ENGINEER'S REPORT ON WATER SUPPLY AND REPLENISHMENT ASSESSMENT

Mission Creek Subbasin Area of Benefit

2010-2011

Prepared for

COACHELLA VALLEY WATER DISTRICT

April 2010

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Prepared by
Environmental Services Division
Engineering Department
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COACHELLA VALLEY WATER DISTRICT

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INTRODUCTION

This is the 8th annual Engineer's Report on Water Supply and Replenishment Assessment for the Mission Creek Subbasin Area of Benefit managed by the Coachella Valley Water District (CVWD). This program began in the 2003-2004 fiscal year and has replenished the Mission Creek Subbasin with a cumulative total of approximately 60,625 acre-feet (AF) of supplemental water.

CVWD serves an area of approximately 1,000 square miles in the Coachella Valley (Valley) within the counties of Riverside, Imperial and San Diego. The Valley is situated in the northwesterly portion of California's Colorado Desert. The Valley is bordered on the west and north by high mountains, which provide an effective barrier against coastal storms, and which greatly reduce the contribution of direct precipitation to recharge the Valley's groundwater basin. The bulk of natural groundwater recharge comes from runoff from the adjacent mountains.

The need to enhance the Valley's water supply has been recognized for many years. The formation of CVWD in 1918 was a direct result of the concern of residents over a plan to export water from the Whitewater River to Imperial Valley. The early residents of the Valley also recognized that action was needed to stem the decline of the water table, which was occurring as a result of their pumpage. This caused CVWD to enter into an agreement for construction of the Coachella Branch of the All American Canal (Coachella Canal or Canal) to bring Colorado River water to the Valley. Since 1949, the Coachella Canal has been providing water for irrigation use in an area generally from Indio and La Quinta southerly to the Salton Sea.

After providing supplemental water in the southeastern part of the Valley and with the onset of recreational development, the need for supplemental water in the northwestern part of the Valley was recognized. As a result, CVWD and the Desert Water Agency (DWA) entered into separate contracts with the State of California (State) to ensure that water from the State Water Project (SWP) would be available. A direct connection from the SWP to the Valley does not currently exist. Therefore, CVWD and DWA entered into an agreement with the Metropolitan Water District of Southern California (MWD) to obtain water from the MWD Colorado River Aqueduct, which crosses the upper portion of the Valley near Whitewater, in exchange for CVWD and DWA SWP water. Since 1973, CVWD and DWA have been releasing Colorado River water near Whitewater to replenish groundwater in the upper portion of the Whitewater River Subbasin of the Valley.

In 1976, CVWD and DWA, recognizing that management of the groundwater basin in the western part of the Valley extended across agency boundaries, entered into a Joint Water Management Agreement. This agreement recognized the need to operate the groundwater basin as a complete unit rather than as individual segments delineated by agency boundaries.

The Water Management Agreement calls for maximum importation of water for replenishment of groundwater basins within defined Water Management Areas. The Agreement also requires collection of data necessary for sound management of all water resources within these same Water Management Areas.

The Water Management Agreement was developed following numerous investigations regarding the groundwater supply within the Valley. Those investigations are addressed in previous reports (Engineer's Reports on Water Supply and Replenishment Assessment for Coachella Valley Water District, 1980-1981 through 2009-2010).

Both CVWD and DWA are permitted by the State Water Code to replenish groundwater basins and to levy and collect water replenishment assessments from any groundwater extractor or surface water diverter (aside from exempt producers) within their jurisdictions who benefits from replenishment of groundwater. CVWD began assessment of groundwater producers within the Whitewater River Subbasin in fiscal year 1980-1981, and DWA began its assessment program in fiscal year 1978-1979. The two agencies are not required to implement assessment procedures jointly or identically.

Due to continuing overdraft conditions in the Mission Creek Subbasin, located northerly of the Whitewater River Subbasin, CVWD and DWA began constructing facilities to replenish the Mission Creek Subbasin in October 2001, in accordance with applicable law. Facilities were completed in June 2002 and in December 2002, DWA and CVWD began recharge activities in the Mission Creek Subbasin.

The State Water Code requires completion of an Engineer's Report regarding the Replenishment Program before CVWD can levy and collect groundwater replenishment assessments. The report shall include the condition of groundwater supplies, the need for groundwater replenishment, the Area of Benefit, water production within said area, and replenishment assessments to be levied upon said water production. It shall also contain recommendations regarding the replenishment program including the source and amount of replenishment water and related costs. The first Engineer’s Report for the Mission Creek Subbasin Area of Benefit was completed in April 2003.

The purpose of this report is to update the groundwater supply conditions and current replenishment program and to establish a replenishment assessment for CVWD's Mission Creek Subbasin Area of Benefit for the upcoming fiscal year.

GROUNDWATER BASIN DESCRIPTION

Geology

The Coachella Valley Groundwater Basin, as described by the California Department of Water Resources (DWR), is bounded on the north and east by non-waterbearing crystalline rocks of the San Bernardino and Little San Bernardino Mountains and on the south and west by the crystalline rocks of the Santa Rosa and San Jacinto Mountains. At the west end of the San Gorgonio Pass, between Beaumont and Banning, the basin boundary is defined by a surface

drainage divide separating the Coachella Valley Groundwater Basin from the Beaumont Groundwater Basin of the Upper Santa Ana drainage area.

The lower boundary is formed primarily by the watershed of the Mecca Hills and by the northwest shoreline of the Salton Sea running between the Santa Rosa Mountains and Mortmar. Between the Salton Sea and Travertine Rock, at the base of the Santa Rosa Mountains, the lower boundary coincides with the Riverside/Imperial County Line.

Southerly of the lower boundary, at Mortmar and at Travertine Rock, the subsurface materials are predominantly fine grained and low in permeability; although groundwater is present, it is not readily extractable. A zone of transition exists at these boundaries; to the north the subsurface materials are coarser and more readily yield groundwater.

Although there is interflow of groundwater throughout the groundwater basin, fault barriers, constrictions in the basin profile and areas of low permeability limit and control movement of groundwater. Based on these factors, the groundwater basin has been divided into Subbasins and Subareas as described by DWR in 1964 and the United States Geological Survey (USGS) in 1971.

The Subbasins present in the Valley are Mission Creek, Desert Hot Springs, Garnet Hill and Whitewater River (Indio) Subbasins. The Subbasins, with their groundwater storage reservoirs, are defined without regard to water quantity or quality. They delineate areas underlain by formations which readily yield the stored water through water wells and offer natural reservoirs for the regulation of water supplies.

The boundaries between Subbasins within the groundwater basin are generally based upon faults that are effective barriers to the lateral movement of groundwater. Minor Subareas have also been delineated, based on one or more of the following geologic or hydrologic characteristics: type of water bearing formations, water quality, areas of confined groundwater, forebay areas, groundwater divides and surface drainage divides.

The following is a list of the Subbasins and associated Subareas, based on the DWR and USGS designations:

- Mission Creek Subbasin
- Desert Hot Springs Subbasin
- Whitewater River (Indio) Subbasin
    - Palm Springs Subarea
    - Garnet Hill Subbarea
    - Thermal Subarea
    - Thousand Palms Subarea
    - Oasis Subarea

Figure 1 shows the locations of these Subbasins and Subareas. This report presents brief descriptions of the Desert Hot Springs Subbasin, Garnet Hill Subarea, and Whitewater River (Indio) Subbasin as they are located outside the area of interest for this report. A more detailed description of the Mission Creek Subbasin is provided in this report.

The following are areas within the Valley where a supply of potable groundwater is not readily available:

- Indio Hills area
- Mecca Hills area
- Barton Canyon area
- Bombay Beach area
- Salton City area

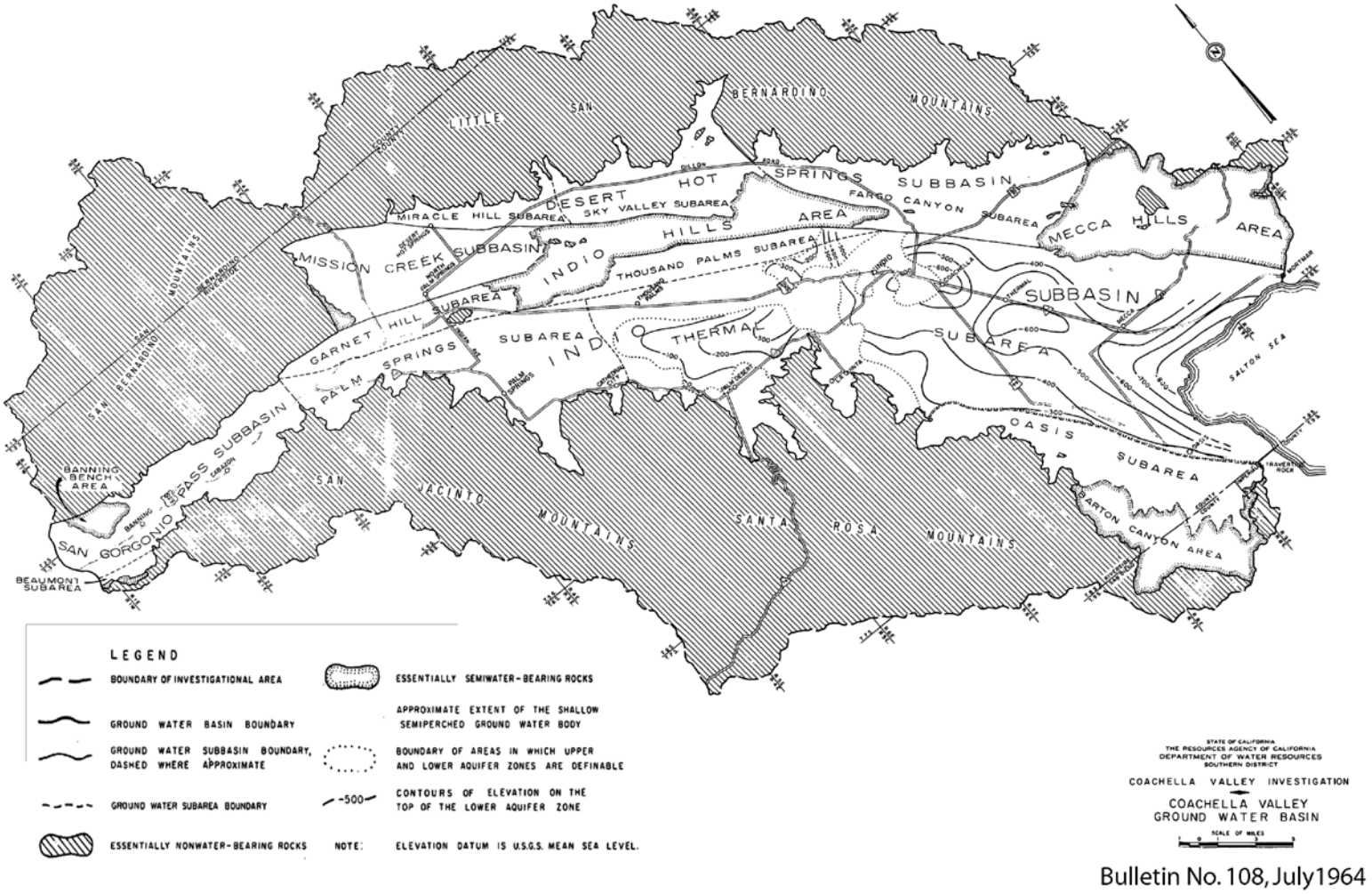
MISSION CREEK SUBBASIN

Water bearing materials underlying the Mission Creek upland comprise the Mission Creek Subbasin. The Subbasin is bounded on the south by the Banning Fault and on the north and east by the Mission Creek Fault. It is bordered on the west by non-waterbearing rocks of the San Bernardino Mountains. To the southeast of the Subbasin are the Indio Hills. The area within this boundary reflects the estimated limit of effective storage within the Subbasin.

Both the Mission Creek Fault and the Banning Fault are effective barriers to groundwater movement, as evidenced by offset water levels, fault springs, and changes in vegetation. Water level measurements in the spring of 1961 between Well Nos. 03S05E04L02S and 03S05E04M01S indicated a vertical difference in the groundwater table elevation of 255 feet in a horizontal distance of 1,600 feet across the Mission Creek Fault. Similar measurements of Well Nos. 03S04E13H01S and 03S04E13N01S on either side of the Banning Fault indicated a vertical difference of 250 feet in water surface elevation over a horizontal distance of 4,900 feet. Water levels are higher on the north side of both faults.

All known wells in the Subbasin were drilled in recent sands and gravels. At depths ranging from 20 to 170 feet, the wells pass through unconsolidated recent material and encounter semi-consolidated and interbedded sands, gravels and silts similar to exposures of the Ocotillo conglomerate in the Indio Hills or the Cabazon fanglomerate exposed at Whitewater Hill. Although these Pleistocene deposits are the main source of water, water also occurs in recent alluvium where the water table is sufficiently shallow.

Figure 1 Coachella Valley Groundwater Subbasins and Associated Subareas



Bulletin No. 108, July1964

Desert Hot Springs Subbasin

The Desert Hot Springs Subbasin is bounded to the north by the Little San Bernardino Mountains and to the southeast by the Mission Creek and San Andreas Faults. The San Andreas Faults separates the Desert Hot Springs Subbasin from the Whitewater River Subbasin and serves as an effective barrier to groundwater flow. The Subbasin has been divided into three Subareas: Miracle Hill, Sky Valley and Fargo Canyon. The Desert Hot Springs Subbasin is not extensively developed except in the area of Desert Hot Springs. Relatively poor groundwater quality has limited the use of this Subbasin for groundwater supply. The Miracle Hill Subarea is characterized by hot mineralized groundwater, which supplies a number of spas in the area.

Garnet Hill Subbarea

The area northeast of the Garnet Hill Fault and the Whitewater River (Indio) Subbasin, named the Garnet Hill Subarea by DWR (1964), was separated as a distinct Subbasin by the USGS because of the effectiveness of the Banning and Garnet Hill Faults as barriers to groundwater movement. This is illustrated by a difference of 170 feet in groundwater level elevation in a horizontal distance of 3,200 feet across the Garnet Hill Fault, as measured in the Spring of 1961. The fault does not reach the surface and is probably effective as a barrier to groundwater movement only below a depth of about 100 feet.

Although some recharge to this Subbarea may come from Mission Creek and other streams that pass through during periods of high flood flows, the chemical character of the groundwater plus its direction of movement indicate that the main source of recharge to the Subbasin comes from the Whitewater River through the permeable deposits which underlie Whitewater Hill. Based on groundwater level measurements, this area is influenced by artificial recharge activities at the Whitewater Spreading Facilities at Windy Point.

Whitewater River (Indio) Subbasin

The Whitewater River Subbasin, known also as the Indio Subbasin, comprises the major portion of the floor of the Valley and encompasses approximately 400 square miles. Beginning about one mile west of the junction of State Highway 111 and Interstate 10, the Whitewater River (Indio) Subbasin extends southeast approximately 70 miles to the Salton Sea. The Subbasin is bordered on the southwest by the Santa Rosa and San Jacinto Mountains, and is separated from Garnet Hill Subarea, Mission Creek Subbasin, and Desert Hot Springs Subbasin to the north and east by the Garnet Hill and San Andreas Faults.

The limit of the Whitewater River (Indio) Subbasin along the base of the San Jacinto Mountains and the northeast portion of the Santa Rosa Mountains coincides with the Coachella Valley Groundwater Basin boundary. The Whitewater River (Indio) Subbasin in this vicinity includes only the Recent terraces and alluvial fans. The Garnet Hill Fault, which extends southeastward from the north side of San Gorgonio Pass to the Indio Hills, is a relatively effective barrier to groundwater movement from the Garnet Hill Subbarea into the Whitewater

River (Indio) Subbasin. The San Andreas Fault, extending southeastward from the junction of the Mission Creek and Banning Faults in the Indio Hills and continuing out of the basin on the east flank of the Salton Sea, is also an effective barrier to groundwater movement.

The Whitewater River (Indio) Subbasin is divided into five Subareas: Palm Springs, Garnet Hill, Thermal, Thousand Palms, and Oasis Subareas. The Palm Springs Subarea is the forebay or main area of recharge to the Subbasin, and the Thermal Subarea comprises the pressure or confined area within the basin. The other three Subareas are peripheral areas having unconfined groundwater conditions.

WATER SUPPLY

Groundwater Storage

In 1964, DWR estimated that the Subbasins in the Coachella Valley Groundwater Basin contained, in the first 1,000 feet below the ground surface, approximately 39,200,000 AF of water. The capacities of the Subbasins are shown in Table 1.

Table 1 Groundwater Storage Coachella Valley Groundwater Basin

Area	Storage [1] (AF)
San Gorgonio Pass Subbasin	2,700,000
Mission Creek Subbasin	2,600,000
Desert Hot Springs Subbasin	4,100,000
Subtotal	9,400,000
Whitewater River Subbasin	
Palm Springs Subarea	4,600,000
Garnet Hill Subarea	1,000,000
Thousand Palms Subarea	1,800,000
Oasis Subarea	3,000,000
Thermal Subarea	19,400,000
Subtotal Whitewater River (Indio) Subbasin	29,800,000
Total all Subbasins	**39,200,000**

[1] First 1,000 feet below ground surface. California Department of Water Resources estimate (DWR, 1964). Water supply and groundwater replenishment for the Mission Creek Subbasin are calculated based on the entire Subbasin. The Subbasin is utilized jointly by CVWD and DWA for water supply purposes and the two agencies jointly manage the water supply there.

Groundwater Levels

Historical water level declines and conditions producing those declines have been extensively described by the USGS and DWR and are documented in the Coachella Valley Water Management Plan.

Although groundwater levels had indicated a general rise in groundwater levels within the Mission Creek Subbasin between 1938 and 1952, since 1952, a steady decline has been experienced.

The historic declining water table in the Mission Creek Subbasin Area of Benefit led to the determination that a management program is required to stabilize water levels and prevent other adverse effects such as water quality degradation and land subsidence. Coachella Valley Water District's Mission Creek Subbasin Groundwater Replenishment is reducing declining water levels in this subbasin. Groundwater recharge in the Mission Creek Subbasin began in 2002, and the benefits of recharge can be seen in recent groundwater level measurements.

Figures 2 and 3 depict groundwater levels for two wells that are representative of CVWD's Mission Creek Subbasin Area of Benefit. These wells are 2 of 9 wells monitored in the Mission Creek Subbasin Area of Benefit by CVWD staff. The average annual change observed in the monitored wells during 2009 was an increase of 0.9 feet.

Figure 2 Groundwater Levels West of Palm Drive

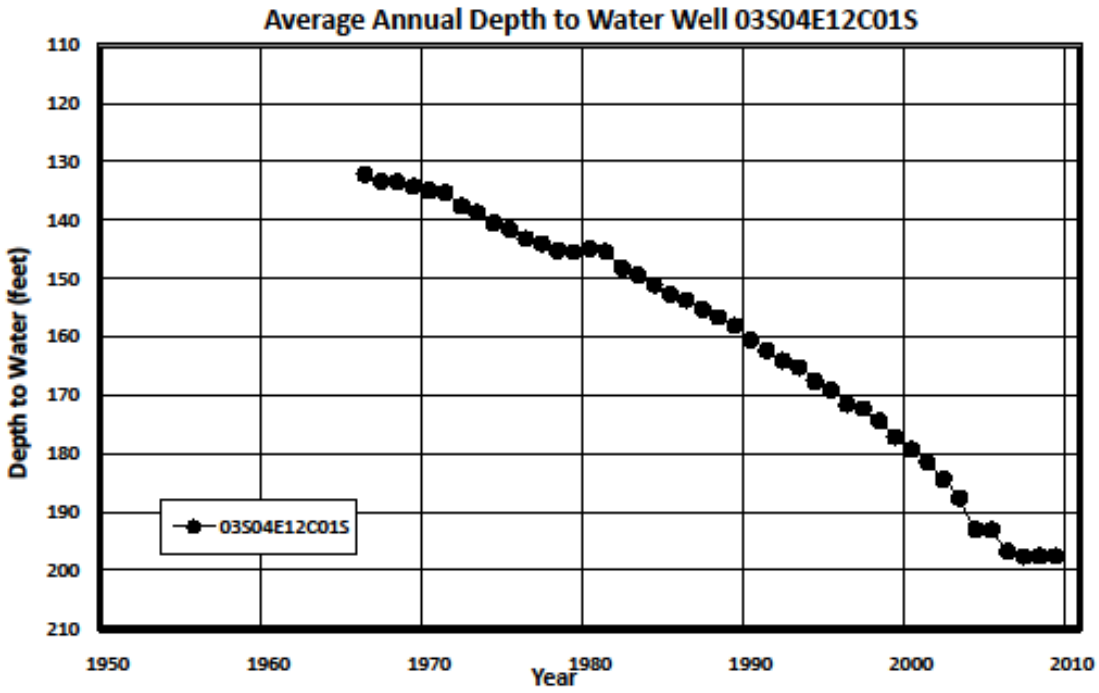
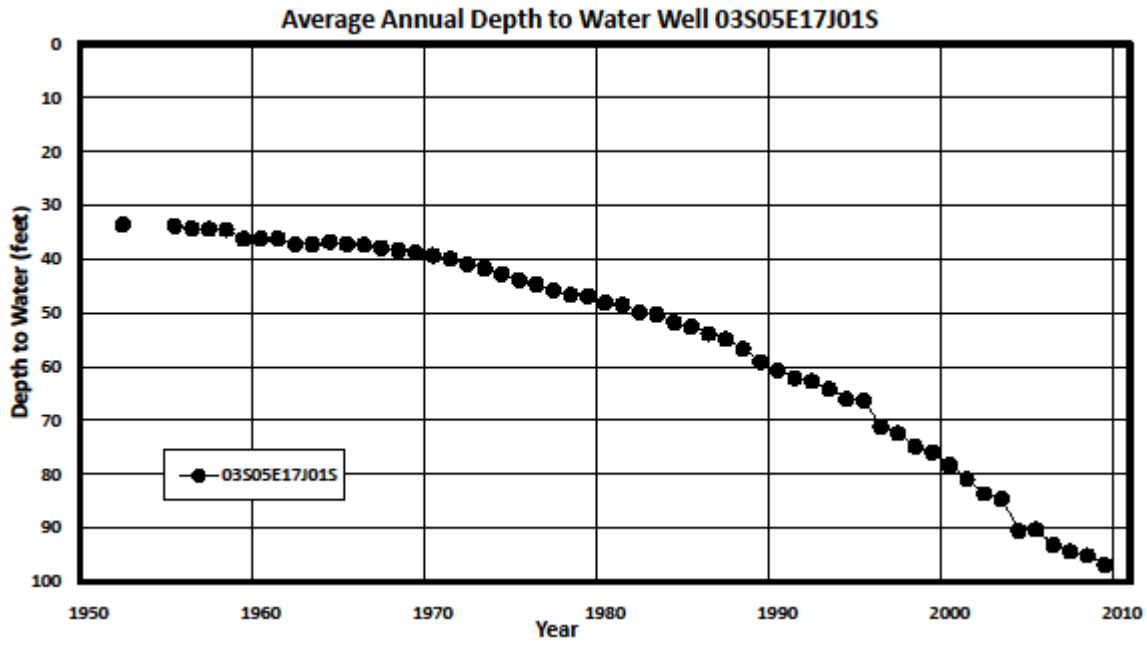


Figure 3 Groundwater Levels near Mountain View Road



Management Area

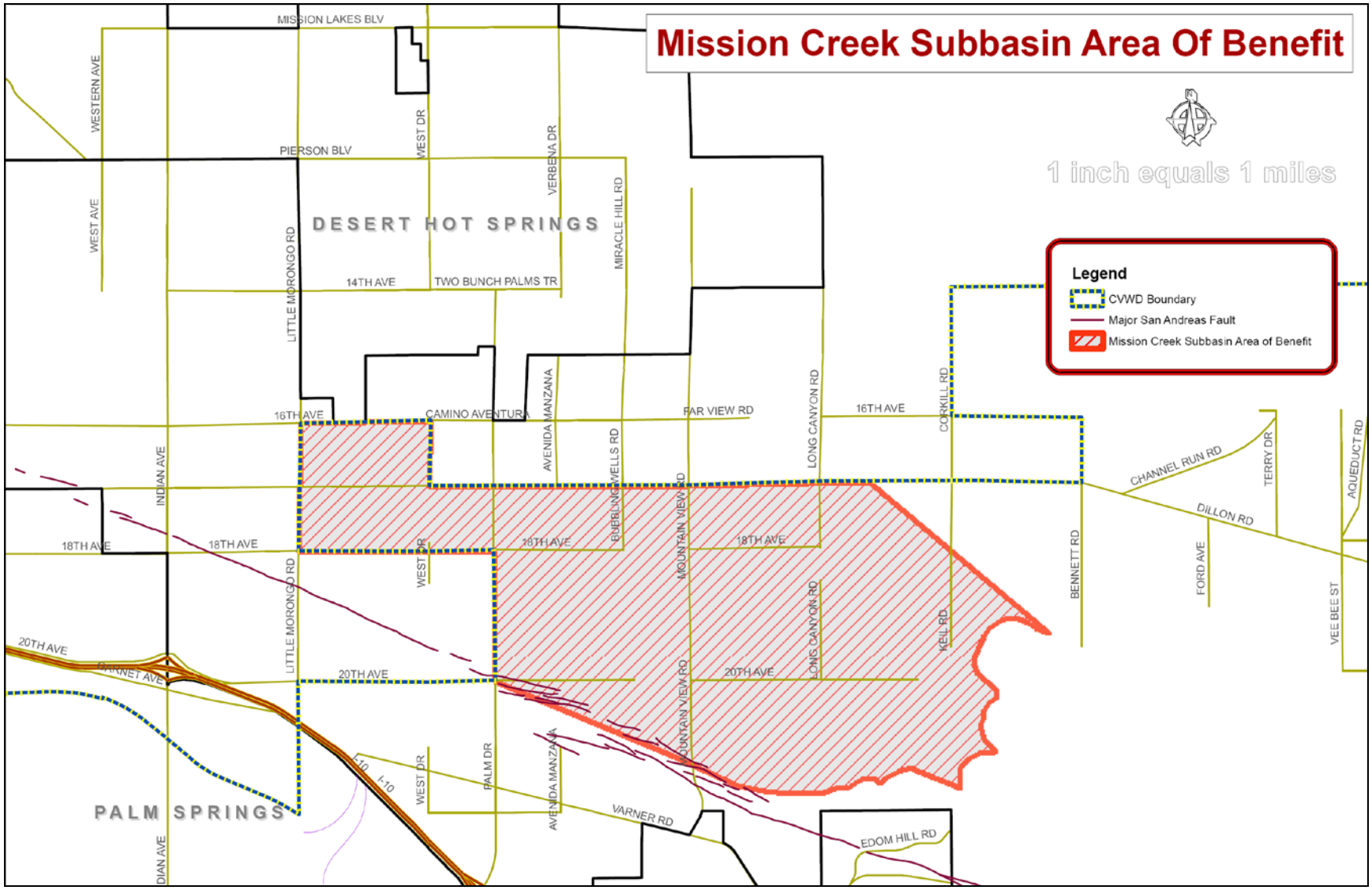
CVWD and DWA have recognized the need to manage the Mission Creek Subbasin as a complete unit rather than as individual segments underlying the individual agencies' boundaries.

Mission Creek Subbasin Area of Benefit Boundary

Figure 4 shows CVWD's Mission Creek Subbasin Area of Benefit. This boundary is defined as follows:

> That portion of the Mission Creek Subbasin within the boundaries of CVWD, bounded on the east beginning approximately one-eighth mile west of the center of Section 10, Township 3 South, Range 5 East, San Bernardino Base and Meridian; thence southeasterly along the trace of the Mission Creek Fault to the base of Edom Hill; thence curving westerly along the base of the Indio Hills following along the southern San Andreas Fault to the intersection of Avenue 20 and Palm Drive; thence north along Palm Drive to Avenue 18; thence west along Avenue 18 to Little Morongo Road; thence north along the west section line of Section 12, Township 3 South, Range 4 East, to Avenue 16; thence east along the north section line of said Section 12 to the northeast corner of the section; thence south along the east section line of said Section 12 to the east-west midsection line, which is Dillon Road; thence east along Dillon Road to the point of beginning.

Figure 4 Mission Creek Subbasin Area of Benefit



Groundwater Production

Table 2 presents historical groundwater production for the Mission Creek Subbasin. This table includes groundwater production for both CVWD's and DWA's Areas of Benefit. Production in 2009 totaled 15,156 AF.

Groundwater Inflows and Outflows

Total inflows and outflows to the Mission Creek Subbasin Area of Benefit for the year 2009 are summarized in Table 3. The natural inflow of 5,000 AF/year includes natural recharge and flow across Subbasin boundaries. The nonconsumptive return of applied water is estimated at 5,305 AF, which is 35 percent of the estimated groundwater production of 15,156 AF/year. The total inflow includes the natural inflow, the nonconsumptive return and the 4,090 AF of actual water recharged at the Mission Creek facilities. The total outflow is the groundwater production estimate plus 2,000 AF/year of natural outflow.

The annual balance is the total inflow less the total outflow for a loss of 2,761 AF of water in storage in the Subbasin.

Overdraft

Groundwater overdraft is manifested not only as a prolonged decline in groundwater storage, but also through secondary adverse effects including decreased well yields, increased energy costs, water quality degradation and land subsidence. The Coachella Valley Water Management Plan (2002) defined overdraft as the loss of freshwater storage.

Based on that definition, the Mission Creek Subbasin's groundwater supply is overdrawn and it will remain so even with the recharge program. Overdraft of the Mission Creek Subbasin will continue with or without further development; however, overdraft will increase with increased development. In effect, the groundwater Subbasin is being mined, since it is not being replenished sufficiently to recover fully.

Imported water may offset groundwater overdraft in a particular year. However, on a long-term basis, water requirements are likely to continue to place demands on groundwater in storage.

Based on the calculations in Table 3, without artificial replenishment, the annual reduction in stored groundwater within the Mission Creek Subbasin for 2009 would be approximately -6,851 AF, compared to an annual balance of -2,761 AF. This table also estimates cumulative gross overdraft between 1978 and 2009 at 118,061 AF. Continued artificial recharge is therefore necessary to reduce annual and cumulative overdraft.

Table 2 Production Within the Management Area in Acre Feet
Coachella Valley Groundwater Basin

Year	CVWD Area of Benefit	DWA Area of Benefit	Total	Annual Change	CVWD Percentage	DWA Percentage
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1978	854	1,399	2,253		37.91	62.09
1979	1,001	2,564	3,565	1,312	28.08	71.92
1980	1,107	2,914	4,021	456	27.53	72.47
1981	1,421	2,878	4,299	278	33.05	66.95
1982	1,302	2,630	3,932	-367	33.11	66.89
1983	1,442	2,979	4,421	489	32.62	67.38
1984	1,915	3,740	5,655	1,234	33.86	66.14
1985	2,148	3,559	5,707	52	37.64	62.36
1986	2,159	4,278	6,437	730	33.54	66.46
1987	2,234	4,483	6,717	280	33.26	66.74
1988	2,302	4,834	7,136	419	32.26	67.74
1989	2,606	5,690	8,296	1,160	31.41	68.59
1990	2,512	5,790	8,302	6	30.26	69.74
1991	2,292	5,486	7,778	-524	29.47	70.53
1992	2,188	6,187	8,375	597	26.13	73.87
1993	2,528	6,333	8,861	486	28.53	71.47
1994	2,863	6,813	9,676	815	29.59	70.41
1995	2,865	7,237	10,102	426	28.36	71.64
1996	2,838	7,724	10,562	460	26.87	73.13
1997	2,104	7,795	9,899	-663	21.25	78.75
1998	2,757	7,534	10,291	392	26.79	73.21
1999	3,004	7,970	10,974	683	27.37	72.63
2000	3,433	8,405	11,838	864	29.00	71.00
2001	3,929	8,421	12,350	512	31.81	68.19
2002	4,371	9,597	13,968	2,130	31.29	68.71
2003	4,425	9,343	13,768	-200	32.14	67.86
2004	4,628	12,069	16,697	2,929	27.79	72.21
2005	4,247	12,068	16,315	-382	26.03	73.97
2006	4,757	12,994	17,751	1,435	26.80	73.20
2007	4,547	12,460	17,007	-744	27.00	73.00
2008	4,543	11,726	16,270	-737	28.00	72.00
2009	4,813	10,343	15,156	-1,114	32.00	68.00
		Average Annual Change		**433**		

(1) Year
(2) Production within CVWD Area of Benefit
(3) Production within DWA Area of Benefit, per Krieger and Stewart
(4) Column (2) plus Column (3)
(5) Current year total minus previous year total
(6) and (7) Percentage of total production

Table 3 Calculation of Overdraft in the Management Area **Coachella Valley Groundwater Basin**[1]		
Item	**Annual Calculation (AF)**	**Total Overdraft (AF)**
Overdraft 1978 - 2008[2]		-115,300
2009 Production	-15,156	
Non-consumptive return[3]	5,305	
Natural inflow[4]	5,000	
Natural outflow[5]	-2,000	
Groundwater replenishment	4,090	
Annual balance	-2,761	
Cumulative overdraft through 2009		-118,061

(1) Based on 65% consumptive use.
(2) Engineer's Report on Water Supply and Replenishment, Mission Creek Subbasin, April 2009.
(3) Based on 35% of production.
(4) Includes actual recharge and flow across Subarea boundaries.
(5) Includes leakage across Subarea boundaries.

REPLENISHMENT PROGRAM

Current Recharge Activities

Alleviation of the Mission Creek Subbasin overdraft was initiated in 2002 by CVWD and DWA using SWP water (Table A Amount).

SWP Table A Amounts

The SWP includes 660 miles of aqueduct and conveyance facilities from Lake Oroville in the north to Lake Perris in the south. The SWP has contracts to deliver 4.1 million AF/year to 29 contracting agencies. CVWD's original Table A Amount is 23,100 AF per year and DWA's original Table A Amount is 38,100 AF/year for a combined Table A Amount of 61,200 AF/year. In 2004, CVWD purchased 9,900 AF/year of SWP Table A Amount from the Tulare Lake Basin Water Storage District to bring its basic Table A Amount to 33,000 AF/year. The total basic Table A Amount for CVWD and DWA is 71,100 AF/year.

CVWD and DWA do not directly receive SWP water. CVWD and DWA have existing exchange agreements (signed in 1972 and amended in 1983) with MWD. These agreements provide for CVWD and DWA to exchange their SWP water deliveries with MWD for Colorado River water. The 1984 Advance Delivery Agreement between CVWD, DWA and MWD allows MWD to store water in the Coachella Valley groundwater basin. The 2003 Exchange Agreement between CVWD, DWA and MWD provides for the transfer of 100,000 AF/year of MWD's Table A Amount to CVWD and DWA. MWD has transferred 88,100 AF/year and 11,900 AF/year of its Table A Amount to CVWD and DWA, respectively. Thus, the total current Table A

Amount for CVWD and DWA is now 171,100 AF/yr with CVWD's portion equal to 121,100 AF/yr.

In 2007, CVWD and DWA completed negotiations for two water transfers. The first transfer is for 12,000 AF/year and 4,000 AF/year, respectively, from Berenda Mesa Water District for a total Table A Amount of 16,000 AF/year. The second negotiation is for 5,250 AF/year and 1,750 AF/year, respectively, from Tulare Lake Water Basin Storage District for a total of 7,000 AF/year. The transfers were completed in 2007 but do not take effect until Jan. 1, 2010. These Table A Amount transfers will bring the total combined Table A Amount for CVWD and DWA to 194,100 AF/year with CVWD's portion equal to 138,350 AF/year. CVWD and DWA also purchase available water from the SWP on the spot market.

SWP Supplemental Water

In 2008, CVWD and DWA executed Agreements to augment SWP water supplies. CVWD and DWA executed separate Agreements to acquire SWP supplemental water from the California Department of Water Resources (DWR) for a Water Supply and Conveyance Under a Dry Year Water Purchase Program. DWR initiated this Dry Year Water Purchase Program to augment water supplies in anticipation of less water available to SWP Contractors resulting from dry hydrologic conditions and/or regulatory constraints. DWR will make the water available for purchase from its Yuba Agreement. The amount of water available for purchase will be based on DWR's determination of the Water Year Classification. It is estimated that CVWD and DWA may be able to purchase up to 4% or 5,600 AF per year, and 1.3% or 1,820 AF per year, respectively. These Agreements provide for the exchange of these supplies with MWD for Colorado River water in accordance with existing exchange agreements

Non-SWP Supplemental Water

In 2003, CVWD and MWD entered into a one-time agreement for MWD to return 32,000 AF of Colorado River water it received as a result of water conservation measures taken by CVWD in Palo Verde prior to execution of the quantification settlement agreement (QSA). Per the agreement with MWD, MWD delivered half of the 32,000 AF (16,000 AF) back to CVWD in 2007at the Whitewater Spreading Basins. In 2008, 8,008 AF was delivered, and in 2009 the remaining 7,992 AF was delivered to CVWD at the Whitewater Spreading Basins.

In 2008, CVWD executed an Agreement with Rosedale Rio Bravo Water Storage District (Rosedale) for a one-time transfer of 10,000 AF, of banked Kern River flood water that is exportable to CVWD. Per the Agreement with Rosedale, deliveries to CVWD will begin in 2008 and be completed by December 31, 2010.

In 2008, DWA and MWD executed an Exchange Agreement for delivery of non-SWP supplemental water purchased by DWA to MWD. MWD will exchange these supplies with Colorado River water in accordance with existing exchange agreements. DWA plans to acquire up to 36,000 acre-feet of non-SWP supplemental water during the period from 2008 through 2015 from entities in Kern County. In 2009, MWD delivered 754 AF to the Mission Creek Subbasin.

2009 Deliveries

In 2009, a total of 64,285 AF was delivered via the SWP to MWD for exchange with Colorado River water as shown in Table 4.

Table 4 SWP Delivery to MWD for Exchange

Description	CVWD (AF)	DWA (AF)	Total (AF)
TABLE A	40,845	16,865	57,710
POOL A & B	66	27	93
DRY YEAR (YUBA)	2,111	1,371	3,482
ROSEDALE	3,000	0	3,000
TOTAL DELIVERED TO MWD	46,022	18,263	64,285

During 2009, MWD delivered 52,368 AF of Colorado River exchange water for recharge to the Mission Creek Subbasin and the upper portion of the Whitewater River Subbasin. To complete the exchange, the amount of water that MWD has previously stored in the groundwater basins through the Advance Delivery Agreement was reduced by 11,917 AF. The previously stored amount was 56,518 AF at the beginning of 2009 and was reduced to 44,601 AF at the end of 2009.

Typically 90 percent of the exchange water is delivered to the Whitewater River Subbasin and 10 percent is delivered to the Mission Creek Subbasin. The total amount of water delivered for recharge within the Mission Creek Subbasin Area of Benefit in 2009 was 4,090 AF as shown in Table 5. This includes 3,336 AF of Colorado River exchange water and 754 AF of Colorado River Water delivered to DWA in exchange for DWA's purchase of non-SWP supplemental water from entities in Kern County.

Table 5 Colorado River Exchange Water Delivered **Coachella Valley Groundwater Basin**[1]	
Year	**AF**
2002	4,733
2003	100
2004	5,564
2005	24,723
2006	19,901
2007	1,011
2008	503
2009	4,090
Total	60,625

(1) Delivered water quantities vary as a result of drought conditions and advance deliveries associated with the exchange agreement.

Future Recharge Activities

Coachella Valley Water Management Plan

CVWD's goal is to ensure a dependable long-term supply of high quality water for all Valley water users. To this end, CVWD developed the Coachella Valley Water Management Plan, which addresses the long-term water supply needs of the entire groundwater basin south of the San Andreas Fault. A final Program Environmental Input Report (PEIR) for the Coachella Valley Water Management Plan and State Water Project Entitlement Transfer was certified by CVWD Board of Directors in October 2002. The CVWD Board of Directors adopted the Coachella Valley Water Management Plan at the same time.

The Coachella Valley Water Management Plan recognizes the need for additional conservation, groundwater recharge and source substitution in order to achieve long-term stability in the Valley's water supply. The Coachella Valley Water Management Plan and PEIR can be found on CVWD's website www.cvwd.org.

The Coachella Valley Water Management Plan also provides a model approach for addressing long-term water supply needs for the Mission Creek Subbasin. A collaborative stakeholder process has begun to develop a water management plan for the Mission Creek Subbasin.

Other Replenishment Activities

Replenishment programs also are under way in the upper and lower portions of the Whitewater River Subbasin. These programs are described in separate Engineer's Reports.

REPLENISHMENT ASSESSMENT

The following Sections describe the cost basis of the Replenishment Assessment Charge. Generally, except for some historical averages and amortizations, the costs utilized to develop the Replenishment Assessment Charge for the upcoming fiscal year are based on the preceding calendar year actual costs. An assessment stabilization fund is utilized to minimize wide swings in the Replenishment Assessment Charge due to highly variable costs.

State Water Code

Sections 31630 through 31639 of the State Water Code (Code) authorize CVWD to levy and collect water Replenishment Assessment Charges for the purpose of replenishing groundwater supplies within its area of jurisdiction. The Code defines production, producer, and minimal pumper for groundwater replenishment purposes as follows:

1. "**Production**" or "**produce**" means the extraction of groundwater by pumping or any other method within the boundaries of the district or the diversion within the district of surface supplies that naturally replenish the groundwater supplies within the district and are used therein.
2. **"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.
3. **"Minimal pumper"** means any producer who produces 25 or fewer acre-feet of groundwater in any year.

This Replenishment Assessment Charge is based on groundwater production within the Mission Creek Subbasin within the boundaries of CVWD and is limited to the Area of Benefit.

Production by minimal pumpers is exempt from assessment. There are approximately 10 to 20 minimal pumpers within the Area of Benefit. These are predominantly small wells used for domestic or limited irrigation purposes. Maximum pumpage by the minimal pumpers in the Area of Benefit would be less than 500 AF/year, or less than five percent of annual groundwater production within the Management Area.

The code defines “replenishment assessment” and it states that assessments may be levied upon all water production within the Area of Benefit, provided the assessment charge is uniform throughout said Area of Benefit. The Replenishment Assessment Charge is a monetary charge authorized by the State Water Code and uniformly applied to extractions of groundwater within certain specified geographic boundaries of CVWD for payments of an imported or recycled (reclaimed) water supply purchased to supplement naturally existing water supplies. Charges for the water supply are limited to certain specified costs.

In the initial twelve years of the upper portion of the Whitewater River Subbasin replenishment program, only the Variable Operation, Maintenance, Power and Replacement (VOMPR) 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. CVWD has also been allowed, under the Water Code, 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 Replenishment Assessment Charge considered in this report is based on the most recent and reliable information available with respect to applicable costs or charges.

CVWD has incurred additional costs associated with the replenishment program, which include continuing engineering studies, well meter reading and maintenance, and groundwater monitoring. These costs have now been included as a portion of the Replenishment Assessment Charge.

State Water Project Costs

The Unit Rate Variable SWP Cost ($90.03/AF) is developed by taking the total allowable actual 2009 SWP costs ($19,153,287) for CVWD and DWA and dividing by the total actual 2009 production (212,671 AF) for the upper portion of the Whitewater River and Mission Creek Subbasins as shown in Table 5. The allowable SWP costs include the Delta Water Charge, VOMPR portion of the Transportation Charge and Off-Aqueduct Power Facilities Charge.

The Delta Water Charge is an assessment for the capital construction and annual operating expenses of SWP conservation facilities such as Oroville Dam and Lake, Frenchman Dam and Lake, Antelope Dam and Lake, Delta facilities and other additional conservation facilities throughout the State.

The VOMPR portion of the Transportation Charge recovers all variable power costs, credits and transmission costs for water conveyed through the SWP system applicable to each reach utilized by the SWP Contractors.

The Off-Aqueduct Power Facilities Charge recovers all power costs, bond service, deposit for reserves, operation and maintenance costs, fuel costs, taxes and insurance for power purchased from non-SWP system sources. These charges are determined by multiplying the total off-aqueduct facility costs by the ratio of the estimate of electrical energy required to pump a SWP Contractor's water for the year to the total electrical energy required to pump all the SWP allocated water for the year.

Mission Creek Spreading Area Construction Costs

An amount is collected annually to cover the amortized cost for CVWD's portion of the construction of the Mission Creek Spreading Area. The actual 2009 amortization was $71,637.

Administrative Costs

Costs to administer the replenishment assessment program include personnel, materials, meter reading, billing, groundwater monitoring and report preparation. The actual adminsistrative costs in 2009 were $17,900.

Assessed Production

It is estimated that the total Fiscal Year 2010-2011 production for the Mission Creek Subbasin Area of Benefit will be 4,813 AF.

As shown in Table 6, the Mission Creek Spreading Area Construction Costs and Administrative Costs are divided by the estimated annual production to yield a unit cost per acre-foot. These unit costs are then added to the Unit Rate Variable SWP Cost to arrive at a Calculated Assessment Rate per Acre-Foot of $109.30/AF.

The Calculated Assessment Rate per Acre-foot is then adjusted by $19.55/AF paid by the SWP Debt Service Fund to arrive at the Total Assessable Rate of $89.75/AF.

Producers within the Mission Creek Subbasin Area of Benefit are listed in Table 7 together with their estimated fiscal year production and their total estimated fiscal year replenishment assessment. Producers will be charged only for actual water produced.

Table 6 Mission Creek Subbasin Area of Benefit Replenishment Assessment Charge for Fiscal Year 2010-2011

CVWD PORTION OF ALLOWABLE COSTS	CVWD TOTAL COSTS FOR 2009 CALENDAR YEAR	+	DWA TOTAL COSTS FOR 2009 CALENDAR YEAR	=	TOTAL COSTS FOR 2009 CALENDAR YEAR	REPLENISHMENT ASSESSMENT 2010-11	REPLENISHMENT ASSESSMENT 2009-10
SWP Entitlement Variable Costs:							
Variable Operation and Maintenance, Power, and Replacement (OMP&R) Components of Transportation Charge	5,483,271		2,489,561		7,972,832	$ 37.48	$ 39.40
Off-Aqueduct Power Facility Component of Transportation Charge	4,430,873		1,626,448		6,057,321	$ 28.47	$ 26.65
Delta Water Charge	3,656,512		1,466,622		5,123,134	$ 24.08	$ 20.59
Total, SWP Entitlement Variable Costs	$ 13,570,656	+	$ 5,582,631	=	$ 19,153,287		
Unit Rate - SWP Entitlement Variable Costs (1)						$ 90.03	$ 86.65
Other Recharge Program Costs:							
Recharge Spreading Area Construction (2)					71,637	14.88	17.92
Administrative Cost (3)					17,900	3.72	2.69
SWP Supplemental Water Purchases (4)					3,209	0.67	
Total Other Recharge Program Costs					$92,745	$ 19.27	$ 20.60
Actual Assessable Production (Acre-Feet)					4,813 AF		
Calculated Assessment Rate Per Acre-Foot						$ 109.30	$ 107.25
Less SWP Entitlement Variable Costs paid by SWP Debt Service					$94,094	(19.55)	(19.69)
Total Assessable Rate per Acre Foot						$ 89.75	$ 87.56
Proposed Assessment Rate Per Acre Foot, FY 2010/2011						$ 89.75	$ 87.56
					% change	2.50%	

NOTES:

(1) Total Variable SWP costs are divided by the total WW and MC actual production for DWA and CVWD, total 212,735 AF

(2) Costs of construction, including interest, to be recovered over a 20 year period.

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

(4) SWP Supplemental water purchases include portions of the Dry Year Program and Turnback water

Table 7 Mission Creek Subbasin Area of Benefit Estimated Producer Assessments for Fiscal Year 2010-2011
Coachella Valley Groundwater Basin

Producer's Name	Estimated Production Acre Feet[1]	Estimated Assessment Dollars[2]
Coachella Valley Water District	3,579.8	$321,287.05
Bluebeyond Fisheries	50.4	$4,523.40
DDGC Desert Holdings, LTD. (Desert Dunes Golf)	1,042.5	$93,564.38
Desert Springs Aquaculture Inc.	140.4	$12,600.90
Total Projected Production	4,813.1	$431,975.73

(1) Estimate based preceding calendar year production.
(2) Production times $89.75/AF. Total is rounded to nearest dollar.
(3) Estimated production. Estimate based on applied water rates, past and comparable, for non harvested water application at 6.3 acre feet per acre.
(4) Production reported by producer.

CONCLUSION AND RECOMMENDATION

As shown in Table 6, the Unit Rate Variable SWP Cost has increased from $86.65/AF to $90.03/AF for a $3.38/AF (4%) increase. In addition, CVWD continues to incur amortized construction costs for the Mission Creek Spreading Area and the costs to administer the Replenishment Assessment Program. The Calculated Assessment Rate per Acre-foot is $109.30/AF, and is then adjusted by $19.55/AF paid by the SWP Debt Service Fund to arrive at the Total Assessable Rate of $89.75/AF. This results in a 2.5% increase over the previous Replenishment Assessment Charge of $87.56/AF.

Because the average natural water inflow into the Mission Creek Subbasin is less than the production, this portion of the Subbasin must continue to use imported water for recharge. The Replenishment Assessment Program continues to be viable and the Replenishment Assessment Charge of $89.75/AF for 2010-2011 is recommended to be levied upon all producers within the Area of Benefit in accordance with the State Water Code.

BIBLIOGRAPHY

1. State of California, The Resources Agency, Department of Water Resources, *Bulletin No. 108*, *Coachella Valley Investigation,* July 1964*.*

2. State of California, The Resources Agency, Department of Conservation, Division of Mines and Geology, *Geologic Map of California, Santa Ana Sheet,* 1966.

3. United States Department of the Interior, Geological Survey Water-Supply Paper 2027; *Analog Model Study of the Ground- Water Basin of the Upper Coachella Valley, California,* 1974.

4. United States Department of the Interior, Geological Survey; *Water Resources Investigation 77- 29: Predicted Water-Level and Water-Quality Effects of Artificial Recharge in the Upper Coachella Valley, California, Using a Finite-Element Digital Model,* April 1978.

5. Desert Water Agency, *Engineer's Report on Basin Water Supply and Water Replenishment Program,* Prepared by Krieger and Stewart, May 1978, Revised June 1978.

6. Geotechnical Consultants, Inc., *Hydrogeologic Investigation: Mission Creek Subbasin Within the Desert Hot Springs County Water District,* prepared for Desert Water Agency, November 1979.

7. Desert Water Agency, *Ground Water Recharge Potential within Mission Creek Subbasin,* Prepared by Krieger and Stewart, November 1980.

8. United States Department of the Interior, Geological Survey; *Water Resources Investigation 91-4142: Evaluation of a Ground-Water Flow and Transport Model of the Upper Coachella Valley, California,* 1992.

9. Mayer, Alex S. and Wesley L. May, Michigan Technological University, Department of Geological Engineering and Sciences, *Mathematical Modeling of Proposed Artificial Recharge for the Mission Creek Subbasin,* Prepared for Mission Springs Water District, March 1998.

10. Desert Water Agency, *Domestic Water System General Plan, 1998,* Prepared by Krieger and Stewart, January 1999.

11. Richard C. Slade and Associates, LLC, *Final Hydrogeologic Evaluation, Well Siting, And Recharge Potential Feasibility Study Mission Creek Groundwater Subbasin, Riverside County, California,* May 2000.

12. Mission Springs Water District, *Hydrogeologic Conditions Near Mission Springs Water District Well Nos. 25 and 26, Cabazon Area, Riverside County,* prepared by Richard C. Slade and Associates, LLC, September 2001.

13. Coachella Valley Water District, *Coachella Valley Water Management Plan,* September 2002.

14. Coachella Valley Water District, *Engineer's Report on Water Supply and Replenishment Assessment, Upper Whitewater River Subbasin Area of Benefit,* 2009-2010, April 2009.

15. Coachella Valley Water District, *Engineer's Report on Water Supply and Groundwater Replenishment Assessment, Mission Creek Subbasin Area of Benefit* 2009-2008, April 2009.

16. Desert Water Agency, *Engineer's Report: Ground Water Replenishment and Assessment Program* 2009-2010, April 2009.