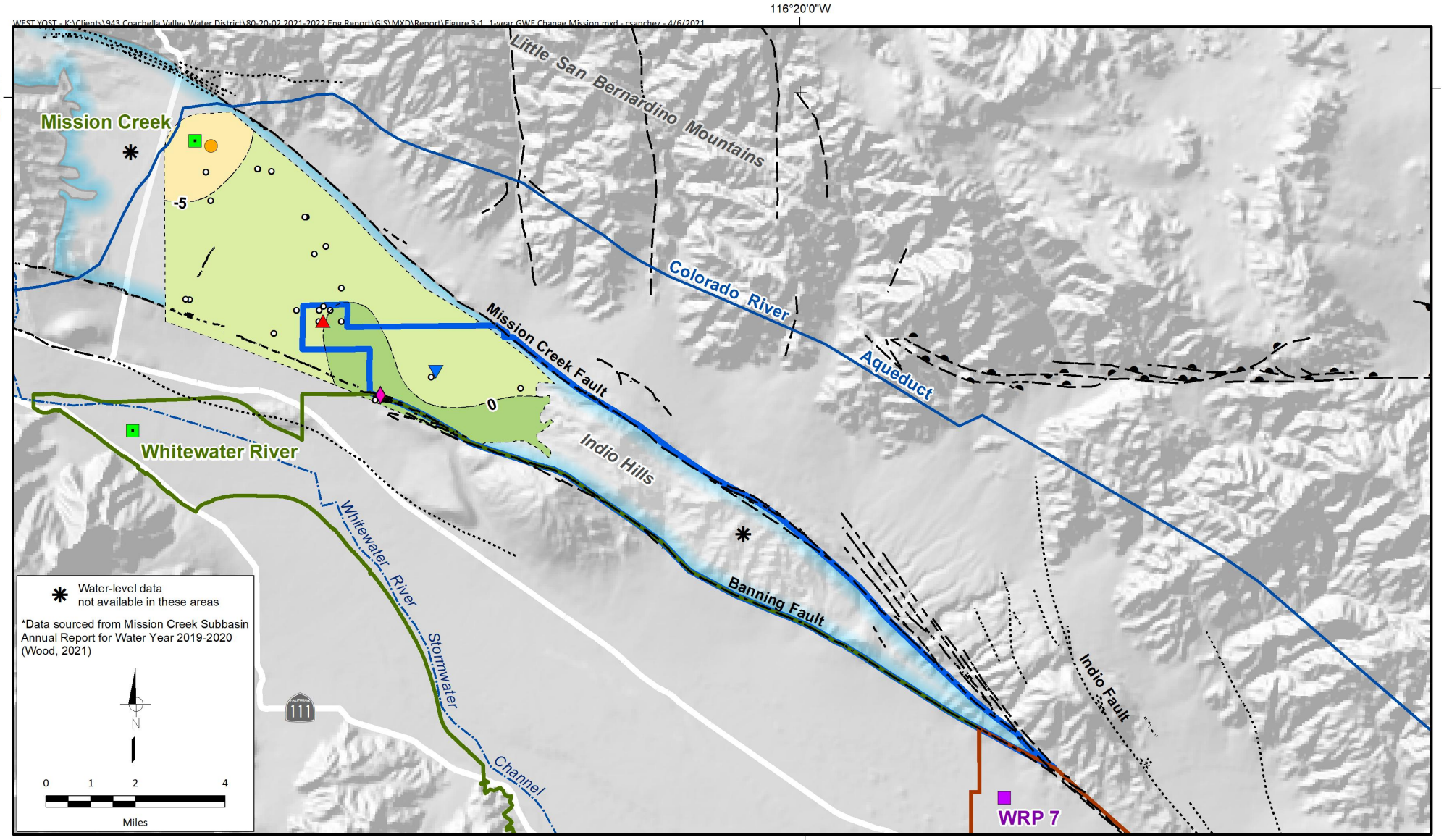
3.2 Groundwater Conditions

Current groundwater conditions in the Mission Creek Subbasin are described in detail in the Mission Creek Subbasin Annual Report for WY 2020 (CVWD, 2021a). This section utilizes the data and findings from that report to summarize the groundwater conditions in the Mission Creek Subbasin AOB.

Figure 3-1 shows changes in average groundwater levels over the last year, from WY 2019 to 2020. Average groundwater levels remained relatively stable across most of the AOB. Groundwater levels in the northwestern part of the management area near the Mission Creek GRF decreased by about 5 ft. This decrease is attributed to the reduction in replenishment at the Mission Creek GRF from 3,688 af in 2019 to 1,768 af in 2020.

Figure 3-2 shows changes in average groundwater levels over the last 10 years, from WY 2010 to 2020. Figure 3-3 shows well hydrographs that exhibit representative trends in groundwater levels across the management area over the same period. Over the last 10 years, groundwater levels across the northern portions of the AOB have increased by up to 15 ft (see Wells 03S05E17J01S, 03S05E19B01S, and 03S04E12F01S). These increases are most likely a result of the high volumes of direct replenishment that occurred at the Mission Creek GRF during the period 2010-2012 coupled with a reduction in pumping over the last 10 to 15 years as a result of conservation efforts. In the northernmost portion of the management area, near the Mission Creek GRF, current groundwater levels have decreased by up to 20 ft (see Well 02S04E21H01S). This recent decline in groundwater levels is likely due to the lower volumes of replenishment that have occurred at the Mission Creek GRF compared to the period of 2010-2012.

The observed groundwater levels at monitoring wells in the Mission Creek Subbasin AOB demonstrate the benefit and effectiveness of the GRP in sustaining groundwater supplies.



Change in Groundwater Elevation*
- 5 ft
- 0
- -5 ft

Wells with Hydrographs in Figure 3-3
- 02S04E21H01S
- 03S04E12F01S
- 03S05E17J01S
- 03S05E19B01S
- Well Used to Calculate One-Year Change in Groundwater Elevation

Replenishment Infrastructure
- Direct Replenishment Facility
- Water Reclamation Plant
- Imported Water Canal/Aqueduct

- Mission Creek Subbasin Management Area

CVWD Areas of Benefit
- East Whitewater River
- West Whitewater River
- Mission Creek

Figure 3-1

WY 2019 to 2020 Change in Groundwater Elevation in the Mission Creek Subbasin Management Area

Coachella Valley Water District
2021-2022 Engineer's Report

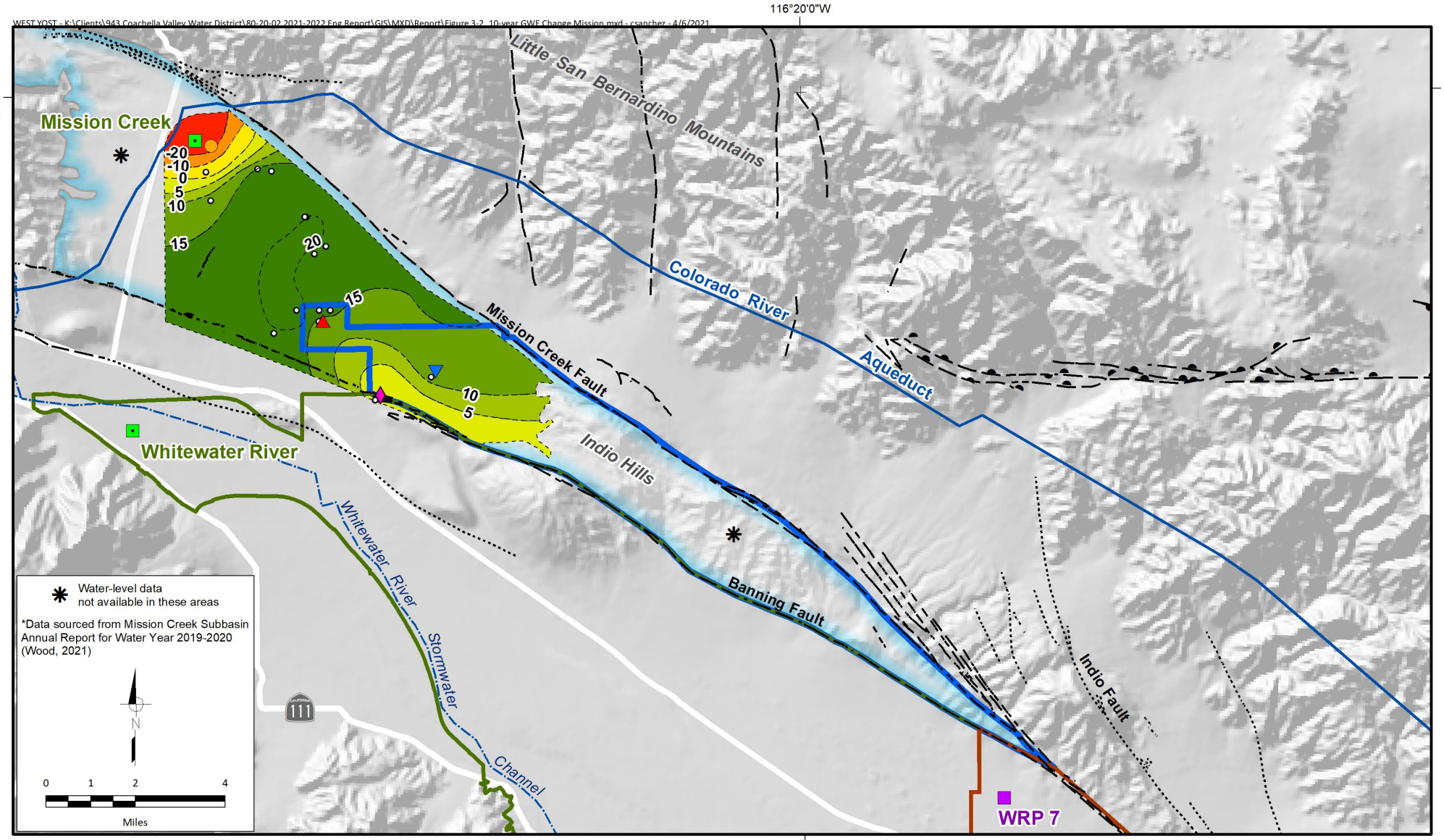
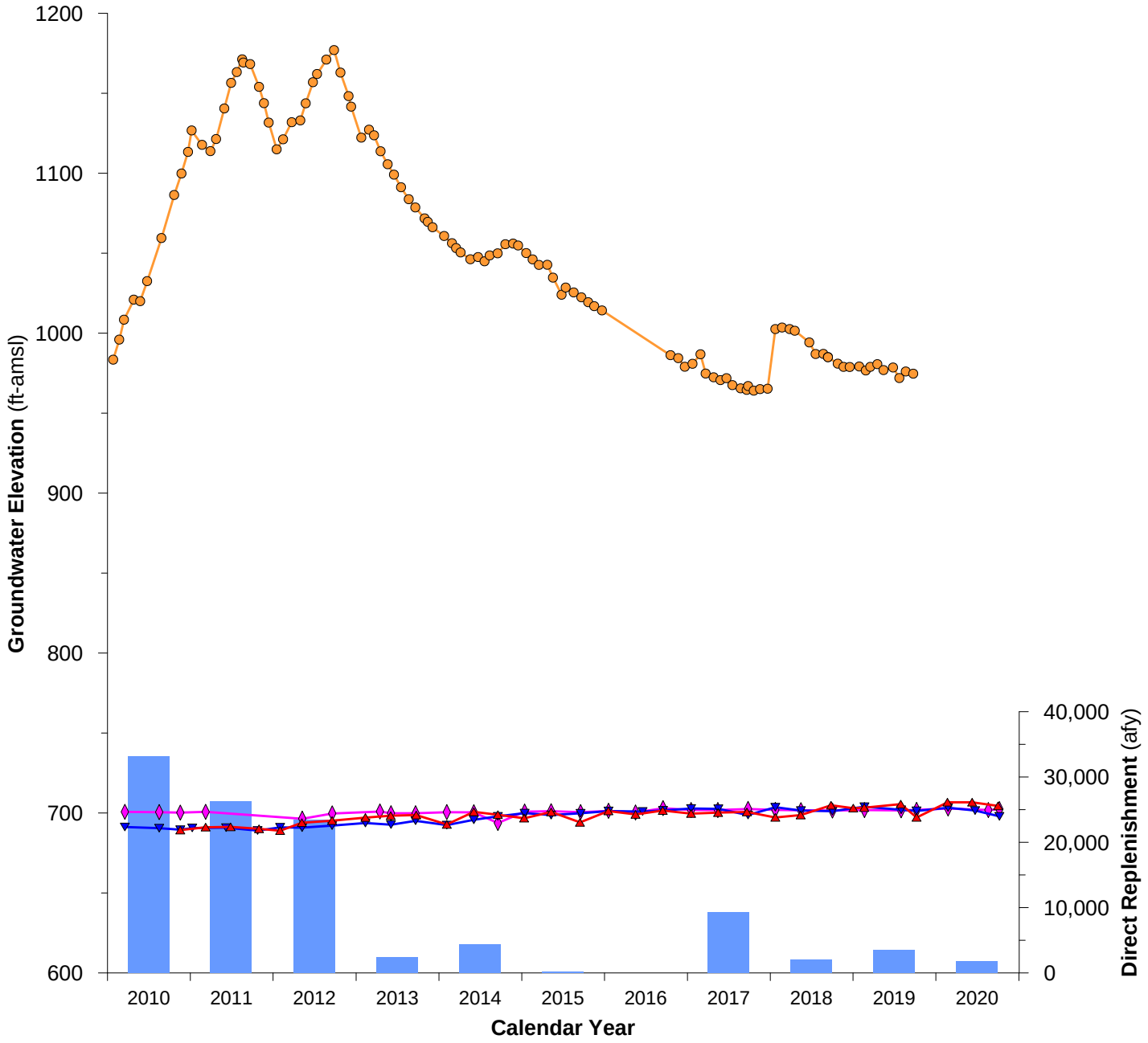


Figure 3-2

WY 2010 to 2020 Change in Groundwater Elevation in the Mission Creek Subbasin Management Area

Coachella Valley Water District
2021-2022 Engineer's Report



Direct Replenishment Deliveries within the Management Area

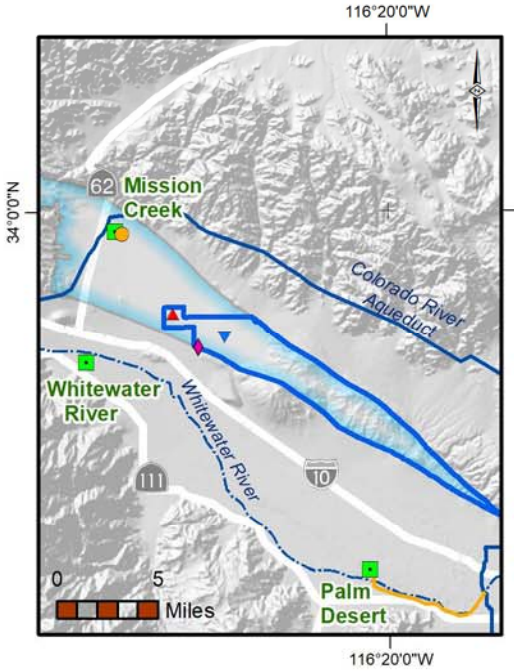
Groundwater Elevation at Representative Monitoring Wells (as symbolized in the map below)

- 02S04E21H01S
- 03S05E17J01S
- 03S05E19B01S
- 03S04E12F01S

Direct Replenishment Facilities

Mission Creek Subbasin Management Area

Mission Creek Subbasin Area of Benefit



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Author: GR
Date: 20210204
Filename: Fig3-3_Mission_Ck_hydrographs

Prepared for:

2021-2022 Engineer's Report of Water Supply and Replenishment Assessment

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Hydrographs and Direct Replenishment for the Mission Creek Subbasin Management Area
2010-2020

Figure 3-3

3.3 Groundwater Production

Table 3-1 lists the annual groundwater production volumes from the Mission Creek Subbasin Management Area from CY 1978 to 2020. The table includes groundwater production for pumpers in both CVWD and DWA AOBs. Beginning in 2004, groundwater pumpers in CVWD's Mission Creek Subbasin AOB extracting greater than 25 afy were required to meter and report their production. Reported production has been used since 2004 as accurately representing assessable production in the AOB.

In CY 2020, assessable production in CVWD's Mission Creek Subbasin AOB was 4,655 af, approximately 33 percent of the total production within the management area. Total production in the management area was 14,244 af, an increase of 9 percent from 2019. Assessable production excludes groundwater production from Minimal pumpers who extract 25 afy or less within CVWD's AOB and 10 afy or less within DWA's AOB. Water Code Section 316335.5 exempts Minimal pumpers within CVWD's Mission Creek Subbasin AOB from any replenishment assessment or production reporting provisions.

3.4 Direct and In-Lieu Replenishment

This section describes the replenishment activities in the Mission Creek Subbasin AOB.

3.4.1 Replenishment Facilities

Direct replenishment of the Mission Creek Subbasin Management Area is currently accomplished via the artificial recharge of SWP water exchanged for Colorado River water at the Mission Creek GRF. The Mission Creek GRF is located in the northern portion of the management area near the intersection of Highway 62 and North Indian Canyon Drive. DWA completed construction of the Mission Creek GRF in June 2002, and direct replenishment activities commenced in November 2002.

Table 3-1. Groundwater Production within the Mission Creek Subbasin Management Area

Calendar Year	Production within CVWD AOB,[(a)] af	Production within DWA AOB,[(b,c)] af	Total Production, af
1978	854	1,399	2,253
1979	1,001	2,564	3,565
1980	1,107	2,914	4,021
1981	1,421	2,878	4,299
1982	1,302	2,630	3,932
1983	1,442	2,979	4,421
1984	1,915	3,740	5,655
1985	2,148	3,559	5,707
1986	2,159	4,278	6,437
1987	2,234	4,483	6,717
1988	2,302	4,834	7,136
1989	2,606	5,690	8,296
1990	2,512	5,790	8,302
1991	2,292	5,486	7,778
1992	2,188	6,187	8,375
1993	2,528	6,333	8,861
1994	2,863	6,813	9,676
1995	2,865	7,237	10,102
1996	2,838	7,724	10,562
1997	2,104	7,795	9,899
1998	2,757	7,534	10,291
1999	3,004	7,970	10,974
2000	3,433	8,405	11,838
2001	3,929	8,421	12,350
2002	4,371	9,597	13,968
2003	4,425	10,073	14,498
2004	4,628	11,920	16,548
2005	4,247	12,080	16,327
2006	4,757	12,608	17,365
2007	4,547	11,862	16,409
2008	4,543	11,232	15,775
2009	4,813	10,295	15,108
2010	4,484	9,820	14,304
2011	4,653	9,550	14,203
2012	4,582	9,493	14,075
2013	4,415	10,080	14,495
2014	4,154	9,680	13,834
2015	4,090	8,580	12,670
2016	4,175	9,044	13,219
2017	4,281	9,250	13,531
2018	4,175	9,695	13,870
2019	3,973	9,142	13,115
2020	4,655	9,589	14,244

(a) Excludes production by Minimal pumpers who extract 25 afy or less and other users exempt from the RAC.
(b) Excludes production by Minimal pumpers who extract 10 afy or less and other users exempt from the RAC.
(c) Production within DWA's AOB per DWA.

3.4.2 Direct Replenishment

Table 3-2 lists the annual volume of Colorado River water delivered to the management area for direct replenishment at the Mission Creek GRF from CY 2002 to 2020. In 2020, a total of 1,768 af of Colorado River water was delivered to the Mission Creek GRF for direct replenishment. From 2002 to 2020, a total of 167,044 af was delivered to the Mission Creek GRF for direct replenishment of the AOB.

Table 3-2. Deliveries of SWP Water Exchanged for Colorado River Water for Direct Replenishment at the Mission Creek Groundwater Replenishment Facility

Calendar Year	SWP Exchange Water Delivered to the Mission Creek GRF, af
2002	4,733
2003	59
2004	5,564
2005	24,723
2006	19,901
2007	1,011
2008[(a)]	503
2009[(a)]	4,090
2010[(a)]	33,210
2011[(a)]	26,238
2012	23,406
2013	2,379
2014	4,325
2015	171
2016	0
2017	9,248
2018	2,027
2019[(b)]	3,688
2020	1,768
Total	**167,044**

(a) Includes deliveries of DWA's non-SWP supplemental water purchased from entities in Kern County for the CPV Sentinel Energy Power Plant.

(b) The volume of water recharged to the Mission Creek GRF in CY 2019 reported in the 2020-2021 Engineer's Report was provisional. The provisional value of 3,498 af was updated herein to 3,688 af.

3.4.3 In-Lieu Replenishment

Access to recycled water for in-lieu source substitution is currently unavailable in the Mission Creek Subbasin Management Area. In the 2013 MC/GH Subbasins WMP (CVWD, 2013), the development of a recycled water system within MSWD's service area was identified as a component of the water management plan. The feasibility of such a recycled water system is driven by the proximity of suitable users to the recycled water supply source. While several potential recycled water users have been identified in the management area, principally golf courses and landscape irrigation, the infrastructure to connect them has not yet been constructed.

3.5 Future Projects

The existing direct replenishment activities in the Mission Creek Subbasin Management Area are expected to continue.

Currently, CVWD has not selected any replenishment projects for future implementation in the Mission Creek Subbasin AOB.

3.6 Need for Continued Replenishment

Historical declines in groundwater levels in the Mission Creek Subbasin led to the determination that a management program was required to stabilize them and prevent associated adverse effects, such as water-quality degradation. The joint management agreement between CVWD and DWA to cooperatively conduct the Mission Creek Subbasin Management Area GRP was developed to serve this need and became effective in 2003.

Since 2003, groundwater levels as measured at wells across the management area, a key metric in assessing the effectiveness of the GRP, have stabilized or are rising. The ten-year change in groundwater levels remains positive across the management area, which is evidence that implementation of the GRP has effectively abated the overdraft that preceded it. Continued artificial replenishment is necessary to maintain these positive trends and prevent a return to overdraft in the future.

3.7 Replenishment Assessment

This section describes the recommended RAC for the Mission Creek Subbasin AOB for FY 2021-2022.

3.7.1 Groundwater Replenishment Program Costs

The RAC includes costs for importing and recharging water, operation and maintenance costs, and administrative costs for the Mission Creek Subbasin AOB. Payments to DWA as outlined in the Mission Creek Water Management agreement between the two agencies to cover similar costs incurred by them are also included in the cost calculations, as allowed for under the Water Code. In addition, continuing engineering studies, well meter reading and maintenance, and groundwater monitoring costs incurred by CVWD are included in the cost calculations.

3.7.2 Methods for Determining Groundwater Production

Groundwater producers who produce more than 25 afy of groundwater in CVWD's Mission Creek Subbasin AOB are required to meter and report their production pursuant to Water Code Sections 31634.5 and 31638.5. Beginning in 2003, when the replenishment assessment became effective in the Mission Creek Subbasin AOB, groundwater producers producing greater than 25 afy in the AOB have been required to meter and report their production. CVWD has an ongoing program to conduct a thorough field investigation of the use of all wells that may be subject to metering and reporting requirements.

The exact number of exempt Minimal pumpers in the Mission Creek Subbasin Management Area is currently unknown. Minimal pumpers predominantly pump water from small wells that are used for domestic or limited irrigation purposes. The maximum groundwater pumping by the unmetered Minimal pumpers in the management area is estimated to be less than 500 afy.

3.7.3 Income Statement

Table 3-3 is a summary income statement showing revenues, expenses, and cash flow for FY 2020 (actual) and FYs 2021 and 2022 (projected). The table notes provide a description of the sources of revenue and expenses.

Table 3-3. Coachella Valley Water District Mission Creek Subbasin Area of Benefit Groundwater Replenishment Program Income Statement

Description	Actual FY 2020, $1,000	Projected FY 2021, $1,000	Projected FY 2022, $1,000
Revenues			
Replenishment Assessment Revenue (RAC Rate)[a]	$547	$590	$590
Other Revenue[b]	274	85	87
Total Revenues	**$821**	**$675**	**$677**
Expenses			
Total O&M Costs[c]	$470	$425	$433
Administrative Costs[d]	235	209	221
Transfer To (From) Other Funds[e]	7	-	-
Total Expenses	**$712**	**$634**	**$654**
Net Increase (Decrease) in Cash Flow[f]	$109	$41	$22
Ending Reserves	$3,823	$3,864	$3,887

(a) Revenues based on FY actual or budgeted production estimates. RAC for FY 2020 = $135.52/af, for FY 2021 = $135.52/af, and for FY 2022 = 135.52/af.
(b) Other Revenue includes investment income.
(c) Operations and Maintenance (O&M) costs include labor, equipment, and materials for the replenishment facilities.
(d) Cost to administer the replenishment assessment program includes personnel, meter reading, billing, groundwater monitoring, and report preparation.
(e) Transfer To (From) Other Funds includes reimbursement to CVWD's Motorpool Fund for its share of CVWD vehicles and equipment purchased by the Motorpool Fund.
(f) Net Increase (Decrease) in Cash Flow excludes depreciation.

3.7.4 Recommended RAC for Fiscal Year 2021-2022

Based on the projected operating costs, revenues, and reserves, CVWD staff recommend no change to the $135.52/af RAC that became effective on July 1, 2017.

Note that as of FY 2020, SWP tax revenues and costs are no longer allocated to the Mission Creek Subbasin AOB RAC. Based on revenues and costs shown in Table 3-3, the Fund is projected to have an increase in cash flow of $41,000 in FY 2021 and of $22,000 in FY 2022. Total O&M costs are the primary cost drivers for the Fund. The Fund is meeting its reserve funding requirements prescribed in CVWD's Reserve Policy.

4.0 WEST WHITEWATER RIVER SUBBASIN AREA OF BENEFIT

This section describes the replenishment and groundwater production activities for CY 2020, the condition of the groundwater supplies, the expenses and revenue of the GRP, and the recommended RAC rate for FY 2021-2022 for the West Whitewater River Subbasin AOB.

4.1 Definition of Area of Benefit

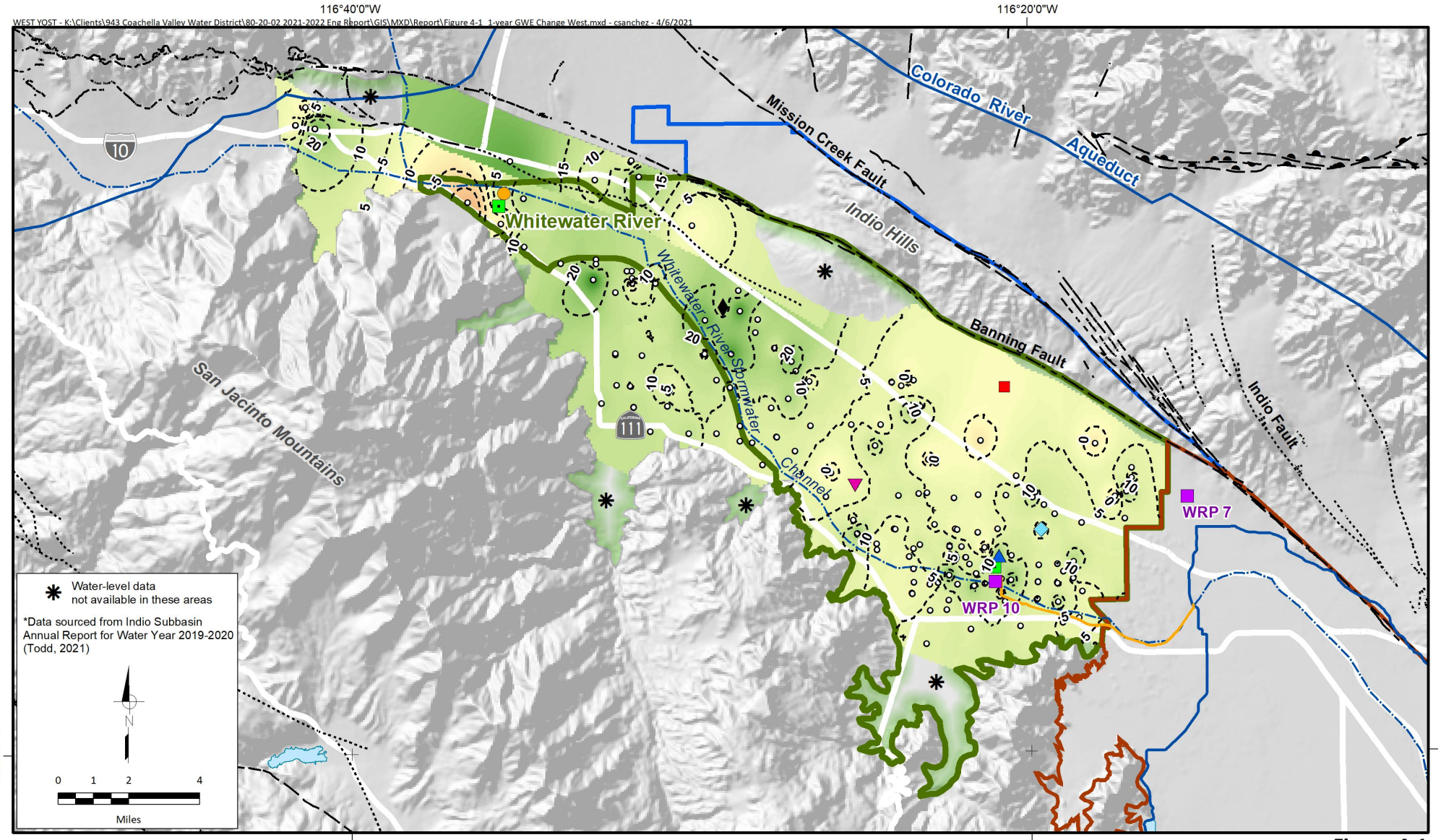
The West Whitewater River Subbasin AOB is the portion of the West Whitewater River Subbasin Management Area located within the boundary of CVWD. Its boundary description is as follows:

> "Beginning at the northwest corner of Section 4, Township 5 South, Range 7 East, San Bernardino Meridian; then south, along Jefferson Street, to Avenue 40; then west, along Avenue 40, to Adams Street; then south, along Adams Street and continuing south along the east line of Section 18, Township 5 South, Range 7 East, to the southeast corner of said section, which is Fred Waring Drive (Avenue 44); then west, along Fred Waring Drive, to Washington Street; then southeast, along Washington Street, to the south bank of the Whitewater River Stormwater Channel; then west, towards the Santa Rosa Mountains near Happy Point; then westerly along the foothills of the Santa Rosa and San Jacinto Mountains until intersecting the service area boundary of Coachella Valley Water District; then northwesterly along the service area boundary of Coachella Valley Water District to the Whitewater River Groundwater Replenishment Facility; then easterly along the service area boundary of Coachella Valley Water District to the South Branch of the San Andreas Fault (Banning Fault); then southeasterly along the South Branch of the San Andreas Fault (Banning Fault) to the intersection with the east line of Section 29, Township 4 South, Range 7 East; then south along the east line of Section 29, Township 4 South, Range 7 East and Section 32, Township 4 South, Range 7 East, to Avenue 38; then west, to the point of beginning."

4.2 Groundwater Conditions

Current groundwater conditions in the Whitewater River Subbasin are described in detail in the Indio (Whitewater River) Subbasin Annual Report for WY 2020 (CVWD 2021b). This section utilizes the data and findings of that report to summarize the groundwater conditions in the West Whitewater River Subbasin AOB.

Figure 4-1 shows changes in average groundwater levels over the last year, from WY 2019 to 2020. Average groundwater levels remained relatively stable or increased by up to 20 ft across most of the AOB. Groundwater levels in the northwestern part of the management area and AOB near the Whitewater River GRF decreased by up to 15 ft. This decrease is attributed to the reduction in replenishment at the Whitewater River GRF from the record replenishment of 385,994 af in 2017 to an average of about 170,000 afy from 2018 to 2020.



Change in Groundwater Elevation*

50 ft

-0-

-50 ft

Well Used to Calculate One-Year Change in Groundwater Elevation

Wells with Hydrographs in Figure 4-3

- 03S04E20F01S
- 04S05E05K01S
- 04S05E36M01S
- 04S06E22C01S
- 05S06E10L01S
- 05S06E11B01S

Replenishment Infrastructure

- Direct Replenishment Facility
- Water Reclamation Plant
- Imported Water Canal/Aqueduct
- Mid-Valley Pipeline

- West Creek Subbasin Management Area

CVWD Areas of Benefit

- East Whitewater River
- West Whitewater River
- Mission Creek

Figure 4-1

WY 2019 to 2020 Change in Groundwater Elevation in the West Whitewater River Management Area

Coachella Valley Water District
2021-2022 Engineer's Report

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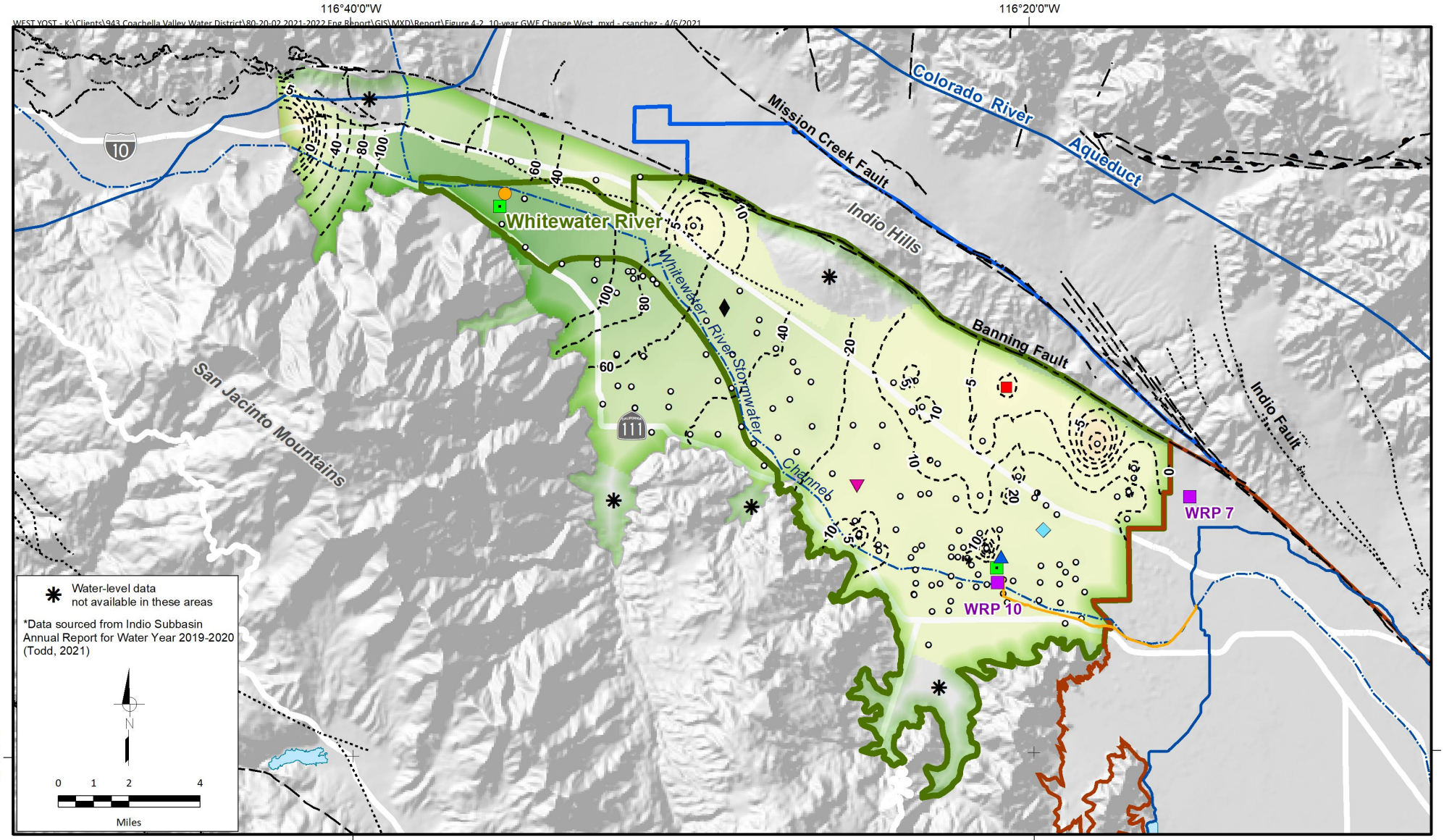
Figure 4-2 shows changes in average groundwater levels over the last 10 years, from WY 2010 to 2020. Figure 4-3 shows well hydrographs that exhibit representative trends in groundwater levels across the management area over the same period. Over the last 10 years, groundwater levels in the northwestern portion of the management area and the AOB have increased by up to 115 ft (see Well 03S04E20F01S). These increases in groundwater levels are most likely the result of the high volumes of direct replenishment that occurred at the Whitewater River GRF during 2010-2012 and 2017-2019. Groundwater levels also gradually increased by up to 60 ft in areas that are hydraulically downgradient of the Whitewater River GRF (see Wells 04S05E05K01S, 04S05E36M01S, and 04S06E22C01S), which demonstrates the benefit and effectiveness of the GRP in sustaining the groundwater supplies across the management area. In addition to direct replenishment, an increase in conservation efforts, as evident by an overall decrease in pumping across the basin, has also contributed to increasing groundwater levels. A notable exception is near the Sun City/Palm Desert area, north of the Bermuda Dunes in the easternmost portion of the AOB where groundwater levels have experienced some localized declines of up to 26 ft. The declining groundwater levels in this area may be addressed in the future through direct replenishment at the newly commissioned Palm Desert GRF and the expansion of the non-potable water system to reduce groundwater pumping.

4.3 Groundwater Production

Table 4-1 lists the annual groundwater production volumes and surface-water diversions in the West Whitewater River Subbasin Management Area from CY 1977 to 2020. The table includes data for both CVWD and DWA AOBs. Starting in 2016, the production volumes for DWA's AOB include a small amount of production in their Garnet Hill Subbasin AOB. As of FY 2021, DWA considers both its Garnet Hill Subbasin and Whitewater River Subbasin AOBs as one. Beginning in 1982, groundwater pumpers in CVWD's West Whitewater River Subbasin AOB extracting greater than 25 afy were required to meter and report their production. Reported production has been used since 1982 as accurately representing assessable production in the AOB.

In CY 2020, the assessable production within CVWD's West Whitewater River Subbasin AOB was 117,770 af, which was approximately 76 percent of total assessable production and diversions within the management area. Total production and surface water diversions in the management area were 153,979 af, which represents a 6 percent increase from CY 2019. Assessable production excludes groundwater production from Minimal pumpers who extract 25 afy or less within CVWD's AOB and 10 afy or less within DWA's AOB. Water Code Section 316335.5 exempts Minimal pumpers within CVWD's West Whitewater River Subbasin AOB from any replenishment assessment or production reporting provisions.



Change in Groundwater Elevation*

160 ft

0

-160 ft

Well Used to Calculate Ten-Year Change in Groundwater Elevation

Wells with Hydrographs in Figure 4-3

- 03S04E20F01S
- 04S05E05K01S
- 04S05E36M01S
- 04S06E22C01S
- 05S06E10L01S
- 05S06E11B01S

Replenishment Infrastructure

- Direct Replenishment Facility
- Water Reclamation Plant
- Imported Water Canal/Aqueduct
- Mid-Valley Pipeline

- West Creek Subbasin Management Area

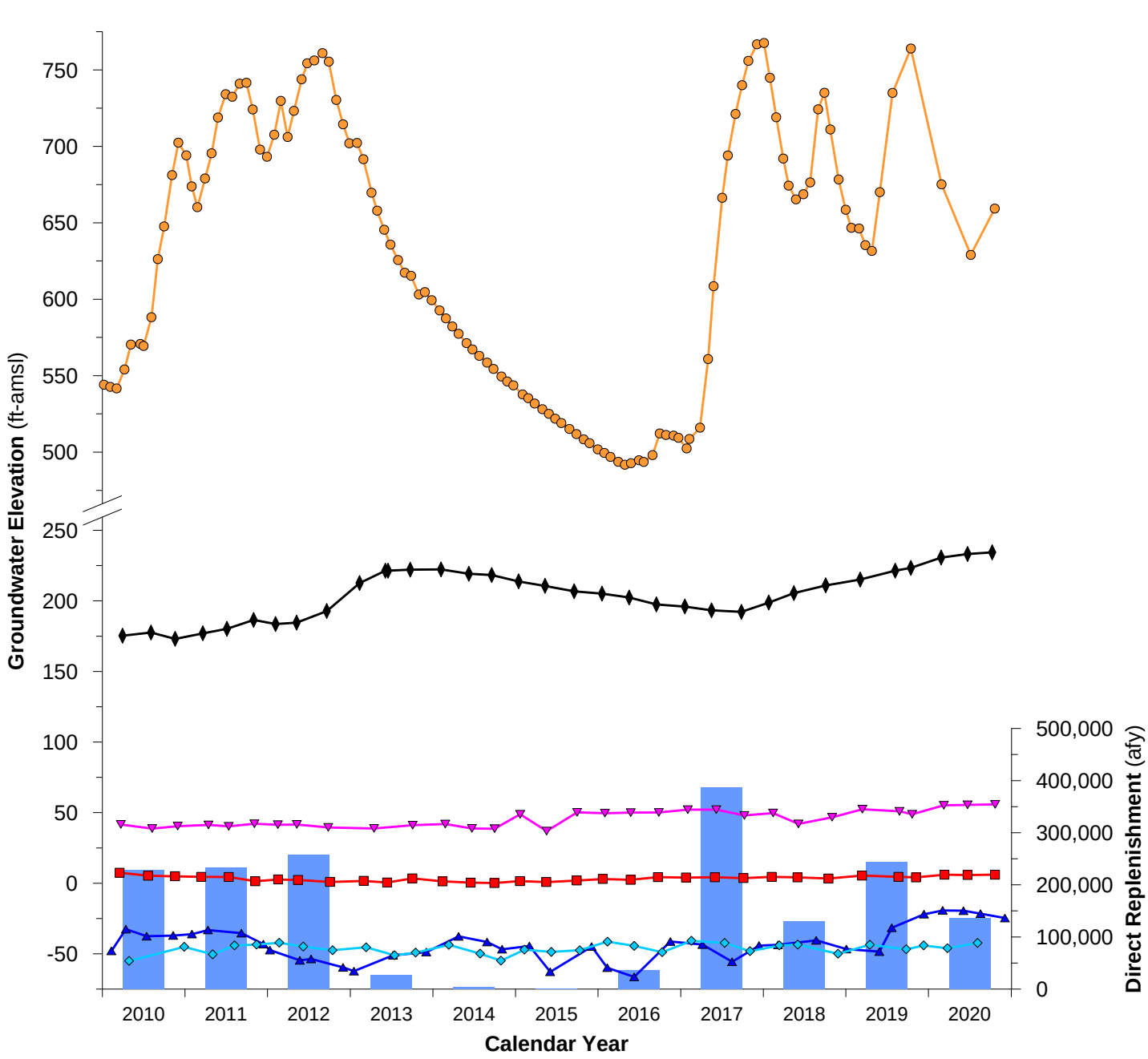
CVWD Areas of Benefit

- East Whitewater River
- West Whitewater River
- Mission Creek

Figure 4-2

WY 2010 to 2020 Change in Groundwater Elevation in the West Whitewater River Management Area

Coachella Valley Water District
2021-2022 Engineer's Report



Direct Replenishment Deliveries within the Management Area

Groundwater Elevation at Representative Monitoring Wells (as symbolized in the map below)

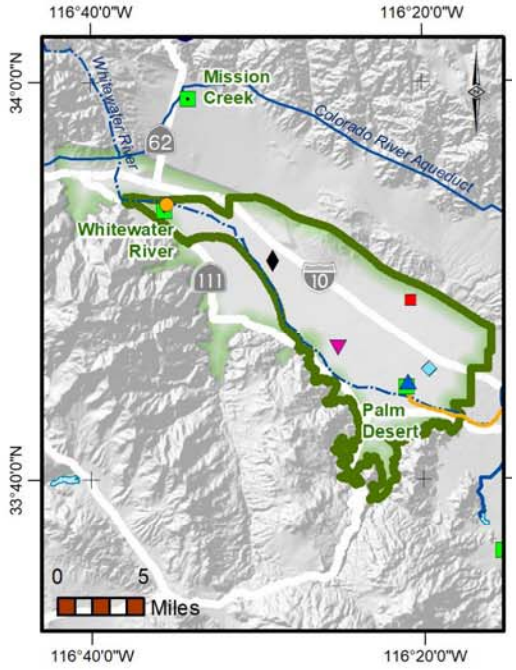
- 03S04E20F01S
- 04S05E05K01S
- 04S05E36M01S
- 04S06E22C01S
- 05S06E11B01S
- 05S06E10L01S

Direct Replenishment Facilities

West Whitewater River Management Area

West Whitewater River Subbasin Area of Benefit

Mid-Valley Pipeline



Prepared by:

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Water. Engineered.

Author: GR
Date: 20210204
Filename: Fig4-3_WWhitewater_hydrographs

Prepared for:

2021-2022 Engineer's Report of Water Supply and Replenishment Assessment

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Hydrographs and Direct Replenishment, for the West Whitewater River Subbasin Management Area
2010-2020

Figure 4-3

Table 4-1. Groundwater Production and Surface-Water Diversions within the West Whitewater River Subbasin Management Area

Calendar Year	Production within CVWD AOB,[(a)] af	Production within DWA AOB,[(b, c)] af	Surface-Water Diversions,[(d)] af	Total Production, af
1977	67,696	18,661	7,000	93,357
1978	61,172	28,100	8,530	97,802
1979	72,733	29,393	7,801	109,927
1980	84,142	32,092	7,303	123,537
1981	86,973	33,660	7,822	128,455
1982	83,050	33,382	6,512	122,944
1983	84,770	33,279	6,467	124,516
1984	104,477	38,121	7,603	150,201
1985	111,635	39,732	7,143	158,510
1986	115,185	40,965	6,704	162,854
1987	125,229	44,800	5,644	175,673
1988	125,122	47,593	5,246	177,961
1989	129,957	47,125	5,936	183,018
1990	136,869	45,396	5,213	187,478
1991	126,360	42,729	4,917	174,006
1992	128,390	42,493	4,712	175,595
1993	131,314	41,188	6,363	178,865
1994	134,223	42,115	5,831	182,169
1995	134,583	41,728	5,809	182,120
1996	137,410	45,342	5,865	188,617
1997	137,406	43,658	5,626	186,690
1998	142,620	41,385	7,545	191,550
1999	157,148	44,350	6,941	208,439
2000	161,834	44,458	6,297	212,589
2001	125,122	47,593	4,928	208,807
2002	129,957	47,125	4,221	213,410
2003	156,185	43,463	4,627	204,275
2004	159,849	48,093	4,758	212,700
2005	153,462	46,080	4,799	204,341
2006	160,239	48,967	4,644	213,850
2007	157,487	50,037	3,490	211,014
2008	161,695	45,405	3,593	210,693
2009	155,793	41,913	1,443	199,149
2010	141,481	39,352	1,582	182,415
2011	141,028	40,071	1,724	182,823
2012	141,379	39,507	2,222	183,108
2013	143,108	37,730	1,802	182,640
2014	136,027	36,372	1,787	174,186
2015	115,588	30,332	1,539	147,459
2016	115,659	30,705	2,031	148,395
2017	120,383	33,164	1,996	155,543
2018	119,250	33,873	1,632	154,755
2019	113,841	29,771	1,916	145,528
2020	117,770	33,786	2,423	153,979

(a) Excludes production by Minimal pumpers who extract 25 afy or less and other users exempt from the RAC.
(b) Excludes production by Minimal pumpers who extract 10 afy or less and other users exempt from the RAC.
(c) Production within DWA AOB includes production within DWA's Garnet Hill Subbasin AOB (starting 2016).
(d) Whitewater Mutual Water Company, Chino Creek, Snow Creek, and Falls Creek (DWA AOB).

4.4 Direct and In-Lieu Replenishment

This section describes the replenishment activities in the West Whitewater Subbasin AOB.

4.4.1 Replenishment Facilities

Direct replenishment of the West Whitewater River Subbasin Management Area is currently accomplished via the artificial recharge of SWP water exchanged for Colorado River water at the Whitewater River GRF and Colorado River Water from the MVP at Phase I of the Palm Desert GRF. The Whitewater River GRF is in the western portion of the West Whitewater River Subbasin AOB between the WRSC and Highway 111. Situated in the flow path of the Whitewater River, this location is ideally suited for large-scale replenishment due to the absence of aquitards that retard infiltration. The Whitewater River GRF went online in 1973. The Palm Desert GRF is located in the southeastern portion of the AOB. Phase I of the project, consisting of re-purposing existing ponds adjacent to and to the north of WRP 10, was completed in late 2018 and has been operational since February 2019.

4.4.2 Direct Replenishment

Table 4-2 lists the annual volume of Colorado River water that was delivered to the management area for direct replenishment at the Whitewater River GRF from CY 1973 to 2020. In 2020, 126,487 af and 9,700 af of Colorado River water were delivered to the Whitewater River and Palm Desert GRFs, respectively for direct replenishment, totaling 136,187 af of replenishment in the West Whitewater Management Area.

From 1973 to 2020, a total of 3,827,451 af was delivered to the Whitewater River and Palm Desert GRFs for direct replenishment of the management area.

4.4.3 In-Lieu Replenishment

In addition to direct replenishment, CVWD provides imported Colorado River water and recycled water to offset groundwater production as identified in the 2010 CVWMP Update. The MVP is a key component in ensuring non-potable water availability to current and future customers. The initial 6.6 miles of pipeline, stretching from the Coachella Canal in Indio to WRP 10 in Palm Desert, was completed in 2009. Currently, 20 golf courses are connected either directly to the MVP or to the non-potable water system supplied by the MVP and WRP 10 recycled water and no longer need to rely on groundwater as their primary source of irrigation water. The goal of these golf courses is to meet their irrigation demands with no more than 20 percent groundwater for their total irrigation use each FY. As golf courses are connected to non-potable water, the managers sign Non-potable Water Agreements, which include an 80 percent non-potable water use requirement. At full build-out of the MVP project, the MVP/WRP 10 system could provide about 52,000 afy of non-potable water for irrigation in the West Whitewater River Subbasin AOB.

WRP 7, located in the northernmost portion of the East Whitewater River Subbasin AOB, currently serves a blend of Colorado River water and recycled water to two golf courses in the West Whitewater River Subbasin AOB.

Table 4-2. Deliveries of Colorado River Water for Direct Replenishment at the West Whitewater River Subbasin Management Area Replenishment Facilities

Calendar Year	SWP Water Exchanged for Colorado River Water Delivered to the Whitewater River GRF, af	Colorado River Water from the Coachella Canal Delivered to the Palm Desert GRF via the MVP, af	Total Amount of Water Delivered to the West Whitewater River Subbasin Management Area, af
1973	7,475	0	7,475
1974	15,396	0	15,396
1975	20,126	0	20,126
1976	13,206	0	13,206
1977	0	0	0
1978	0	0	0
1979	25,192	0	25,192
1980	26,341	0	26,341
1981	35,251	0	35,251
1982	27,020	0	27,020
1983	53,732	0	53,732
1984	83,708	0	83,708
1985	251,994	0	251,994
1986	298,201	0	298,201
1987	104,334	0	104,334
1988	1,096	0	1,096
1989	12,478	0	12,478
1990	31,721	0	31,721
1991	14	0	14
1992	40,870	0	40,870
1993	60,153	0	60,153
1994	36,763	0	36,763
1995	61,318	0	61,318
1996	138,266	0	138,266
1997	113,677	0	113,677
1998	132,455	0	132,455
1999	90,601	0	90,601
2000	72,450	0	72,450
2001	707	0	707
2002	33,435	0	33,435
2003	902	0	902
2004	13,224	0	13,224
2005	165,554	0	165,554
2006	98,959	0	98,959
2007	16,009	0	16,009
2008	8,008	0	8,008
2009	57,024	0	57,024
2010	228,330	0	228,330
2011	232,214	0	232,214
2012	257,267	0	257,267
2013	26,620	0	26,620
2014	3,533	0	3,533
2015	865	0	865
2016	35,699	0	35,699
2017	385,994	0	385,994
2018	129,725	0	129,725
2019	235,600	7,757	243,357
2020	126,487	9,700	136,187
Total	3,809,994	17,457	3,827,451

4.5 Future Projects

Direct and in-lieu replenishment activities in the West Whitewater River Subbasin Management Area are expected to continue and include the following future projects.

CVWD will continue to prioritize the conversion of golf courses in the West Whitewater River Subbasin AOB from groundwater to in-lieu sources. CVWD is completing an update to the 2017 draft non-potable water master plan to guide implementation of the MVP project and WRP 10 recycled water facilities for this purpose. The plan update is scheduled to be completed in April 2021; the environmental analysis has started and is scheduled to be completed in October 2021. Current plans are to connect approximately 23 additional golf courses and construct two new pump stations for the expansion of the MVP/WRP 10 non-potable water system between 2021 and 2031. CVWD will seek grant/loan funding through the Clean Water State Revolving Fund (CWSRF) program, grants from the WIIN program, and Sanitation reserve funds to expand the non-potable water system.

The Palm Desert Groundwater Replenishment Project is a direct replenishment project that involves repurposing existing percolation ponds located north of WRP 10 and constructing detention basins within the WRSC to the south of the facility. As planned, the Palm Desert GRF will have the capacity to directly recharge up to approximately 25,000 afy of Colorado River water into the West Whitewater River Subbasin AOB. Phase I of the project, the repurposing of existing WRP 10 percolation ponds, was completed and began operations in early 2019. The design of Phase II was complete as of August 2019 and will include the construction of three detention basins within the WRSC south of WRP 10 and the extension of the existing MVP within the northern bank of the stormwater channel. The Environmental Impact Report (EIR) for Phase II was approved by CVWD's Board of Directors on January 9, 2018. Project permitting from the California Department of Fish and Wildlife (CDFW) and from U.S. Army Corps of Engineers is the next phase of the project, with permit approval anticipated by December 2021. Four shallow monitoring wells were drilled in 2019 as part of the monitoring network used to track the groundwater system hydraulic response, subsurface movement of Colorado River water, and associated water quality response.

4.6 Need for Continued Replenishment

Historical declines in groundwater levels in the western portion of the Whitewater River Subbasin led to the determination that a management program was required to stabilize the declining groundwater levels and prevent associated adverse effects, such as water-quality degradation and land subsidence. The joint management agreement between CVWD and DWA to cooperatively conduct the West Whitewater River Subbasin Management Area GRP was developed to serve this need and became effective in 1976.

Since 1976, groundwater levels, as measured at wells across most of the AOB, a key metric in assessing the effectiveness of the GRP, have stabilized or are rising. The ten-year average change in groundwater levels remains positive across most of the AOB, which evidences that implementation of the GRP has effectively abated the overdraft conditions that preceded it. Groundwater levels have continued to gradually decline in the northeastern portion of the AOB. Continued direct and in-lieu replenishment activities are necessary to maintain the increasing trends in groundwater levels, slow or reverse the declining trends, and prevent conditions of overdraft in the future.

4.7 Replenishment Assessment

This section describes the recommended RAC for the West Whitewater River Subbasin AOB for FY 2021-2022.

4.7.1 Groundwater Replenishment Program Costs

The RAC includes costs for importing and recharging water, operation and maintenance costs, administrative costs, debt service, and capital improvements necessary to maintain the replenishment facilities for the West Whitewater Subbasin AOB. Payments from DWA to reimburse CVWD for operating costs as outlined in the Whitewater Management Agreement between the two agencies are also included in the cost calculations, as allowed for under the Water Code. In addition, continuing engineering studies, well meter reading and maintenance, and groundwater monitoring costs incurred by CVWD are included in the cost calculations.

4.7.2 Methods for Determining Groundwater Production

Since 1982, when the replenishment assessment became effective in the West Whitewater River Subbasin AOB, groundwater pumpers extracting greater than 25 afy from the AOB have been required to meter and report their production pursuant to Water Code Sections 31634.5 and 31638.5. CVWD has an ongoing program to conduct a thorough field investigation of the use of all wells that may be subject to metering and reporting requirements.

The exact number of exempt Minimal pumpers in the West Whitewater River Subbasin Management Area is currently unknown. Minimal pumpers predominantly pump water from small wells that are used for domestic or limited irrigation purposes. The maximum groundwater pumping by the unmetered Minimal pumpers in the management area is estimated to be less than 500 afy.

4.7.3 Income Statement

Table 4-3 is a summary income statement showing revenues, expenses, and cash flow for FY 2020 (actual) and FYs 2021 and 2022 (projected). The table notes provide a description of the sources of revenue and expenses.

4.7.4 Recommended RAC for Fiscal Year 2021-2022

Based on the projected operating costs, revenues, and reserves, CVWD staff recommends that the $143.80/af RAC that became effective on July 1, 2017 be increased by $21.57/af, to $165.37/af, effective July 1, 2021.

Note that as of FY 2020, SWP tax revenues and costs are no longer allocated to the West Whitewater River Subbasin AOB RAC. Based on revenues and costs shown in Table 4-3, the Fund is projected to have a decrease in cash flow of $101,000 in FY 2021. Despite the proposed RAC increase, cash flow in FY 2022 is projected to decrease in the amount of $8,361,000. Water purchase costs are the primary cost drivers for the Fund. As shown in the income statement, the Fund will not be able to maintain a positive cash flow in FY 2022 even with the proposed RAC increase but continues to meet its reserve funding requirements prescribed in CVWD's Reserve Policy.

Table 4-3. Coachella Valley Water District West Whitewater River Subbasin Area of Benefit Groundwater Replenishment Program Income Statement

Description	Actual[a] FY 2020, $1,000	Projected FY 2021, $1,000	Projected FY 2022, $1,000
Revenues			
RAC Rate[b]	$16,513	$16,968	$19,514
Property Tax, General[c]	1,980	2,014	2,042
Other Revenue[d]	5,144	4,825	4,832
Total Revenues	**$23,637**	**$23,807**	**$26,388**
Expenses			
Total O&M Costs[e]	$4,697	$4,774	$4,870
Power Costs	548	465	480
Administrative Costs[f]	3,230	3,843	4,038
QSA Mitigation Costs	665	219	775
Water Purchases[g]	13,346	12,966	20,260
In-lieu Replenishment Costs[h]	259	240	2,901
Capital Improvement Budget	99	135	163
Debt Service[i]	1,900	1,200	1,200
Transfer To (From) Other Funds[j]	87	66	62
Total Expenses	**$24,831**	**$23,908**	**$34,749**
Net Increase (Decrease) in Cash Flow[k]	($1,194)	($101)	($8,361)
Ending Reserves	$34,013	$33,912	$25,551

(a) In FY 2020 the Nonpotable Water Fund was merged into the West Whitewater Replenishment Fund.

(b) Revenues based on FY actual or budgeted production estimates. RAC for FY 2020 = $143.80/af, for FY 2021 = $143.80/af, and for FY 2022 = $165.37/af.

(c) Property Taxes, General is an allocation of CVWD's 1 percent General Property Tax to the Whitewater Fund.

(d) Other Revenues include investment income, reimbursement of shared facility costs, revenues received from Whitewater Hydro leases, grant revenues, and water sales from the MVP.

(e) O&M costs include labor, equipment, and materials for the replenishment facilities.

(f) Cost to administer the replenishment assessment program includes personnel, meter reading, billing, groundwater monitoring, and report preparation.

(g) Water purchases from the Rosedale Rio-Bravo GLC, the Metropolitan Water District, along with water purchases from the Canal Fund for replenishment activities.

(h) Costs for projects providing recycled water or Colorado River water in place of groundwater.

(i) Debt Service - 30-year variable debt instrument payable to CVWD's Domestic Water Fund in the amount of $52,340,180. This note reimburses the Domestic Water Fund for funds provided for the 2009 construction of the MVP. The annual payment will be interest only until such time as the fund has reserves in excess of CVWD's Reserve Policy.

(j) Transfer To (From) Other Funds includes reimbursements to CVWD's Motorpool Fund for its share of CVWD vehicles and equipment purchased by the Motorpool Fund. In addition, the Transfer To (From) Other Funds includes the transfer of reserves from the Nonpotable Fund that was merged into the West Whitewater Fund in FY 2020.

(k) Net Increase (Decrease) in Cash Flow excludes depreciation.

5.0 EAST WHITEWATER RIVER SUBBASIN AREA OF BENEFIT

This section describes the replenishment and groundwater production activities for CY 2020, the condition of the groundwater supplies, the expenses and revenue of the GRP, and the recommended RAC rate for FY 2021-22 for the East Whitewater River Subbasin AOB.

5.1 Definition of Area of Benefit

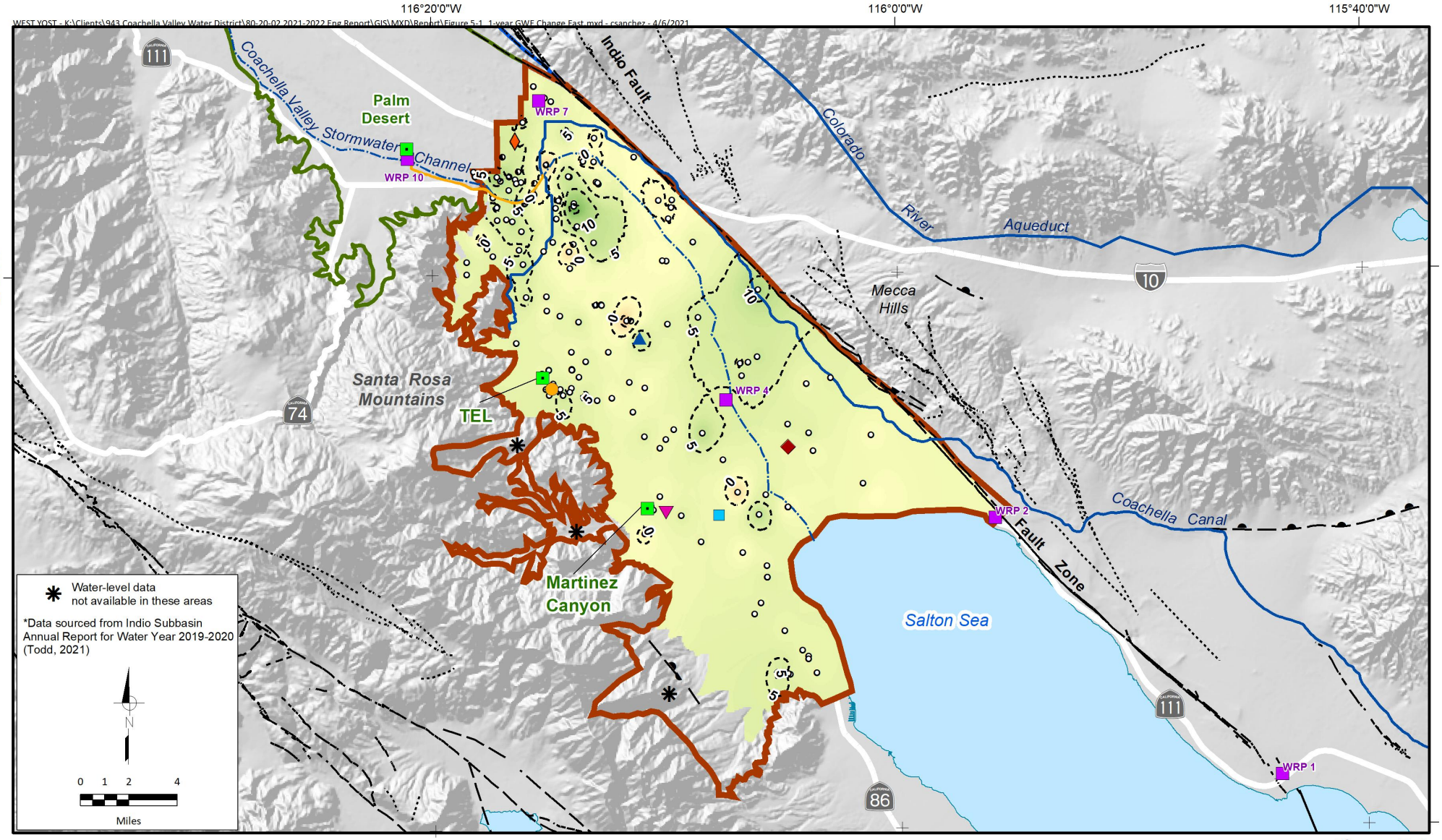
The East Whitewater River Subbasin AOB is the eastern portion of the Whitewater River Subbasin located within the boundary of CVWD. Its boundary description is as follows:

> "Beginning at the northwest corner of Section 4, Township 7 South, Range 5 East, San Bernardino Meridian; then south, along Jefferson Street, to Avenue 40; then west, along Avenue 40, to Adams Street; then south, along Adams Street and continuing south along the east line of Section 18, Township 5 South, Range 7 East, to the southeast corner of said section, which is Fred Waring Drive (Avenue 44); then west, along Fred Waring Drive, to Washington Street; then southeast, along Washington Street, to the south bank of the Whitewater River Stormwater Channel; then west, towards the Santa Rosa Mountains near Happy Point; then southeasterly along the foothills of the Santa Rosa Mountains until a point located 1/3 mile west and 1/4 mile south from the northeast corner of Section 8, Township 9 South, Range 9 East; then northeasterly, to a point located 1/10 mile west and 1/4 mile north of the southeast corner of Section 4, Township 9 South, Range 9 East; then continuing along the Salton Sea, the Whitewater River Subbasin's eastern boundary and primary discharge area, as described in California's Groundwater, Bulletin 118 (DWR 2003), to a point located 4/10 mile east and 3/10 mile north of the southwest corner of Section 34, Township 7 South, Range 10 East; then northeasterly, to the northeast corner of Section 34, Township 7 South, Range 10 East; then northwesterly to a point 1/4 mile south of the northeast corner of Section 20, Township 7 South, Range 10 East; then northwesterly along the San Andreas Fault to the intersection with the east line of Section 29, Township 4 South, Range 7 East; then south along the east line of Section 29, Township 4 South, Range 7 East and Section 32, Township 4 South, Range 7 East, to Avenue 38; then west, to the point of beginning."

5.2 Groundwater Conditions

Current groundwater conditions in the Whitewater River Subbasin are described in detail in the Indio (Whitewater River) Subbasin Annual Report for WY 2020 (CVWD, 2021b). This section utilizes the data and findings from that report to summarize the groundwater conditions in the East Whitewater River Subbasin AOB.

Figure 5-1 shows changes in average groundwater levels over the last year, from WY 2019 to 2020. Average groundwater levels remained relatively stable or increased by up to 35 ft across most of the AOB.



Change in Groundwater Elevation*

35 ft

0

-35 ft

Well Used to Calculate One-Year Change in Groundwater Elevation

Wells with Hydrographs in Figure 5-3

- 05S07E08Q01S
- 06S08E19R01S
- 07S07E03D01S
- 07S08E32A01S
- 07S08E35D01S
- 07S09E18H01S

Replenishment Infrastructure

- Direct Replenishment Facility
- Water Reclamation Plant
- Imported Water Canal/Aqueduct
- Mid-Valley Pipeline

CVWD Areas of Benefit

- East Whitewater River
- West Whitewater River
- Mission Creek

Figure 5-1

WY 2019 to 2020 Change in Groundwater Elevation in the East Whitewater River Subbasin AOB

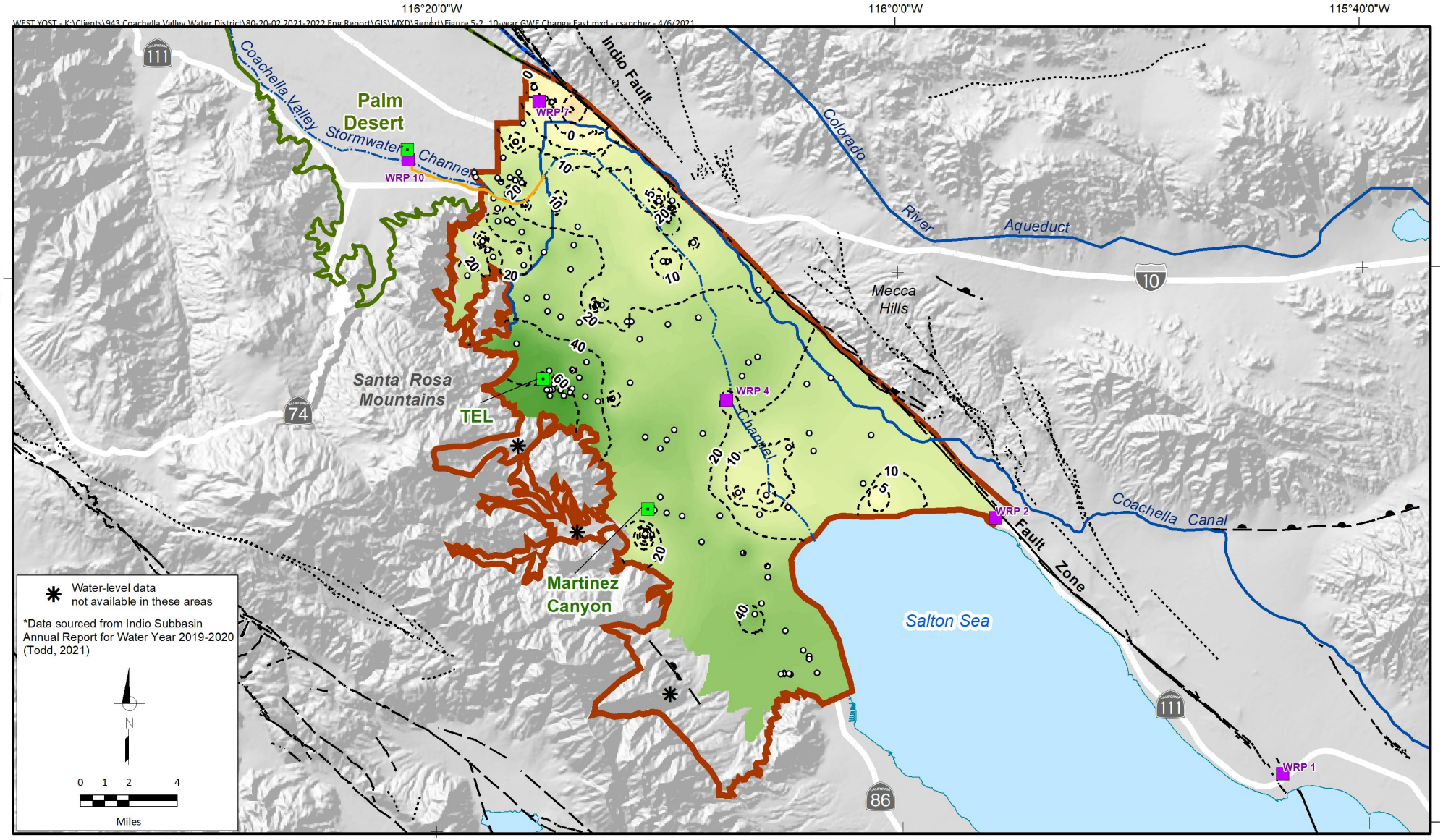
Coachella Valley Water District
2021-2022 Engineer's Report

Figure 5-2 shows changes in average groundwater levels over the last 10 years, from WY 2010 to 2020. Figure 5-3 shows well hydrographs that exhibit representative trends in groundwater levels across the AOB over the same period. Over the last 10 years, groundwater levels in the direct vicinity of the TEL GRF increased by up to 70 ft (see Well 07S07E03D01S). These increases in groundwater levels are primarily the result of annual direct replenishment, which has averaged 35,500 afy at the TEL GRF since 2010. Groundwater levels have also gradually increased by up to 30 ft in the western portion of the AOB surrounding the TEL GRF (see Wells 06S08E19R01S, 07S09E18H01, 07S08E32A01 and 07S08E35D01). Coupled with conservation efforts, in-lieu replenishment programs where Colorado River water and recycled water are used to reduce demands on groundwater have helped increase groundwater levels across the AOB, as evidenced by a decrease in production over the last decade. In the southern portion of the AOB, artesian conditions remained relatively stable from WY 2019 to 2020. The stable or increasing groundwater levels across the AOB demonstrate the benefit and effectiveness of the GRP in sustaining the groundwater supplies.

5.3 Groundwater Production

Table 5-1 lists the annual groundwater production volumes in the East Whitewater River Subbasin AOB from CY 1999 to 2020. The 1999 production value is from the CVWMP, Table 3-2 Summary of Historical Water Supplies in 1936 and 1999 (CVWD, 2002a). Production values for the years 2002 through 2011 were determined from reported and estimated unreported groundwater production. Beginning in 2005, when the replenishment assessment became effective in the East Whitewater River Subbasin AOB, groundwater pumpers extracting greater than 25 af were required to meter and report their production. Reported production has been used since 2012 as accurately representing assessable production in the AOB.

In CY 2020, the assessable production was 117,925 af. This represents a less than one percent increase from 2019. Assessable production excludes groundwater production from Minimal pumpers who extract 25 afy or less and tribal uses. Water Code Section 31633.5 exempts Minimal pumpers from any replenishment assessment or production reporting provisions.



Change in Groundwater Elevation*

75 ft

0

-75 ft

Well Used to Calculate Ten-Year Change in Groundwater Elevation

Wells with Hydrographs in Figure 5-3

- 05S07E08Q01S
- 06S08E19R01S
- 07S07E03D01S
- 07S08E32A01S
- 07S08E35D01S
- 07S09E18H01S

Replenishment Infrastructure

- Direct Replenishment Facility
- Water Reclamation Plant
- Imported Water Canal/Aqueduct
- Mid-Valley Pipeline

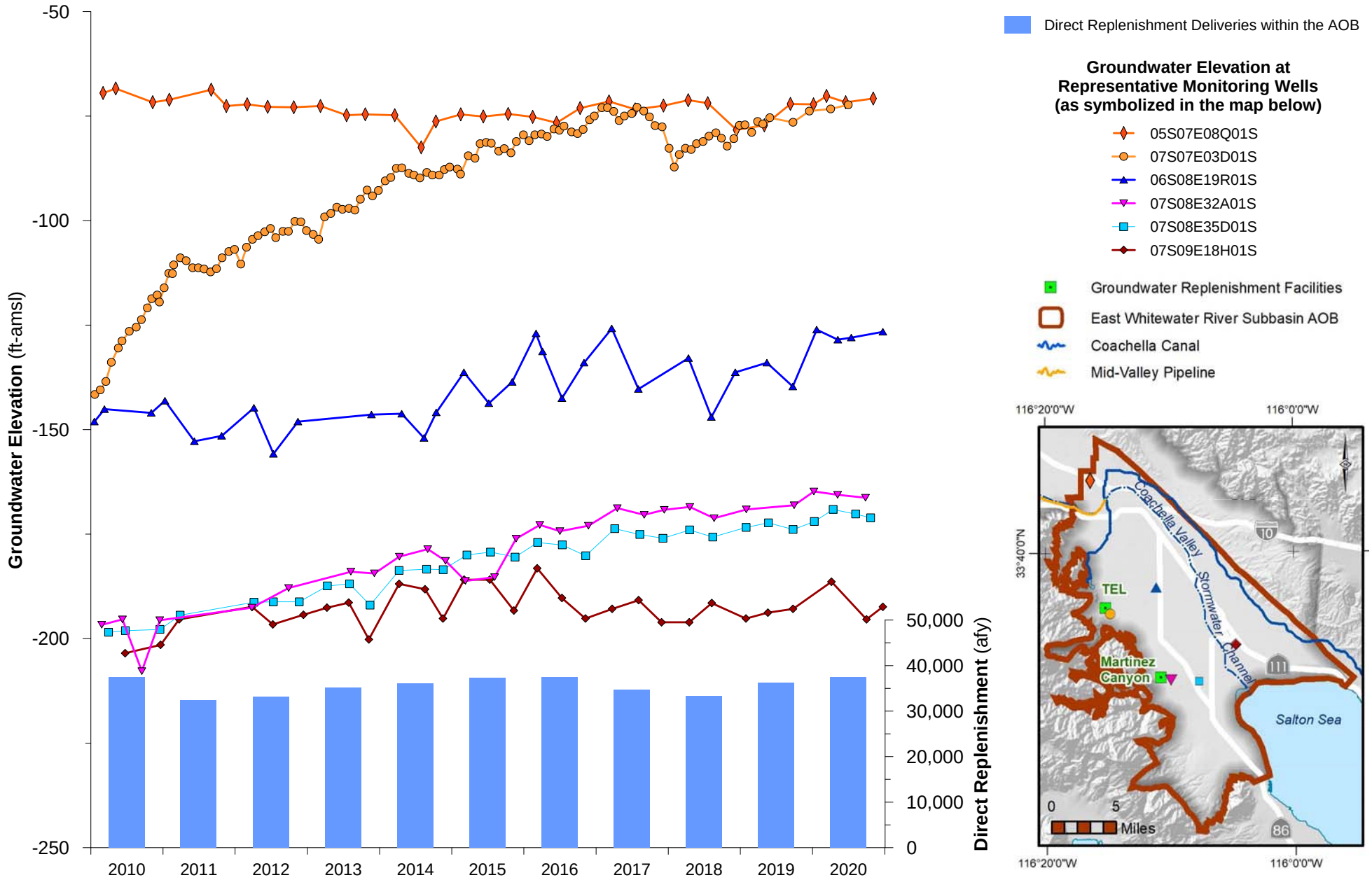
CVWD Areas of Benefit

- East Whitewater River
- West Whitewater River
- Mission Creek

Figure 5-2

WY 2010 to 2020 Change in Groundwater Elevation in the East Whitewater River Subbasin AOB

Coachella Valley Water District
2021-2022 Engineer's Report



Prepared by:

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Water. Engineered.

Author: GR
Date: 20210204
Filename: Fig5-3_EWhitewater_hydrographs

Prepared for:

2021-2022 Engineer's Report of Water Supply and Replenishment Assessment

WATER DISTRICT

Hydrographs and Direct Replenishment for the East Whitewater River Subbasin AOB
2010-2020

Figure 5-3

Table 5-1. Groundwater Production within the East Whitewater River Subbasin Area of Benefit

Calendar Year	Groundwater[a,b] Production, af
1999	168,300
2000	166,700
2001	199,800
2002	172,300
2003	172,000
2004	172,000
2005	172,000
2006	172,000
2007	172,000
2008	172,000
2009	160,000
2010	150,000
2011	145,000
2012	120,064
2013	119,194
2014	123,465
2015	113,706
2016[c]	113,333
2017	117,444
2018	120,935
2019	117,269
2020	117,925

(a) Excludes production by Minimal pumpers who extract 25 afy or less and other users exempt from the RAC
(b) The 1999 production value is from the CVWMP, Table 3-2, Summary of Historical Water Supplies in 1936 and 1999. The CVWMP did not include production values for 2000 and 2001. Production values for the years 2002 through 2012 were estimated from reported and projected unreported groundwater production. The production values for 2012 through 2020 are equal to the reported groundwater production during those CYs.
(c) The 2016 production amount was updated with data reported after publication of the 2017-2018 Engineer's Report.

5.4 Direct and In-Lieu Replenishment

This section describes the replenishment activities in the East Whitewater River Subbasin AOB.

5.4.1 Replenishment Facilities

5.4.1.1 Thomas E. Levy Groundwater Replenishment Facility

The TEL GRF is located just south of Lake Cahuilla at Dike 4, a major flood control dike, near Avenue 62 and Madison Street in La Quinta. This location is ideally suited for large-scale replenishment, given its proximity to Lake Cahuilla and the relative absence of aquitards that would retard infiltration. The TEL GRF went online in June 2009. The 2010 CVWMP Update recommends a goal of 40,000 afy at the TEL GRF. In 2017, Todd Groundwater completed a study to evaluate the feasibility of increasing groundwater

replenishment with Colorado River water at the TEL GRF. The study recommended additional monitoring to better characterize hydrogeological conditions in the vicinity of the TEL GRF. During 2019, six monitoring wells were installed in the vicinity of the GRF. Monitoring at these six additional wells began in 2020.

5.4.1.2 Martinez Canyon Groundwater Replenishment Facility Pilot Project

In March 2005, CVWD completed construction of a pilot replenishment facility and several monitoring wells on the Martinez Canyon alluvial fan at 72 Avenue and Lemon Blossom Lane. This pilot facility was designed to replenish approximately 4,000 afy, but the results from the Martinez Canyon Pilot project (operated from 2005 through 2013) indicated that the site may not be ideally suited for groundwater replenishment. Although there have been no deliveries of replenishment water to the Martinez Canyon GRF since 2013, CVWD continues to monitor and evaluate the need for and feasibility of a replenishment facility on the Martinez Canyon alluvial fan.

5.4.2 Direct Replenishment

Table 5-2 lists the annual volumes of Colorado River water that was delivered to the AOB for direct replenishment from 1997 to 2020. In 2020, CVWD delivered 37,536 af of Colorado River water for direct replenishment at the TEL GRF. Deliveries of Colorado River water to the TEL GRF were reduced in 2017 and 2018 from the then-maximum level of 37,495 af in 2016 as a result of pump maintenance and panel repair work done for the Coachella Canal Lining Project. Deliveries in 2019 and 2020 have returned to a two-year average of 36,840 af.

From 1997 to 2020, a total of 450,425 af was delivered to the TEL GRF and Martinez Canyon GRF pilot project for direct replenishment of the AOB.

5.4.3 In-Lieu Replenishment

In addition to the direct replenishment activities described above, CVWD has provided imported Colorado River water since 1949 and recycled water since 1997 to replace groundwater pumping. CVWD continues to work with groundwater users—such as farmers, golf courses, and others—to encourage the use of these alternative water sources. Currently, 32 of 37 golf courses in the East Valley receive Colorado River water or recycled water and no longer rely on groundwater as their primary source of irrigation water. Most of the golf courses receive Colorado River water from the Coachella Canal and its laterals for their non-potable irrigation uses. Nine holes of one golf course receive blended recycled and canal water from WRP 7 for part of the year and one golf course receives canal water from the MVP. The goal for the golf courses is to meet their irrigation demands with no more than 20 percent well water for their total irrigation use each FY. CVWD continues to work with golf course managers to encourage them to sign the updated Non-potable Water Agreement, which includes this requirement, and all new connections sign a Non-potable Water Agreement that requires 80 percent non-potable water use.

Table 5-2. Deliveries of Colorado River Water for Direct Replenishment at the East Whitewater River Subbasin AOB Replenishment Facilities

Calendar Year	Colorado River Water Delivered, af
1997	415
1998	1,364
1999	2,802
2000	1,813
2001	3,572
2002	2,360
2003	1,671
2004	3,450
2005	4,743
2006	2,648
2007	5,775
2008	7,473
2009	21,735
2010	37,401
2011	32,417
2012	33,166
2013	35,192
2014	36,030
2015	37,262
2016	37,495
2017	34,614
2018	33,348
2019	36,143
2020	37,536
Total	**450,425**

5.5 Future Projects

Direct and in-lieu replenishment activities in the East Whitewater River Subbasin AOB are expected to continue and include the following future projects.

In addition to various upgrades to the delivery system and existing connections, CVWD's Engineering Department completed improvements to the irrigation distribution system within the City of La Quinta, which will allow for additional canal water utilization for irrigation purposes at the La Quinta Resort Mountains and Dunes courses as well as the La Quinta Country Club, Citrus Golf Club, Traditions Golf Club, and the SilverRock Resort. Improvements will continue to the L4 Pump Station through 2021 to allow for these clubs and the Mountain View Country Club to achieve their 80 percent non-potable irrigation needs.

The Oasis In-Lieu Recharge Project is an in-lieu replenishment/source-substitution project that was identified in the 2010 CVWMP Update and selected for implementation. The project involves the construction of a canal water distribution system in the Oasis area of the AOB to provide imported Colorado River water for agricultural irrigation on the Oasis slope in-lieu of groundwater production. The project is designed to reduce groundwater production in the area by approximately 32,000 afy. Phase I of the project included two reservoirs to provide additional storage and operational improvements/flexibility in the Oasis area and construction on this phase of the project was completed in December 2020. The construction contract for Phase 2 was awarded in November 2020. The right-of-way acquisitions are still in process and should be completed by March 2021. The contractor is in the process of procuring the long lead items associated with this project with a tentative construction start date of March 2021.

To further in-lieu replenishment, connections to the Eagle Falls, Rancho Casa Blanca, and the Quarry golf courses are planned.

CVWD filed Wastewater Change Petition WW0093 with the SWRCB pursuant to California Water Code 1211 in support of a proposed recycled water project for CVWD WRP 4. The project is an integral component of the 2010 CVWMP Update, developed to eliminate groundwater overdraft and the associated adverse impacts by, among other measures, developing additional water sources for source substitution, such as recycled water. This recycled water project will also provide important water quality benefits by reducing wastewater discharges to the CVSC and the Salton Sea. The project proposes to install facilities to produce and deliver recycled water from WRP 4 and eliminate its wastewater discharges by year 2030. CVWD continues to seek resolutions to protests received to the change petition. As part of this process, CVWD will initiate project-specific environmental review pursuant to California Environmental Quality Act (CEQA) Statutes and Guidelines to supplement the review completed in the Programmatic Environmental Impact Report (PEIR) (CVWD, 2002b) and Subsequent PEIR (CVWD, 2010). CVWD is currently working with a consultant (hired in September 2020) to prepare a Preliminary Engineering Report that can be used for the project-specific environmental review.

5.6 Need for Continued Replenishment

The historical declines in groundwater levels in the eastern portion of the East Whitewater River Subbasin led to the determination that a management program was required to stabilize the declining groundwater levels and prevent associated adverse effects, such as water-quality degradation and land subsidence. CVWD's GRP for the East Whitewater River Subbasin AOB was developed to serve this need and became effective in 2005.

Since the initiation of direct replenishment activities at the TEL GRF in 1997, groundwater levels as measured at wells across most of the AOB, a key metric in assessing the effectiveness of the GRP, have stabilized or are rising. The ten-year average change in groundwater levels remains positive across most of the AOB, which is evidence that implementation of the GRP has effectively abated the conditions of overdraft that preceded it. Continued artificial replenishment is necessary to maintain these positive trends and prevent a return to overdraft in the future.

5.7 Replenishment Assessment

This section describes the recommended RAC for the East Whitewater River Subbasin AOB for FY 2021-2022.

5.7.1 Groundwater Replenishment Program Costs

The RAC includes the cost of replenishment water, operation and maintenance costs, administrative costs, debt service, and capital improvements necessary to maintain the replenishment facilities for the East Whitewater Subbasin AOB. Replenishment water for the East Whitewater River Subbasin AOB GRP comes from CVWD's Colorado River water contract and the QSA. The replenishment water is priced at CVWD's Canal Water Class 2 rate. In addition, continuing engineering studies, well meter reading and maintenance, and groundwater monitoring costs incurred by CVWD are included in the cost calculations.

5.7.2 Methods for Determining Groundwater Production

Groundwater producers who extract more than 25 afy of groundwater, including flowing artesian groundwater, are required to meter and report their production pursuant to Water Code Sections 3164.5 and 31638.5. Beginning in 2005, when the replenishment assessment became effective in the East Whitewater River Subbasin AOB, groundwater pumpers extracting greater than 25 afy have been required to meter and report their production. CVWD has an ongoing program to conduct a thorough field investigation of the use of all wells that may be subject to metering and reporting requirements.

The exact number of exempt Minimal pumpers in the East Whitewater River Subbasin AOB is currently unknown. Minimal pumpers predominantly pump water from small wells that are used for domestic or limited irrigation purposes. The maximum groundwater pumping by the unmetered Minimal pumpers in the AOB is estimated to be less than 1,000 afy.

5.7.3 Debt Consolidation

The East Whitewater Replenishment Fund received a loan from CVWD's Domestic Water Fund to construct the TEL GRF in the amount of $60.3 million. Beginning in 2013, this capital debt is now consolidated with the Uncollected RAC First Four Years and Assessed vs. Assessable Amortizations from prior years to form one debt service amount, and such debt will be paid back each year to the Domestic Water Fund.

5.7.4 Income Statement

Table 5-3 is a summary income statement showing revenues, expenses, and cash flow for FY 2020 (actual) and FYs 2021 and 2022 (projected). The table notes provide a description of the sources of revenue and expenses.

Table 5-3. Coachella Valley Water District East Whitewater River Subbasin Area of Benefit Groundwater Replenishment Program Income Statement

Description	Actual FY 2020, $1,000	Projected FY 2021, $1,000	Projected FY 2022, $1,000
Revenues			
RAC Rate[a]	$7,771	$7,920	$8,672
Property Tax, General[b]	4,465	4,538	6,779
Other Revenue[c]	733	234	99
Total Revenues	**$12,969**	**$12,692**	**$15,550**
Expenses			
Total O&M Costs[d]	$2,003	$2,223	$2,267
Power Costs[e]	1,041	952	981
Colorado River Water[f]	3,967	3,975	3,991
QSA Mitigation Costs	1,080	520	1,923
Administrative Costs[g]	1,602	1,889	2,000
In-lieu Replenishment Capital Costs[h]	468	102	832
Capital Improvement[i]	179	138	210
Capital Improvement Project – Oasis In-lieu Replenishment[j]	-	4,000	34,000
Loan Proceeds – Oasis In-lieu Replenishment[j]	-	(4,000)	(34,000)
Debt Service[k]	13,338	9,278	2,104
Transfer (From) To Other Funds[l]	22	64	61
Total Expenses	**$23,700**	**$19,141**	**$14,369**
Net Increase (Decrease) in Cash Flow[m]	($10,731)	($6,449)	$1,180
Ending Reserves	**$6,472**	**$23**	**$1,204**

(a) RAC for FY 2020 and FY 2021 = $66/af. RAC for FY 2022 = $72.27/af. Revenues based on FY actual or budgeted production estimates.
(b) General Property Taxes are the 1 percent discretionary property taxes collected that are allocated to the enterprise funds as determined by the Board of Directors.
(c) Other Revenues include investment income and miscellaneous charges for services.
(d) O&M costs include labor, equipment, and materials for the replenishment facilities.
(e) Power costs are the actual power and utility charges for the recharge facilities for FY 2020.
(f) Colorado River water costs for FY 2020 were based on the delivered volume of approximately 37,800 af. FYs 2021 and 2022 water costs are based on an estimated 37,000 af. The calculated rate per af is comprised of CVWD's Class 2 Rate plus Quagga and Gate Charges.
(g) Annual cost to administer the GRP includes personnel, meter reading, investigation, report preparation, and billing.
(h) In-lieu Replenishment Capital Costs include design work on the Madison Club meter connection and the Oasis In-Lieu Recharge Phase II Project.
(i) Costs for irrigation distribution improvements, TEL facility monitoring upgrades, and the fund's share of General District capital projects.
(j) Projected annual capital costs for the construction of the Oasis In-lieu Replenishment Project offset with debt proceeds from the sale of bonds.
(k) Debt Service - 15-year variable debt instrument payable to CVWD's Domestic Water Fund in the amount of $60,285,179. This note payable reimburses the Domestic Water Fund for the land and construction costs of the replenishment facilities within this AOB.
(l) Transfer To (From) Other Funds is to reimburse CVWD's Motorpool Fund for its share of CVWD vehicles and equipment purchased by the Motorpool Fund.
(m) Net Increase (Decrease) in Cash Flow excludes depreciation.

5.7.5 Recommended RAC for Fiscal Year 2021-2022

Based on the projected operating costs, revenues, and reserves, CVWD staff recommends that the $66.00/af RAC that became effective on July 1, 2016 be increased by $6.27/af, to $72.27/af, effective July 1, 2021.

Note that as of FY 2020, SWP tax revenues are no longer allocated to the East Whitewater River Subbasin AOB RAC. Based on the revenues and costs shown in Table 5-3, the Fund is projected to have a negative cash flow of $6,449,000 in FY 2021 and a positive cash flow of $1,180,000 in FY 2022. Debt Service costs are the primary cost drivers for the Fund. The Fund is projected to maintain a positive cash flow in FY 2022, but not meet its reserve funding requirements prescribed in CVWD's Reserve Policy.

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