

# **Coachella Valley Water District**



## **Colorado River Water Agricultural Water Conservation Plan**

**United States Bureau of Reclamation  
Lower Colorado Region  
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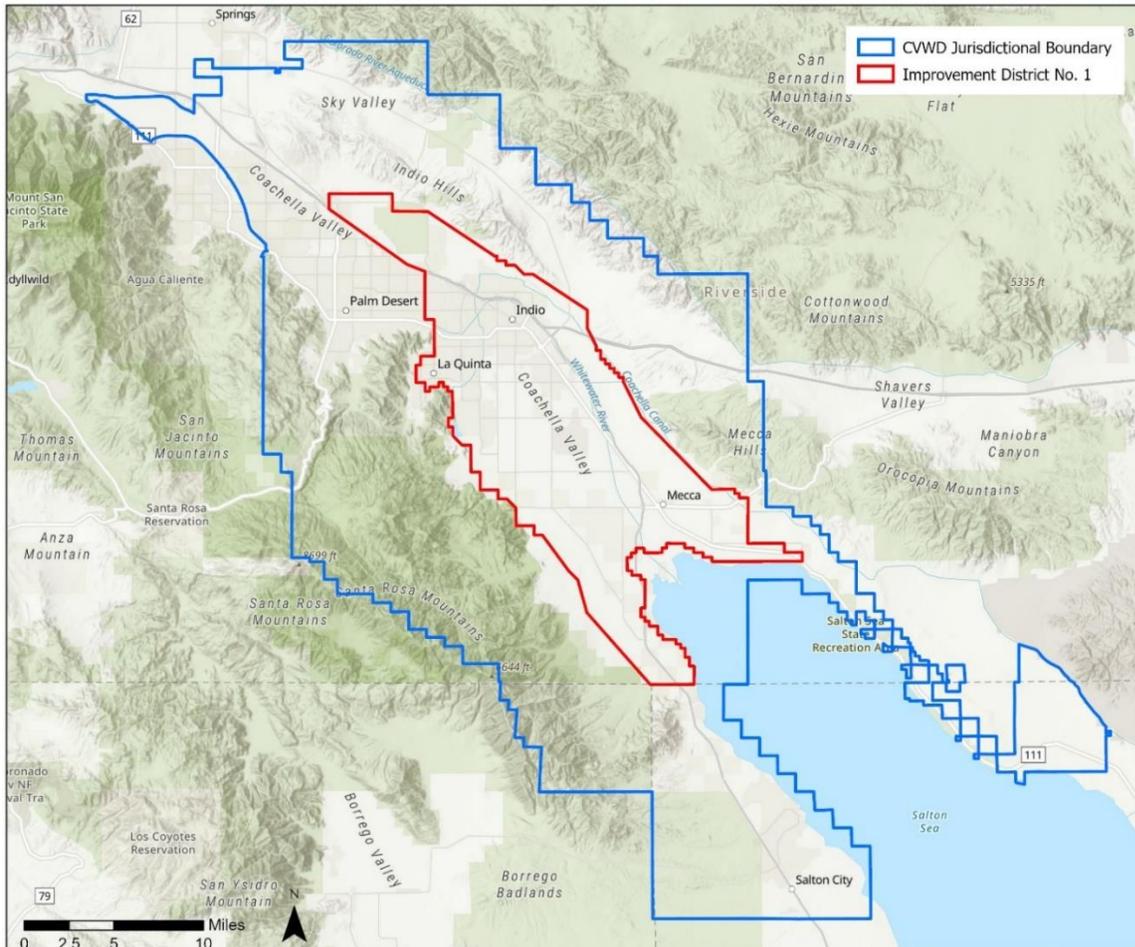
# I. District Description

## A. Background

CVWD was formed in 1918 under the County Water District Act provisions of the California Water Code. The water-related services provided by CVWD include irrigation water delivery and agricultural drainage, urban and domestic water delivery, wastewater reclamation and recycling, stormwater protection, and groundwater management achieved through replenishment, source substitution, and conservation. CVWD imports Colorado River water via the Coachella Canal primarily for agricultural and golf course irrigation and for groundwater replenishment. CVWD is a California State Water Project (SWP) contractor and imports SWP water through an exchange of Colorado River Aqueduct water with Metropolitan Water District (MWD). SWP exchange water is used for groundwater replenishment. CVWD operates more than 95 wells for domestic supply. It also operates five wastewater reclamation plants, two of which provide recycled water for irrigation.

The Coachella Valley’s farmland is among the largest crop-grown regions in the state, renowned for its dates, citrus, grapes, and bell peppers. More than two-thirds of local farmland is irrigated in part with Colorado River water delivered via the Coachella Canal. Improvement District No. 1 (ID-1) was established as the service area for Colorado River water delivery, as shown in **Figure 1**. ID-1 encompasses 136,400 acres covering most of the East Valley and a portion of the West Valley.

**Figure 1. CVWD Boundary and Improvement District No. 1 (ID-1)**



## **B. Physical Setting**

The Coachella Valley is bordered on the north by Mount San Gorgonio in the San Bernardino Mountains, on the west by the San Jacinto and Santa Rosa Mountains, on the east by the Little San Bernardino Mountains, and on the south by the Salton Sea. The Coachella Valley lies within the northwesterly portion of California's Colorado Desert, an extension of the Sonoran Desert. The San Bernardino, San Jacinto, and Santa Rosa Mountains impede the eastward movement of storms and create a rain shadow which contributes to an arid climate.

## **C. Climate**

Climate in the Coachella Valley is characterized by low humidity, high summer temperatures, and mild dry winters. Average annual precipitation ranges from 3 to 6 inches on the valley floor. Most of the precipitation occurs between December and February. Additionally, mid-summer high temperatures commonly exceed 100 degrees Fahrenheit (°F), frequently exceed 110°F, and periodically reach 120°F. Winter high temperatures typically range from about 45°F to 70°F.

## **D. Lands and Crops**

### **i. Soils**

The four main soil types found in ID-1 are the Carsitas-Myoma-Carrizso association, Myoma-Indio-Gilman association, Gilman-Coachella-Indio association, and Salton-Indio-Gilman association.

The Carsitas-Myoma-Carrizso association consists of nearly level to moderately steep, somewhat excessively drained or excessively drained sands, fine sands, gravelly sands, cobbly sands, and stony sands on alluvial fans and valley fill. This soil type makes up approximately 20% of the irrigated soils in the Coachella Valley.

The Myoma-Indio-Gilman association consists of soils that are nearly level to rolling, somewhat excessively drained to moderately well drained fine sands in dune areas, and loamy fine sands, very fine sandy loams, fine sandy loams, and silt loams on alluvial fans. This soil type makes up approximately 10% of the irrigated soils in the Coachella Valley.

The Gilman-Coachella-Indio association consists of nearly level to rolling, somewhat excessively drained or excessively drained to moderately drained fine sands, fine sandy loams, loamy fine sands, and very fine sandy loams on alluvial fans. This soil type makes up approximately 45% of the irrigated soils in the Coachella Valley.

The Salton-Indio-Gilman association consists of nearly level, somewhat poorly drained to well drained, silty clay loams, very fine sandy loams, fine sandy loams, and silt loams in lacustrine basins. This soil type makes up approximately 25% of the irrigated soils in the Coachella Valley.

### **ii. Crop Information**

Desert conditions allow diverse crops to be grown year-round with double cropping. The warm winters result in crops being available for winter market when most agricultural production throughout the United States has shut down. Common crops include carrots, lettuce, dates, and grapes. The 2020 crop types, crop acreages, and estimated value of agricultural production within ID-1 are shown in **Table 1** below. This information comes from CVWD's 2021 Annual Agriculture Report which includes a summary of crops in 2020 and is included as **Attachment 1**. In 2020, approximately 59,101 acres (including double cropping) were irrigated with a total estimated crop value of \$574.9 million.

**Table 1. 2020 Crop Summary**

<b>Crop</b>	<b>Acreage</b>	<b>Yield In Tons</b>	<b>Value Per Acre</b>	<b>Total Value</b>
<b>Fruits</b>				
Dates	9,449	37,796	\$8,800	\$83,151,200
Grapes	5,511	26,891	\$13,418	\$73,946,598
Lemon-Limes	4,789	39,850	\$8,260	\$39,557,140
Oranges-Tangerines	1,176	799,680	\$13,260	\$15,593,760
Grapefruit	391	172	\$8,418	\$3,291,438
Melons-Watermelon	361	14,440	\$16,265	\$5,871,665
Figs	140	714	\$4,760	\$666,400
Mangoes	117	731	\$15,625	\$1,828,125
Olives	86	464	\$7,020	\$603,720
Misc. Fruit	77	9,394	\$3,081	\$237,237
Strawberries	58	609	\$37,625	\$2,182,250
Peaches	56	291	\$15,458	\$865,648
<b>Vegetables</b>				
Carrots	4,111	197,328	\$6,279	\$25,812,969
Bell Peppers	3,688	74,682	\$18,225	\$67,213,800
Lettuce	3,515	61,513	\$9,000	\$31,635,000
Cauliflower	1,873	13,785	\$9,197	\$17,225,981
Sweet Corn	1,468	13,939	\$6,613	\$9,707,884
Oriental Vegetables	1,337	18,718	\$8,100	\$10,829,700
Broccoli	1,219	10,724	\$9,287	\$11,320,853
Spices	1,112	227,293	\$3,796	\$4,221,152
Celery	779	18,042	\$8,801	\$6,855,979
Okra	759	5,617	\$9,472	\$7,189,248
Artichoke	705	6,891	\$15,606	\$11,002,230
Spinach	671	10,266	\$13,362	\$8,965,902
Green Beans	602	2,486	\$7,410	\$4,460,820
Cabbage	553	8,848	\$6,502	\$3,595,606
Onions-Green	377	1,795	\$1,072	\$404,144
Potatoes	344	5,848	\$3,325	\$1,143,800
Kale	316	5,795	\$7,677	\$2,425,932
Sugar Beets	315	476,438	\$7,381	\$2,325,015
Tomatoes	312	5,117	\$10,119	\$3,157,128
Squash	276	2,291	\$5,644	\$1,557,744
Eggplant	259	4,533	\$19,600	\$5,076,400
Radishes	161	4,632	\$10,324	\$1,662,164
Chili Peppers	94	52,875	\$16,500	\$1,551,000
Parsley	0	0	\$0	\$0
Turnip	0	0	\$0	\$0

Crop	Acreage	Yield In Tons	Value Per Acre	Total Value
<b>Forage</b>				
Pasture-Permanent	1,393	-	\$130	\$181,090
Hay-Alfalfa	542	4,336	\$1,440	\$780,480
Hemp <sup>1</sup>	22	8,360	\$133,000	\$2,926,000
Pasture	21	-	\$130	\$2,730
Corn	0	0	\$0	\$0
<b>Other</b>				
Golf Course	6,024	54,216	\$11,250	\$67,770,000
Turf Grass	1,223	11,007	\$11,250	\$13,758,750
Nursery-Trees	1,090	-	\$9,959	\$10,855,310
Duck Pond	775	3.74	\$76	\$58,900
Polo Field	510	4,590	\$11,250	\$5,737,500
Fish Farm	265	776	\$14,650	\$3,882,250
Nursery-Plants	179	-	\$9,959	\$1,782,661
<b>Total</b>	<b>59,101</b>			<b>\$574,871,303</b>

1 – Irrigation restricted to groundwater/domestic.

## II. District Operations and Operating Policies

### A. Delivery System

Imported water for irrigation is diverted from the Colorado River at Imperial Dam above Yuma, Arizona. The water is transported through the All-American and Coachella Canals, over a distance of 160 miles. The Colorado River water is primarily delivered to farms, but an increasing percentage is now being delivered to golf courses within ID-1 as well. The total amount of Colorado River water delivered to farms in 2020 was 242,607 acre feet (AF).

The Coachella Canal distribution system was constructed and engineered to follow the natural slope of the land to allow the free flow of water using the force of gravity. Irrigation pumps are used to deliver water to elevated areas. The lateral distribution system delivers water to farms at the highest point of every 40 acres of eligible land within CVWD's service area. The distribution system which delivers water from the 123-mile Coachella Canal consists of 488 miles of concrete pipelines which vary in diameter from 12 to 96 inches, as shown in **Table 2**. The distribution laterals that connect to the canal and carry water to the farmlands have flows that vary from 3 cubic feet per second (cfs) to 230 cfs. Flows into the lateral distribution system come from the Coachella Canal and are controlled by computer through remote control valves installed at each canal turnout. The distribution system is entirely comprised of underground pipeline to prevent evaporation and phreatophyte losses. Baffle stands are installed every 1/4 mile along laterals in order to raise the water level to make farm deliveries.

**Table 2. Distribution System (miles)**

Unlined Canal	Lined Canal	Pipeline
0	123	488

All farm turnouts have totalizing water meters to measure the cumulative quantity of water delivered. This method of direct metering of delivered irrigation water has proven beneficial to both farmers and

CVWD. The farmer benefits by knowing the precise amount of water which was delivered to the field. A history of precise water deliveries allows for the farmer to make more accurate estimates when ordering water. Metered water deliveries allow CVWD to account for the water being used. Blocked or leaking main lines can be traced back to the location of the problem by cross-checking all irrigation deliveries. This is done by computer daily for the entire system.

In a typical day, CVWD staff continuously receive and enter incoming water orders into the main computer. A telemetry system is also linked to the main computer system. The computer verifies that delivery capacity is available for each order received and updates the master irrigation schedule. Each day, the computer generates the delivery gate settings and downloads the information into a laptop computer for the Zanjero (water delivery employee) to make their rounds the next day. The Zanjero reads and follows the laptop instructions on the route. Water delivery numbers are uploaded from the laptop to the main supervisory control and data acquisition (SCADA) computer at CVWD headquarters in real time. This paperless approach allows the computer to instantly cross-check the distribution system for leaks, clogged meters, and other maintenance problems.

In addition, the physical structure of CVWD's water management system precludes a common waste of water which allows excess water to run off the bottom of a field when too much water was applied during irrigation. Many irrigation systems in California contain a system of water disposal ditches to move the water to a disposal area. The CVWD drainage system was deliberately designed to eliminate receiving facilities for the waste of water. The main collection system is entirely constructed of underground pipes sized only to accommodate soil drainage. There is no capacity to accommodate water waste flows either directly through inlet structures, or indirectly through excessive percolation. District regulations expressly declare disposal of this water an illegal and prohibited activity. In addition, with no place for the water to be collected, farmers cannot arbitrarily order excess water without the risk of flooding nearby lands.

More than 60% of the agricultural acreage in the Coachella Valley is under drip or other micro-irrigation. Drip irrigation typically refers to an irrigation system in which water is delivered through a plastic pipe or an emitter near the base of a plant. The emitter may discharge water in streams, sprays, or drops. The common feature in these systems is the direct application of water to the crop without allowing additional water to flow to adjacent weed vegetation. This reduces water use, allows pesticides and herbicides to be added directly into irrigation lines, and contributes to increased crop yields. Area farms are among the most efficient agricultural water users in the state.

For additional information, see the U.S. Bureau of Reclamation (USBR) Review of Operations and Maintenance Examination Reports on file.

## **B. Storage Facilities**

Approximately 3,000 acre feet (AF) of storage is divided between the Coachella Branch of the All-American Canal (1,500 AF) and Lake Cahuilla (1,500 AF). The Coachella Valley Groundwater Basin also serves an important role in providing storage capacity that is replenished when surface water is available and then utilized when needed. In 1964, the California Department of Water Resources (DWR) estimated that the basin contained approximately 39,200,000 AF of water in the first 1,000 feet below the ground surface. The significant water storage capacity in the basin provides flexibility for the management of groundwater resources. The groundwater basin also serves to convey water through groundwater flow from areas of recharge to areas of discharge, including municipal and private production wells.

### C. Drainage Facilities

A summary of CVWD’s drainage facilities is provided in **Table 3**.

**Table 3. Drainage Facilities**

Total On-Farm Drains (miles)	Area with Farm Drains (acres)	District Open Drains (miles)	District Pipe Drains (miles)
2,298	37,425	21	166

### D. Water Measurement and Accounting

A summary of canal water customers and turnouts is provided in **Table 4**.

**Table 4. Canal Customers in 2020**

Customers	Measured Customers	Customer Turnouts	Measured Turnouts
1,268	1,268	1,268	1,268

A summary of agricultural water meters is provided in **Table 5**.

**Table 5. CVWD Agricultural Water Meter Inventory**

Type	Number	Reading	Calibration	Maintenance
Propeller Meter	1,064	Daily	At factory	Scheduled and as needed
Mag Meter	36	Daily	At factory	Scheduled and as needed

A summary of canal water use by usage type is provided in **Table 6**. The usage types include agricultural irrigation, Mid-Valley Pipeline (MVP), recharge at the Thomas E. Levy Groundwater Replenishment Facility (TEL-GRF), golf course irrigation, regulatory water, water delivered to Water Reclamation Plant (WRP) 7, and construction. The MVP supplies Coachella Canal water either directly to non-potable irrigation customers or to WRP 10 where it supplements the supply of recycled water and a mixture is delivered to non-potable water customers. Regulatory water is the metered release of excess water from the Canal water delivery system needed to meet scheduled deliveries in the gravity flow delivery system.

**Table 6. Canal Water Use by Type in 2020 (AF)**

Agriculture <sup>1</sup>	MVP	TEL-GRF Recharge	Golf Course	Regulatory	Other <sup>2</sup>	WRP 7	Construction	Total
242,606	22,774	37,536	18,711	8,524	5,474	1,398	450	337,473

1 – Agriculture includes fish farms and nurseries.

2 – Other includes lakes, polo fields, and duck clubs.

### E. Water Pricing Structure

Canal water rates by type of user are included in **Attachment 2**, CVWD’s 2021 Canal Water Rates & Charges. Rates are based on volume in AF and every account is metered. See **Attachment 2** for other consumptive and miscellaneous charges.

### **III. Inventory of Water Resources**

#### **A. Water Supplies and Contracts**

The Coachella Valley relies on a combination of local groundwater, local surface water, Colorado River water, SWP exchange water, and recycled water to meet water demands. Groundwater represents a source of supply for domestic, agricultural, and municipal water demands. In this arid region, natural recharge to groundwater is limited and groundwater supply has historically been insufficient to satisfy local water demands without leading to overdraft. However, groundwater remains a key part of the supply portfolio for the area. Moreover, the aquifer serves an important role in providing storage capacity that is replenished when surface water is available and then utilized when needed, such as during drought or shortage. The aquifer also serves to convey water through groundwater flow from areas of recharge to areas of discharge, including production wells.

Natural surface water flow in the Coachella Valley occurs as a result of precipitation, precipitation runoff, and stream flow originating from the San Bernardino and San Jacinto Mountains, with lesser amounts from the Santa Rosa Mountains. This watershed runoff is diverted for use, percolates into streambeds, or is captured in mountain-front percolation basins where it recharges the groundwater basin. CVWD holds State of California surface water rights in the Whitewater River and multiple tributaries, which have a long-term average watershed runoff of 52,506 AFY. These rights allow CVWD to capture available watershed runoff for replenishment of the groundwater basin. Other local water agencies also divert watershed runoff.

Colorado River water has been a significant water supply source for the area since the Coachella Canal was completed in 1949. The Colorado River is managed and operated in accordance with the Law of the River, a collection of interstate compacts, federal and state legislation, various agreements and contracts, an international treaty, a U.S. Supreme Court decree, and federal administrative actions that govern the rights to use Colorado River water within the seven Colorado River Basin states. California's Colorado River supply is protected by the 1968 Colorado River Basin Project Act, which provides that in years of insufficient supply on the main stem of the Colorado River, supplies to the Central Arizona Project shall be reduced to zero before California will be reduced below 4.4 million AF in any year. This assures full supplies to the Coachella Valley, except in periods of extreme drought.

The Coachella Canal is a branch of the All-American Canal that brings Colorado River water into the Imperial and Coachella Valleys. Under the 1931 Seven Party Agreement, CVWD receives 330,000 AFY of Priority 3A Colorado River water diverted from the All-American Canal at the Imperial Dam. The Coachella Canal originates at Drop 1 on the All-American Canal and extends approximately 123 miles, terminating in CVWD's Lake Cahuilla. The service area for Colorado River water delivery under CVWD's contract with USBR is defined as ID-1. Under the 1931 Seven Party Agreement, CVWD has water rights to Colorado River water as part of the first 3.85 million AFY allocated to California. CVWD is in the third priority position along with Imperial Irrigation District (IID).

In 2003, CVWD, IID, and MWD successfully negotiated the 2003 Quantification Settlement Agreement (2003 QSA), which quantifies Colorado River allocations through 2077 and supports the transfer of water between agencies. Under the 2003 QSA, CVWD has a base entitlement of 330,000 AFY. CVWD negotiated water transfer agreements with MWD and IID that increased CVWD supplies by an additional 123,000 AFY. CVWD's net QSA supply will increase to 424,000 AFY by 2026 and remain at that level until 2047, decreasing to 421,000 AFY until 2077, when the agreement terminates.

As of 2020, CVWD’s available Colorado River water diversions at Imperial Dam under the QSA were 394,000 AFY, as shown in **Table 7**. This includes the base entitlement of 330,000 AFY, the MWD/IID Transfer of 20,000 AFY, IID/CVWD First Transfer of 50,000 AFY, and IID/CVWD Second Transfer of 23,000 AFY. CVWD’s QSA diversions also deduct the 26,000 AFY transferred to San Diego County Water Authority (SDCWA) as part of the Coachella Canal Lining Project and the 3,000 AFY transfer to Indian Present Perfected Rights. Under the QSA, entitlements will increase to 424,000 AFY by 2026 as shown in **Table 7**. This is an increase of 30,000 AF compared to 2020 as a result of the Second IID/CVWD Transfer.

**Table 7. Colorado River Water Entitlements Under the QSA in 2020 and 2026 (AFY)**

<b>Budget Component</b>	<b>2020</b>	<b>2026</b>
Base Entitlement	330,000	330,000
Less Coachella Canal Lining (to SDCWA)	-26,000	-26,000
Less Miscellaneous/Indian PPRs <sup>1</sup>	-3,000	-3,000
1988 MWD/IID Approval Agreement	20,000	20,000
First IID/CVWD Transfer	50,000	50,000
Second IID/CVWD Transfer	23,000	53,000
<b>Total Colorado River Diversions</b>	<b>394,000</b>	<b>424,000</b>

1 – Indian Present Perfected Rights

Additionally, under the 2003 QSA, MWD transferred 35,000 AFY of its SWP Table A Amount to CVWD. This SWP water is exchanged for Colorado River water and can be delivered at Imperial Dam for delivery via the Coachella Canal or at Lake Havasu for delivery via the Colorado River Aqueduct to the Whitewater River Groundwater Replenishment Facility (WWR-GRF) in the northwestern area of the basin. The 2019 Second Amendment guaranteed delivery of the 35,000 AFY from 2019 to 2026, for a total of 280,000 AFY of water during that timeframe. MWD can deliver the water through CVWD’s Whitewater Service Connections (for recharge at WWR-GRF) or via the Advance Delivery agreements with MWD.

The MWD/IID Transfer originated in a 1989 agreement with MWD to receive 20,000 AF of its Colorado River supply. The 2019 Amended and Restated Agreement for Exchange and Advance Delivery of Water defined the exchange and delivery terms between MWD, CVWD, and Desert Water Agency (DWA). The 2019 Second Amendment to Delivery and Exchange Agreement reduced CVWD’s annual delivery of the MWD/IID Transfer to 15,000 AFY, for a total of 105,000 AF, if taken at the Whitewater Service Connections between 2020 and 2026. For those seven years, MWD retains the remaining 5,000 AFY, after which CVWD’s allocation increases back up to 20,000 AFY. CVWD’s total allocations under the QSA, including MWD’s transfer of 35,000 AFY and the MWD/IID Transfer, will increase from 429,000 AFY in 2020 to 459,000 AFY by 2026 and remain at that level for the remainder of the 75-year term of the QSA.

SWP water has been an important component of the region’s water supply portfolio since CVWD and DWA began receiving SWP exchange water for recharge at the WWR-GRF in the northwestern portion of the groundwater basin. Because there is no physical connection to SWP conveyance facilities in the Coachella Valley, MWD takes delivery of CVWD’s SWP water, and in exchange, delivers an equal amount of Colorado River water to the Whitewater Service Connections (for recharge at WWR-GRF and MC-GRF). Starting in 1973, CVWD began exchanging SWP water with MWD for Colorado River water delivered via MWD’s Colorado River Aqueduct. Today, CVWD and DWA have a combined maximum annual SWP Table A amount of 194,100 AFY as shown in Table 8. A 100,000 AFY MWD Transfer obtained under the 2003 Exchange Agreement included a “Call Back” component that allowed MWD to call back the 100,000 AFY and assume the entire cost of delivery if it needed the water. The 2019 Amended and Restated Exchange

Agreement ended MWD’s right to call back that 100,000 AFY of Table A water. In 2004, CVWD purchased an additional 9,900 AFY of SWP Table A water from the Tulare Lake Basin Water Storage District (Tulare Lake Basin) in Kings County. In 2007, CVWD and DWA made a second purchase of Table A SWP water from Tulare Lake Basin totaling 7,000 AFY. In 2007, CVWD and DWA also completed the transfer of 16,000 AFY of Table A Amounts from the Berrenda Mesa Water District in Kern County. These latter two transfers became effective in January 2010. With these additional transfers, the total SWP Table A Amount for CVWD and DWA is 194,100 AFY, as shown in **Table 8**.

**Table 8. SWP Table A Amounts in the Coachella Valley (AFY)**

Agency	Original SWP Table A	MWD Transfer	Tulare Lake Basin Transfer 1	Tulare Lake Basin Transfer 2	Berrenda Transfer	Total
CVWD	23,100	88,100	9,900	5,250	12,000	138,350
DWA	38,100	11,900	-	1,750	4,000	55,750
<b>Total</b>	<b>61,200</b>	<b>100,000</b>	<b>9,900</b>	<b>7,000</b>	<b>16,000</b>	<b>194,100</b>

Recycled water is a reliable local resource that can be used to help offset groundwater pumping. Wastewater that has been highly treated and disinfected can be reused for landscape irrigation and other nonpotable purposes. Recycled wastewater has historically been used for irrigation of golf courses and large landscaped areas (homeowners associations, athletic fields, facility landscapes) in the Coachella Valley. CVWD operates Water Reclamation Plant (WRP)-7 and WRP-10, which currently generate recycled water for irrigation of golf courses and large landscaped areas. CVWD provided 9,457 AF of recycled water in 2020.

### **B. Quality of Water Sources**

Colorado River water is imported through the Coachella Canal for direct use on lands overlying the Indio Subbasin within CVWD’s service area, which includes lands used for agriculture in the East Valley. SWP Exchange water is also imported through the Colorado River Aqueduct and recharged in the WWR-GRF. These sources are used for groundwater recharge or direct deliveries for irrigation. Total dissolved solids (TDS) concentrations in the Colorado River Aqueduct supply average about 590 mg/L from 2010 through 2019, while concentrations in the Coachella Canal supply average about 760 mg/L over the same period. TDS levels in Colorado River water are currently meeting applicable water quality objectives.

## **IV. Water Conservation Measures and Results**

### **A. Existing Water Conservation Measures**

CVWD has implemented many agricultural water conservation measures, as discussed below.

#### **Lake Cahuilla Storage Reservoir**

In the mid-1960s, CVWD constructed what was then the world's largest soil cement-lined reservoir to add terminal storage capacity to the Coachella Canal. This provides storage space when demand fluctuates below supply. Because water travels more than 160 miles by gravity, demand is estimated several days in advance based on projected weather conditions, crop patterns, ET conditions, historic usage and other factors. The terminal reservoir offers the flexibility to meet these changing needs.

### **Canal Telemetry Control**

In the 1960s, CVWD became one of the first agricultural water suppliers to place a major canal system under telemetry control. This allowed an operator to monitor and adjust water control structures around the clock. The telemetry system has been improved and upgraded many times since then. One upgrade included the complete replacement of all control systems and electronics. The current system uses two minicomputers operating in parallel with a "smart" remote microprocessor at each field location. The two minicomputers continually update each other so that the system will continue to function should one computer malfunction. Field data and control signals are transmitted long distances. The "smart" remotes at the check gate structures monitor the upstream and downstream water levels and the gate positions. These units allow the operator to control the gate position or flow rate and include provisions for independent operation if the telemetry link with headquarters is lost or the water level in the canal approaches the limit of safe operation.

The check gates on the upper and middle canal can be operated by the telemetry control system as separate reservoirs. If additional water is needed, the operator can obtain it from storage in the pond behind one check gate and automatically adjust the other check gates to continue the required flow rate. During potential summer storms, the water level in the canal can be lowered by opening the check gates. If farmers cancel irrigation water orders in the event of a storm, the check gates are closed, creating additional storage in the canal and preventing the loss of water to the Salton Sea.

### **Canal Lining Projects**

In the 1980s, CVWD reduced its Colorado River Diversion over 25% by concrete lining 49 miles of the Coachella Canal. The resulting change from an 80-foot wide earth-lined canal to a 43-foot wide concrete-lined canal prevented seepage losses estimated at 132,000 AFY.

The improved channel also increased velocity in the canal which reduced the water travel time from the Colorado River from seven days to five days. Changes in water depth in response to gate adjustment became much more responsive. The additional Colorado River water supply available as a result of these water conservation efforts was passed to lower priority users.

In 2005, CVWD began a project to line the remaining 35 miles of unlined canal in order to eliminate seepage of Colorado River water. Construction was completed in 2006, and the entire 123-mile Coachella Canal is now lined. After a few thousand acre feet of conserved water are set aside for environmental and other purposes, a net of about 26,000 acre feet of water is now available to meet the growing urban needs of Southern California.

### **Direct Metering of Agricultural Delivery**

Agricultural water deliveries are directly metered at all farm turnouts. The meter displays rate of delivery as well as total water delivered.

### **Support of California Irrigation Management Information System (CIMIS) Network**

Four CIMIS stations operate within the Coachella Valley and are accessed daily by water users to provide timely evapotranspiration (ET<sub>o</sub>) information. Timely information is essential to enable farmers to order the correct amounts of water for irrigation. In cooperation with DWR, CVWD monitors and maintains four CIMIS stations within the Coachella Valley. These are #136 in Oasis, #218 in Thermal South, #208 in La Quinta II, and #200 in Indio. The CVWD website contains daily ET<sub>o</sub> from the #200 station in Indio, as well as a direct link to CIMIS for the remaining sites.

### **Flood-to-Drip Rebate**

CVWD offered a Flood-to-Drip irrigation rebate program through a grant from USBR. The goal of the program was to leave a portion of saved water in Lakes Mead and Powell. CVWD paid customers \$1,500 per acre, up to 160 acres, to convert flood irrigated crops to drip irrigation. Customers were required to demonstrate a minimum savings of 3 AFY. Three customers utilized this program, converting a total of 71 acres and saving an estimated 453 AFY.

### **Education Program**

In order to educate students to be conscientious about water conservation, CVWD employs two full-time teachers on staff to implement a school education program. Presently, there are four components to the program. The first is classroom presentations on a variety of water-related topics with an emphasis on water conservation, the second component is facility tours, the third is science fair promotion and sponsorship, and the fourth is a newsletter targeted to teachers. CVWD's teachers make audience-specific water education presentations to students at every level from pre-school to college. All school lesson plans are developed using California State Board of Education Standards and Frameworks. In addition to classroom presentations, CVWD's teachers host several tours of water-related facilities and judge science fairs for the public and private schools within the agency's service area. A quarterly newsletter aimed at teachers was created to promote the other three components of the program and provide valuable information to assist teachers in incorporating water-related topics into their lesson plans.

### **Agricultural Water Advisory Group**

In order to collaborate with the agricultural industry and other related organizations in the Coachella Valley, CVWD formed the Agricultural Water Advisory Group (AWAG) in December 2015. The AWAG meets twice annually in April and October to discuss topics such as water, State and Federal legislative updates, available grants, farming best management practices, and information to assist farmers. This ensures collaboration with entities such as the Natural Resources Conservation Service, United States Department of Agriculture, and Riverside County's Agricultural Commissioner's office who provide important updates and educational presentations.

### **Water Conservation Manager**

The district hired a Water Conservation Coordinator in 2005. The position has since been changed to the Conservation Manager. The Conservation Manager oversees the staff and programs of the Water Management Division. In addition to the Conservation Manager, the Water Management Department has a staff consisting of one Water Management Supervisor, ten Water Management Specialists, one Water Management Technician, one Water Management Aide, one Administrative Assistant, and one Office Assistant. Staff works with farmers, golf courses, cities, private residences, and homeowner associations to encourage the efficient use of water. The Water Management Department works closely with agricultural customers on the efforts described above.

## **B. Projected Results and Benefits for Selected Measures**

CVWD began development of the 2002 Coachella Valley Water Management Plan (CVWMP) in 1994 with the general goal of providing adequate quantities of safe, high-quality water at the lowest cost to local water users. The 2002 CVWMP identified the groundwater overdraft that had occurred and the threat of continued overdraft, based on projections of growth and water demand. In an effort to address groundwater overdraft, the 2002 CVWMP involved a combination of water conservation (municipal, agricultural, and golf course), increased water importation, increased groundwater recharge, and source substitution, which is the delivery of an alternate surface water supply in lieu of pumping groundwater.

The 2010 CVWMP Update was prepared to respond to changes affecting water supplies, water demands, and evolving federal and state laws and regulations. The 2010 CVWMP was submitted to the Department of Water Resources as an Alternative Plan for the Indio Subbasin to comply with the Sustainable Groundwater Management Act. The 2022 Indio Subbasin Alternative Plan Update (2022 Indio Subbasin Water Management Plan Update) was then prepared as an update to the Alternative Plan. The 2022 Indio Subbasin Alternative Plan Update retains the original CVWMP goal to reliably meet current and future water demands in a cost-effective and sustainable manner. It also includes an additional sustainability goal to maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial uses by managing groundwater to avoid the occurrence of undesirable results. The 2022 Indio Subbasin Alternative Plan Update includes projects and management actions available to meet these goals, including activities in, domestic water conservation, agricultural water conservation, water supply development, source substitution and replenishment, and water quality protection. For all user types, CVWD offers water management staff support, publications related to water use efficiency, public outreach and education, demonstration gardens, and school education programs.

For domestic water user conservation, CVWD provides rebate programs, direct install programs, water waste enforcement, landscape audits, landscape and leak detection workshops, and a landscaper certification program. For non-domestic water user conservation, CVWD has partnered with the Coachella Valley Resource Conservation District to offer landscape audits and farm audits through their certified staff member. For these users, CVWD regularly seeks out grant opportunities to fund programs that will help reduce water use and dependence on ground water.

For agricultural conservation, it has been demonstrated that CVWD-provided programs with voluntary grower participation are effective in increasing water use efficiency through both the USBR Water 2025 Challenge and the Extraordinary Conservation Measures programs. The Extraordinary Conservation Measures programs were a series of voluntary agricultural conservation measures which pay back USBR for past excess Colorado River diversions under the Inadvertent Overrun and Payback Policy. The following programs are currently being developed for agricultural conservation by CVWD. At this time, CVWD is not actively engaging in these programs, however through consistent communication with the agricultural community, we are able to offer services as needed. The following services are provided as needed and as funding is available.

#### **Grower Education and Training**

This consists of grower meetings and grower training programs funded by CVWD. In order to encourage grower participation, CVWD would implement confidential grower audits.

#### **CVWD-Provided Services**

This includes CVWD-funded conservation programs provided as a service to growers within ID-1, as recommended by the Agricultural Water Advisory Group. Programs could include scientific irrigation scheduling, scientific salinity management, soil moisture monitoring, and farm distribution uniformity evaluations. From 2004 through 2009, 73,400 AF of documented extraordinary conservation occurred using these types of programs for a total program cost of \$2,954,000 (about \$40/AF). Additional expenditures of \$200,000 in 2009 and 2010 resulted in savings of 3,400 AF (\$59/AF).

#### **Irrigation Upgrade or Retrofit**

This provides full funding, partial funding, or financial support to growers that wish to convert from flood and sprinkler to micro-sprinkler and drip irrigation systems. In a fully funded program, CVWD would provide reasonable reimbursement to a grower who upgrades their irrigation system or retrofits an aging

dripsystem. A partially funded program would share the expenses with growers, and a program that offers financial support would provide low or no-interest loans for the upgrades or retrofits.

### **Economic Incentives**

This involves adoption of one or more pricing approaches to encourage conservation, if needed. For example, this could be accomplished by establishing an irrigation water allocation based on ETo and a crop-specific coefficient. Water use in excess of the base allocation would be charged at a higher rate.

### **Regulatory Programs**

These types of programs would be considered as a last resort, and would include regulations that support and provide for agricultural conservation. These programs could include the following:

- Requiring all new permanent crops to use drip and/or micro-spray irrigation systems. All current crops would need to be converted within a 5-year period.
- Requiring on-farm water management plans prepared by growers to define the water application methods and water conservation measures utilized.

## **C. Public Engagement**

The 2022 Indio Subbasin Alternative Plan Update is the key water management planning document for the Indio Subbasin. The plan includes water conservation projects and management actions for all water use sectors, including urban, golf, and agriculture. These projects and management actions are identified as conservation measures in this plan. Preparation of the Indio Subbasin Alternative Plan Update was a public process. Seven public workshops and eight Tribal Workgroup meetings were held to provide updates to and receive input from public and Tribal participants throughout the update process. Each Indio Subbasin Groundwater Sustainability Agency (GSA) also held a public hearing for adoption of the Alternative Plan Update. The Indio Subbasin Alternative Plan Update states that the GSAs will continue to seek grant funding to support ongoing delivery and expansion of agricultural and golf conservation programs.

CVWD also regularly engages the two largest user groups of Canal water through the AWAG and Golf and Water Task Force. The AWAG meets to discuss water issues, legislative updates, grant funding opportunities, best management practices, and information to assist farmers. The Golf and Water Task Force was created to discuss water supply issues and explore ways for CVWD to help the golf courses in its service area reduce water use. CVWD will continue to engage agricultural and golf water users through the AWAG and Golf and Water Task Force.

## **D. Environmental Review**

If previously identified selected conservation measures were implemented, environmental review would be conducted as needed.

## **E. Implementation Schedule and Budgets for Selected Measures**

If previously identified selected conservation measures were implemented, applicable schedules and budgets would be prepared.

## **V. Water Management Challenges, Opportunities, and Goals**

### **A. Challenges**

Salinity management is a key issue in the Coachella Valley, with ramifications for recharge, water recycling, brine management, and agricultural drainage. A primary factor in salinity management in the area is the importation of salts with Colorado River water. Importation of Colorado River water for agricultural irrigation and groundwater replenishment has been fundamental to reversing chronic groundwater level declines, storage depletion, subsidence, and seawater intrusion. However, Colorado River water has higher average TDS concentrations than groundwater found in portions of the groundwater basin that is considered in water management plans.

### **B. Opportunities**

The Recycled Water Policy, adopted in 2009 and amended in 2018, is administered by the State Water Resources Control Board to encourage the increased use of recycled water and support water supply diversity and sustainability. The Recycled Water Policy states that salts and nutrients from all sources must be managed on a basin-wide or watershed-wide basis to attain water quality objectives and protect beneficial uses. This is typically achieved through the development of a Salt and Nutrient Management Plan (SNMP).

In 2015, CVWD, DWA, and Indio Water Authority (IWA) created an SNMP for the Coachella Valley Groundwater Basin (CV-SNMP). The Colorado River Basin Regional Water Quality Control Board (RWQCB) evaluated the 2015 SNMP and provided comments and recommendations on its compliance with the updated 2018 Recycled Water Policy. In response, the CV-SNMP development process was restarted in 2020 by an expanded SNMP agency group that includes all water and wastewater agencies in the Coachella Valley. In 2021, the SNMP agencies submitted a Development Workplan that describes a detailed scope of work for updating the CV-SNMP, including a new groundwater monitoring program to support implementation. The RWQCB approved the Groundwater Monitoring Workplan in February 2021 and accepted the Development Workplan in October 2021. This presents an opportunity for CVWD and the other SNMP agencies to develop and implement an SNMP in collaboration with the RWQCB and other Coachella Valley stakeholders.

### **C. Goals**

To ensure effective basin-wide salinity management, CVWD aims to prepare an updated CV-SNMP in coordination with the other SNMP agencies, the RWQCB, and other stakeholders beginning in 2022. Additionally, the SNMP agencies aim to fill identified gaps in the proposed CV-SNMP monitoring network and to complete initial sampling by 2026.

In addition to salinity management, CVWD is committed to local groundwater management to maintain sustainability of the Coachella Valley Groundwater Basin. Local water agencies have long recognized the multi-faceted nature of groundwater issues in the area and have developed relevant management plans, including the 2002 Coachella Valley Water Management Plan (CVWMP), the 2010 CVWMP Update, and the 2013 Mission Creek/Garnet Hill Water Management Plan (MC/GH WMP). In 2017, the agencies submitted the 2010 CVWMP Update and the 2013 MC/GH WMP with accompanying bridge documents as Alternative Plans for the Indio and Mission Creek Subbasins, respectively, in accordance with the Sustainable Groundwater Management Act. Both Alternative Plans were updated in 2021. Implementation of these updated plans will allow the agencies to continue local adaptive groundwater management for long-term basin sustainability.

## **VI. Attachments**

**Attachment 1.** CVWD 2021 Annual Agriculture Report

**Attachment 2.** CVWD 2021 Canal Water Rates & Charges

## **Attachment 1**

CVWD 2021 Annual Agriculture Report



# 2021 ANNUAL AGRICULTURE REPORT

THE CROP REPORT COVERS THE REPORTING PERIOD FROM JANUARY 2020 – DECEMBER 2020

- **\$574,871,303** Value of this year's production
- **59,101** Total acreage irrigation includes double cropping and irrigated but not harvested
- **\$9,727** Average gross value per acre

Financial figures are rounded to the nearest dollar. Crop categories established by the Bureau of Reclamation.  
This report is only applicable to ID1

## A MESSAGE FROM THE GENERAL MANAGER



Welcome to Coachella Valley Water District's (CVWD) 2021 Agriculture Report, an annual newsletter for CVWD canal water customers including famers, agricultural businesses, and agricultural groups. We have moved the crop report, provided in the past in our Annual Review and Water Quality Report, here to provide more prominence and timeliness and have included short articles about our work protecting our sources of water for farmers, residents, and visitors alike.

Also in this edition of the Ariculture Report is an article about the ongoing Oasis In-Lieu Project, which is expanding CVWD's irrigation distribution system to deliver canal water to properties in the Oasis area that are currently using groundwater for irrigation. The project will supply 32,000-acre feet of water from the Coachella Canal and help prevent aquifer overdraft.

The productive farmlands of the eastern Coachella Valley have some of the highest per acre crop yields in the world. Together farming and tourism propel the economy of the Coachella Valley, thanks to the water resources that CVWD works to protect.

We welcome your feedback about this publication. Just email us at [publicinfo@cvwd.org](mailto:publicinfo@cvwd.org).

Thank you,

Jim Barrett

**YourWater**  
is our promise.

	ACREAGE	YIELD IN TONS	VALUE/ACRE	TOTAL VALUE
<b>FRUIT</b>	<b>22,211</b>	<b>931,032</b>	<b>\$10,256</b>	<b>\$227,795,181</b>
Dates	9,449	37,796	\$8,800	\$83,151,200
Figs	140	714	\$4,760	\$666,400
Grapefruit	391	172	\$8,418	\$3,291,438
Grapes	5,511	26,891	\$13,418	\$73,946,598
Lemon-Limes	4,789	39,850	\$8,260	\$39,557,140
Mangoes	117	731	\$15,625	\$1,828,125
Olives	86	464	\$7,020	\$603,720
Oranges-Tangerines	1,176	799,680	\$13,260	\$15,593,760
Peaches	56	291	\$15,458	\$865,648
Strawberries	58	609	\$37,625	\$2,182,250
Melons-Watermelon	361	14,440	\$16,265	\$5,871,665
Misc. Fruit	77	9,394	\$3,081	\$237,237

	ACREAGE	YIELD IN TONS	VALUE/ACRE	TOTAL VALUE
<b>VEGETABLES</b>	<b>24,846</b>	<b>1,229,456</b>	<b>\$9,633</b>	<b>\$239,340,451</b>
Artichoke	705	6,891	\$15,606	\$11,002,230
Bell Peppers	3,688	74,682	\$18,225	\$67,213,800
Broccoli	1,219	10,724	\$9,287	\$11,320,853
Cabbage	553	8,848	\$6,502	\$3,595,606
Carrots	4,111	197,328	\$6,279	\$25,812,969
Cauliflower	1,873	13,785	\$9,197	\$17,225,981
Celery	779	18,042	\$8,801	\$6,855,979
Chili Peppers	94	52,875	\$16,500	\$1,551,000
Eggplant	259	4,533	\$19,600	\$5,076,400
Green Beans	602	2,486	\$7,410	\$4,460,820
Kale	316	5,795	\$7,677	\$2,425,932
Lettuce	3,515	61,513	\$9,000	\$31,635,000
Okra	759	5,617	\$9,472	\$7,189,248
Onions-Green	377	1,795	\$1,072	\$404,144
Oriental Vegetables	1,337	18,718	\$8,100	\$10,829,700
Parsley	-	-	-	-
Potatoes	344	5,848	\$3,325	\$1,143,800
Radishes	161	4,632	\$10,324	\$1,662,164
Spices	1,112	227,293	\$3,796	\$4,221,152
Spinach	671	10,266	\$13,362	\$8,965,902
Squash	276	2,291	\$5,644	\$1,557,744
Sugar Beets	315	476,438	\$7,381	\$2,325,015
Sweet Corn	1,468	13,939	\$6,613	\$9,707,884
Tomatoes	312	5,117	\$10,119	\$3,157,128
Turnip	-	-	-	-

	ACREAGE	YIELD IN TONS	VALUE/ACRE	TOTAL VALUE
<b>FORAGE</b>	<b>1,978</b>	<b>\$12,696</b>	<b>\$1,967</b>	<b>\$3,890,300</b>
Corn	-	-	-	-
Hay-Alfalfa	542	4,336	\$1,440	\$780,480
Pasture	21		\$130	\$2,730
Pasture-Permanent	1,393		\$130	\$181,090
Hemp*	22	8,360	\$133,000	\$2,926,000

<b>FISH FARM</b>	<b>265</b>	<b>776</b>	<b>\$14,650</b>	<b>\$3,882,250</b>
<b>DUCK POND</b>	<b>775</b>	<b>4</b>	<b>\$76</b>	<b>\$58,900</b>
<b>GOLF COURSE</b>	<b>6,024</b>	<b>542,160</b>	<b>\$11,250</b>	<b>\$67,770,000</b>
<b>POLO FIELD</b>	<b>510</b>	<b>4,590</b>	<b>\$11,250</b>	<b>\$5,737,500</b>
<b>TURF GRASS</b>	<b>1,223</b>	<b>11,007</b>	<b>\$11,250</b>	<b>\$13,758,750</b>
<b>NURSERY-Plants</b>	<b>179</b>		<b>\$9,959</b>	<b>\$1,782,661</b>
<b>NURSERY-Trees</b>	<b>1,090</b>		<b>\$9,959</b>	<b>\$10,855,310</b>

\* Irrigation restricted to groundwater/Domestic

2020 CROP REPORT



Oasis Reservoir

## Irrigation Project Substitutes Canal Water for Groundwater

A project that will bring canal water to 7,100 acres of land in the Oasis area currently irrigated with pumped groundwater has hit major milestones.

CVWD is completing the Oasis-in-Lieu Recharge Project that will bring up to approximately 32,000 acre-feet of Colorado River water annually via the Coachella Canal for irrigation. The Project will help prevent aquifer overdraft.

Approximately 9 miles of the proposed total 18 miles of pipeline had been completed by fall 2021, along with 3 of the 4 planned reservoirs. The remainder of the project, which includes the fourth reservoir, two pump stations, two booster stations, the remaining 9 miles of pipeline, and 39 new customer delivery turnouts, is expected to be completed by the fall of 2022.

The new pipeline in the project area will allow for the distribution of this alternative source of supply to users at the northern portion of the Oasis area near Avenue 69 (west of Harrison Street) all the way to westerly side of the Salton Sea along Avenue 84.

Total estimated cost of the project is \$50.4 million.

## CVWD Adopts Climate Action and Adaptation Plan

The Board of Directors of the CVWD voted unanimously to adopt the 2021 Coachella Valley Water District Climate Action and Adaptation Plan to guide the district's response to climate change.

The Climate Action and Adaptation Plan (CAAP) provides a comprehensive assessment of CVWD's current greenhouse gas (GHG) emissions from CVWD multi-faceted operations, and identifies the measures, policies, and projects developed to reduce GHGs.

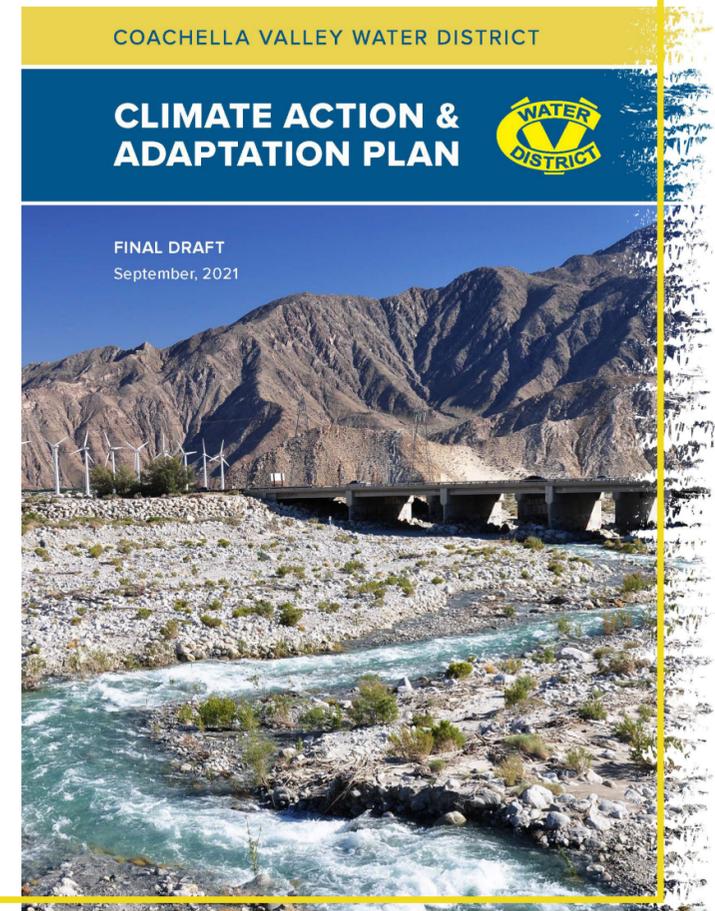
At its Sept. 28 meeting, the board received a presentation giving an overview of the CAAP, which will support CVWD's efforts to identify projects to reduce greenhouse gas emissions and improve energy efficiency and water supply resiliency. The plan will also help CVWD obtain funding necessary to implement such projects and further support CVWD's mission.

The plan notes that CVWD recognizes the potential impact of climate change to its mission of providing high quality water to the Coachella Valley region at a reasonable cost in a reliable manner. This includes more intense flooding events and more persistent drought conditions that can harm CVWD flood control facilities and reduce local water supplies.

CVWD is working to improve sustainability in its operations and end uses among its customers through such programs as rebate programs for homeowners to invest in water-efficient landscaping and washing equipment, seminars and workshops to educate its customers, including commercial and agricultural end users, water conservation contests for homes and businesses, and a number of other water conservation programs that target commercial and agricultural water efficiency.

CVWD and local water agencies are implementing water management plans that State officials have determined satisfy the Sustainable Groundwater Management Act, which is designed to bring groundwater basins into balanced levels of pumping and recharge. CVWD is also expanding water recycling services to improve groundwater conditions within its service area. CVWD's emphasis on sustainable water management and grant funded projects provided the catalyst for developing its first CAAP to help reduce GHG emissions from its operations.

To view the plan, [click here](#).



## **Attachment 2**

CVWD 2021 Canal Water Rates & Charges

# Coachella Valley Water District's Canal Water Rates & Charges

(effective July 1, 2021)

<b>Consumptive Rates</b>			
<b>Type of user</b>	<b>Description</b>	<b>Irrigation Water Commodity Charge*</b>	<b>Water Supply Surcharge*</b>
Class 1	All canal water customers who use Colorado River (canal) water for commercial agricultural activities – i.e., customers who use canal water for the production of agricultural commodities for commercial purposes, including growing crops and raising animals for the commercial production/sale of food, fiber, fuel and other products.	\$34.32	\$0
Class 2	All other canal customers – i.e., customers who use canal water for: groundwater replenishment, including the District Replenishment Fund; drinking water production; landscape irrigation; recreation; and other activities, including, but not limited to, golf courses, hunting clubs, polo fields and the District Nonpotable Water Fund.	\$34.32	\$67.80
Construction	Temporary use for construction purposes	\$47.41	\$67.80

\*Rates are per acre-foot, which is equal to 325,850 gallons

<b>Other Consumptive &amp; Miscellaneous Charges</b>	
Quagga mussel mitigation surcharge	\$3.18 per acre-foot
Scheduled gate orders	\$19.80 per occurrence
Unscheduled gate orders	\$39.60 per occurrence
Surcharge for deliveries outside the boundaries of Improvement District 1	\$3.92 per acre per month
Irrigation Water Availability Assessment	3.8 x IWCC x number of acres in the parcel
Account Establishment Fee	\$46
Return payment charge	\$25

Other restrictions and rates apply where required, and may include a hold harmless agreement and/or various applications where necessary. Fees, charges and services are non-refundable. These rates are subject to rules and regulations as adopted and amended by the Coachella Valley Water District Board of Directors.



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