Water and the Coachella Valley
Coachella Valley: An H₂Oasis

Coachella Valley Water District is among the most dynamic, diverse and innovative water agencies in the entire state of California.

The district has a rich history, filled with meaningful achievements across several decades of delivering water and water-related services to local consumers.

This rich tradition is complemented by current technological and cutting-edge water management techniques.

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Colorado River water is released from The Colorado Aqueduct into the Whitewater River. The district’s boundaries have grown to encompass nearly 640,000 acres — 1,000 square miles. Most of CVWD is located in Riverside County; boundaries extend into Imperial and San Diego counties.

Many water-related services are offered. The district’s “roots” are in agricultural irrigation. It delivers about 280,000 acre-feet* annually of imported water to some of the most productive farms anywhere.

CVWD provides drinking water to more than 100,000 homes and businesses, from wells drilled into an aquifer with capacity estimated at 39.2 million acre-feet.

Nearly as many residents receive their sanitation services from the district; 6.5 billion gallons of sewage are treated yearly.

Whenever and wherever possible, this wastewater is treated, then recycled for golf courses and other outdoor irrigation.

Recycled water supplements imported water for use in recharging groundwater tables, a vital program to ensure adequate supplies of water for future generations.

Rain is rare — on average three inches a year — but when flooding occurs, CVWD is responsible for the region’s stormwater protection, helping to prevent the loss of life and extensive property damage.

The district’s sources of water are nearly as varied as the services it provides.

*An acre-foot of water is 325,851 gallons.
Where The Water Comes From

Were it not for the aquifer, Coachella Valley would have stayed raw desert, suitable only for a few drought-tolerant animals and plants.

All drinking and other domestic water, comes from the aquifer, a source usually referred to as groundwater. The district’s domestic water sales are nearly 125,000 acre-feet annually and increase monthly.

The aquifer is “refilled” using Colorado River water, diverted into the Whitewater River or pumped to other recharge sites.

Agricultural irrigation primarily is from the Colorado River and delivered to local farms by the 122-mile Coachella Canal.

Historically, CVWD diverts 330,000 acre-feet annually. A quarter to a third of farming irrigation water is groundwater, pumped from privately-owned wells.

Most valley golf courses are irrigated using groundwater. Increasing numbers in the lower valley (east of Washington Street) use imported and recycled water.

A crucial component of effective water management is finding alternatives to use of groundwater for outdoor irrigation.

Prior to the canal’s completion in 1949, imported water was not available to the Coachella Valley. Except for modest flows from rivers and streams, water was drawn from private wells. CVWD did not operate its own wells until it began assuming the operations of some of the several small, private companies that once proliferated throughout the desert regions.

As domestic growth continued, CVWD realized more imported water would be needed to keep up with demand. In the 1960s the district joined the State Water Project. Only CVWD and Metropolitan Water District of Southern California hold entitlements to Colorado River water and State Project Water—valley-wide totalling 500,000 acre-feet annually.
Agricultural Irrigation

More than a century ago, farmers came to Coachella Valley for cheap land, a warm climate that allowed for year-round growing and a seemingly endless abundance of water, some of which once flowed freely to the surface because of plentiful artesian wells.

To maximize profits on a limited number of acres, local farmers specialized in niche crops, such as domestically grown dates, and early season production, including table grapes, melons and citrus.

Agriculture was so successful, however, that groundwater tables began dropping at alarming rates. Most of the artesian wells stopped flowing. In economically hard times some farmers could not afford the expense of operating their wells.

Had the canal not been built, farming might have ceased as a viable industry.

Today, growers produce crops that on average exceed $8,000 an acre in gross value; annually among the highest returns in the country and the world.

Overall crop production on less than 70,000 acres exceeds $575,000 a year.

More than 60 percent of area farms use drip or other micro-irrigation. This reduces water uses, allows adding pesticides and herbicides directly into irrigation lines and contributes to increased crop yields.

Experts believe many agrarian-based, ancient civilizations—such as Mesopotamia and the Anastasia—perished because they had inadequate drainage for farmland. As a result, a buildup of salt in the soil made it unusable for crops.

In Coachella Valley, shortly after work on the canal was completed, construction began on an underground, tile drainage system designed to carry used agricultural irrigation water—which is high in salinity—away from farmland and to the Salton Sea.

In 2005, CVWD received a state grant to research effective ways to desalinate drainage. In the future the district intends to use up to 11,000 acre-feet of treated drainage for outdoor irrigation annually.

This system boasts nearly 2,500 miles of on-farm and district-maintained drains.

Table grapes are among the leading crops grown in the Coachella Valley.
Farm Drainage

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Domestic Water

CVWD first ventured into providing domestic water to residents of Coachella Valley in 1961, when it took over the operations of two privately-held companies. Three years later, CVWD was operating 60 wells and serving 3,250 homes and businesses.

Today the district is the largest provider of domestic water in Coachella Valley, with services south along the Salton Sea and north into portions of Cathedral City.

Water is pumped from more than 100 wells into pipes for immediate delivery to homes and businesses, or stored until it is needed in nearly 75 enclosed reservoirs.

Water from the aquifer is nearly pristine, ready to drink “as is,” but is subjected to a plethora of tests to ensure it meets all state and federal drinking water standards.

Coachella Valley’s domestic water meets all health standards.
In its own laboratory and at others, the district annually tests in excess of 20,000 water samples for more than 100 regulated and unregulated substances.

Results from these tests are mailed to all consumers and registered voters in the district as part of CVWD’s annual report.

The district has a remarkable record with respect to water quality. The number of instances when contaminants have been discovered are few. In those rare cases where a well is closed, it is almost always as an extra precaution, not because health limits were reached or exceeded.

### Domestic Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Population Served</th>
<th>Water Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>19,084</td>
<td>3.1 billion gallons</td>
</tr>
<tr>
<td>1980</td>
<td>62,705</td>
<td>8.7 billion gallons</td>
</tr>
<tr>
<td>1990</td>
<td>139,620</td>
<td>24.7 billion gallons</td>
</tr>
<tr>
<td>2000</td>
<td>202,873</td>
<td>36.0 billion gallons</td>
</tr>
<tr>
<td>2005</td>
<td>240,573</td>
<td>40.3 billion gallons</td>
</tr>
</tbody>
</table>

In addition to addressing concerns about water quality, district officials constantly are investigating new ways to increase the quantity of water available in the valley.

In the decades since domestic water first was provided by CVWD, the amount of water consumed individually by residents has dropped considerably.

The district’s domestic water distribution system is nearly 1,900 miles in length. Replacement of worn or outdated pipes and other facilities is an on-going process.
the vast majority of CVWD domestic water customers also get sanitation services from the water district.

Acquiring Palm Desert County Club water and sewer systems in 1967 put CVWD in the business of both sanitation and wastewater reclamation for the first time. Today there are more than 91,000 home and business accounts.

The district now operates six wastewater reclamation plants, including the original site in Palm Desert.

Facilities have the capacity to treat more than 31 million gallons of sewage a day, and currently handle on average slightly more than 18 million gallons daily.

Three of these sites create recycled water, two at a tertiary (three-stage) level.

Several CVWD plants are undergoing expansion to handle increased demand as a result of tremendous area growth, residentially and commercially.

Demand is compounded by the switch in some areas from septic tanks to sewer systems, better for groundwater quality.

More than 90 miles of pipeline are in use to collect raw sewage and transport it to the closest treatment facility.

Tons of sludge created by the process are treated, then hauled away and used by private companies in making fertilizer.
Wastewater Treatment

The vast majority of CVWD domestic water customers also get sanitation services from the water district. Acquiring Palm Desert County Club water and sewer systems in 1967 put CVWD in the business of both sanitation and wastewater reclamation for the first time. Today there are more than 91,000 home and business accounts. The district now operates six wastewater reclamation plants, including the original site in Palm Desert. Facilities have the capacity to treat more than 31 million gallons of sewage a day, and currently handle on average slightly more than 18 million gallons daily. Three of these sites create recycled water, two at a tertiary (three-stage) level. Several CVWD plants are undergoing expansion to handle increased demand as a result of tremendous area growth, residually and commercially. Demand is compounded by the switch in some areas from septic tanks to sewer systems, better for groundwater quality. More than 90 miles of pipeline are in use to collect raw sewage and transport it to the closest treatment facility. Tons of sludge created by the process are treated, then hauled away and used by private companies in making fertilizer.

Purple identifies pipes and other facilities used in the delivery of recycled water.

Recycled Water

Use of recycled water is playing an ever-increasing role in CVWD’s effective water management.

More than a dozen golf courses and other large-volume water consumers use recycled water for at least part of their irrigation. Almost 15,000 acre-feet of recycled water is used yearly, saving a like amount of groundwater for use by more than 37,500 residents. The increase in the valley’s population of permanent residents is increasing the availability of recycled water year-round.

In review is a project that maximizes use of recycled water, which will be combined with imported water for delivery to the 50 mid-valley golf courses. Removing courses from their dependency on groundwater for irrigation helps preserve the aquifer.
Floodwaters can damage millions of dollars in property and disrupt many people’s lives.

The Coachella Valley Stormwater District was assimilated by CVWD in 1935. The district protects 590 square miles from flooding. Backbone of the system is 25 miles of naturally-occurring Whitewater River riverbed. Because the river spreads across the lower valley during flooding, it was channelized. It is the Coachella Valley Stormwater Channel, downstream from Point Happy in La Quinta near Highway 111 and Washington Avenue.

Regional Stormwater Protection

Flood protection is the service provided by the district likely to get the least attention from the public — until it starts to rain and there is a storm. Then protection of life and property becomes the top priority for everyone involved.
The riverbed and 24.5-mile channel are fed by several smaller channels, dikes and levees designed and built to collect rapidly moving floodwater as it pours from the adjacent mountains onto the valley floor.

Within CVWD’s boundaries there are 16 stormwater protection channels. These and other facilities have a length of 133 miles.

Many of these were built or improved in the 1970s in cooperation with cities and other agencies following severe floods.

Such cooperation is vital because while the district is responsible for flood control facilities, building bridges and related infrastructure rests with other levels of government, such as counties and cities.

Federal funding occasionally is available for significant flood control protection, but competition for this revenue is intense.

Stormwater protection recipients are not directly assessed any fees. Funding comes primarily from local property taxes. This has limited expansion of the stormwater system, so CVWD has used innovative approaches and programs.

Cooperation with the National Weather Service helped establish the region as only the second to receive broadcasts, with flood warnings, in Spanish and English.

In Thousand Palms CVWD is working with the Army Corps of Engineers on a protection project with limited funds and complex environmental issues.
A CVWD conservation expert discusses the benefits of weather-based timers.

A Tradition of Conservation

The water district began this century by participating in several significant events, reflecting many decades of dedication to conservation and the protection of local water rights and multiple water sources.

CVWD’s board of directors adopted the Coachella Valley Water Management Plan in 2002. This comprehensive, 35-year blueprint was designed to ensure reliable, affordable water is readily available well into the future through reduced consumer demand, increases in imported supplies and source substitutions—such as greater use of canal and recycled water for golf courses and similar outdoor irrigation.

Community representatives have joined CVWD on committees formed to review ways to implement the Management Plan.
CVWD joined with Metropolitan Water District, Imperial Irrigation District and San Diego County Water Authority the next year in adopting the Quantification Settlement Agreement.

The QSA is crucial in California’s need to live within its 4.4 million acre-feet annual entitlement to Colorado River water.

The agreement establishes the district’s entitlement to this water and provides in the future for additional, reasonably-priced supplies that can be used to recharge the aquifer and in lieu of groundwater.

Also enacted recently was a landscape ordinance that encourages use of native and other low-water use plants, requiring new projects to use 25 percent less water. In farming, scientifically-based programs for irrigation and salinity-control to save water are credited with conserving more than 30,000 acre-feet in two years.

The district also sponsors well-attended annual landscape workshops and tours, and creates displays for special events. CVWD produces the popular book, *Lush & Efficient: Gardening in the Coachella Valley*, and various other publications.

Additional public education includes programs for all students through sixth grade, and many higher grades, too. Students discover at an early age that it is dangerous to play in or near the canal.

Later they learn they play an important role in helping to conserve water sources and ensure there will be future supplies.
A Water District Without H$_2$O

The district was established using California water code provisions of the County Water District Act in 1918. The original name was the Coachella Valley County Water District.

The district began with rock-solid support from the community, dedicated leadership and a long, water-related “to do” list.

What CVWD did not have was water to sell. All wells were privately owned and operated; imported water unavailable.

CVWD’s first directors moved quickly to file paperwork necessary to secure rights to all unclaimed Whitewater River water, an important source for aquifer recharge.

The district also obtained property in an area west of Palm Springs, Windy Point, for use its in groundwater replenishment.

The very first recharge efforts involved capturing fast-moving floodwaters during storms. Today, modern facilities divert stormwater, natural runoff from nearby mountains and water released from the Colorado Aqueduct into the riverbed.

The current program has fed 585 billion gallons of water back into the aquifer.

In addition to protecting local water from outside threats, CVWD sought to prevent a crisis within. The district used its authority to require artesian-flowing wells be capped to prevent waste.
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With a rapid increase in well pumping, CVWD leadership realized groundwater management alone would not be enough to ensure continued, adequate supplies of irrigation water for the region. The district aggressively lobbied federal officials for inclusion in increased delivery of Colorado River water into California.

As a result, in 1919, CVWD’s directors approved contracts with Washington, D.C., for importation of Colorado River water into Coachella Valley for farm irrigation. Bringing imported water to the region would require a massive waterway. Thus, construction of the 122-mile Coachella Canal became part of the Boulder Canyon Act, which also authorized construction of Hoover Dam and Lake Mead in the 1930s. Since 1973, nearly two million acre-feet of water have been recharged into the aquifer.
Colorado River To The Rescue

Farming in the Coachella Valley is an incredible success story. Too successful in the beginning, perhaps, because agricultural growth led to a dramatic drop in groundwater tables at a time when there were no other available sources of water.

If CVWD had not worked to bring canal water to the valley, the aquifer would have been overdrafted to a point where it would have been too costly to operate wells.

As it was, the district had to make major concessions to ensure it was included in Bureau of Reclamation plans. At one point, CVWD’s directors voted to be assimilated by Imperial Irrigation District, leading to their immediate recall by the community.

The district retained its entitlement to Colorado River water, but had to accept a junior rights holder status, a source of contention and conflict for 70 years.

This controversy seems like child’s play, however, when compared to long-standing conflict about distribution of Colorado River water among the seven states that have legal entitlement to it; and among participating agencies in California.

The states are divided into two basins:

The upper basin states are Wyoming, Colorado, Utah and New Mexico.

The lower basin states are California, Nevada and Arizona.

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<th>Lower Basin (7.5 million acre-feet)</th>
</tr>
</thead>
<tbody>
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<td>California</td>
</tr>
<tr>
<td>Nevada</td>
<td>Arizona</td>
</tr>
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<td>Mexico</td>
<td>Nevada, Arizona</td>
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Evaporation* 1.0 million acre-feet (Additional water, but only when available)

(*And other system losses)

Total 18.5 million acre-feet (Actual flows have been as low as 5 million acre-feet and as high as nearly 24 million acre-feet.)

The upper basin states divide Colorado River water based on a percentage of what is available. Each of the lower basin states has a defined, quantified entitlement.

The Colorado River Compact in 1922 ensures lower basin states on average get 7.5 million acre-feet of water annually.

Photo courtesy Bureau of Reclamation

Hoover Dam during construction.

Colorado River Water Distribution

Upper Basin 7.5 million acre-feet (Wyoming, Utah, Colorado, New Mexico)

Lower Basin 7.5 million acre-feet

California 4.4 million acre-feet

Arizona 2.8 million acre-feet

Nevada 300,000 acre-feet

Mexico 1.5 million acre-feet

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### Colorado River Water Distribution

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<td><strong>Lower Basin</strong></td>
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</tr>
<tr>
<td>California</td>
<td>4.4 million acre-feet</td>
</tr>
<tr>
<td>Arizona</td>
<td>2.8 million acre-feet</td>
</tr>
<tr>
<td>Nevada</td>
<td>300,000 acre-feet</td>
</tr>
<tr>
<td>Mexico</td>
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The Colorado River Compact in 1922 ensures lower basin states on average get 7.5 million acre-feet of water annually.
Agriculture has entitlement to 87.5 percent of Colorado River water sent to California.

Seeking ‘Peace On The River’

Colorado River water played an enormous role in the growth and development of the Southwest, especially in Southern California.

Although the first 3.85 million acre-feet of its 4.4 million acre-foot entitlement was assigned to agencies providing agricultural irrigation, California’s urban population thirsted for water wherever available.

Because the other basin states initially did not use their full entitlements to the water, as early as 1953 California tapped into the Colorado River for as much as 800,000 acre-feet of “surplus.”

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As the chart on Page 19 shows, annual flows — estimated at between 13.8 million and 15 million acre-feet on average — are lower in some years than the total amount of water designated for distribution. Legal entitlements exceed availability, leading to potential shortages during dry years.

This was not an issue when most of the states did not use their full allocations, but the Central Arizona Project in that state and growth in Nevada led those states to reach full entitlements — and want more.

The upper basin states also are entitled to 7.5 million acre-feet annually, but must take less if necessary to ensure that the lower basin states get their full allotment.

Over time the six other basin states put pressure on the federal government to limit California to its legal entitlement.

The state was given sort of a reprieve: If it could come up with a plan to stay within its entitlement, then California could have up to 15 years to end its reliance on the surplus: A soft landing.

Responsibility for developing a workable plan fell squarely on the shoulders of the water agencies receiving Colorado River water, including CVWD.

The result—the Quantification Settlement Agreement—took years of negotiations and several legal battles before it was adopted.

A crucial element of the agreement is the transfer of agricultural irrigation water for urban (domestic) uses.
This contributed to district efficiency in making water deliveries to farms and the other irrigators who use imported water. When built, the last 37 (northernmost) miles of the canal were concrete-lined to ensure more efficient connections to the 500 miles of underground laterals. The first 49 (southeasternmost) miles of the waterway were replaced by a parallel concrete waterway in 1980, conserving more than 130,000 acre-feet annually. The project was funded by the federal government, which uses water saved to meet treaty obligations with Mexico. In 1991 an experimental process to line portions of the canal while water was still in it was used on 1.4 miles of waterway. The remaining 35 miles of still-earthen areas of the waterway are being replaced by a parallel, concrete canal. As planned, completion was expected by late 2006. The project is funded by the state, with the net of 26,000 acre-feet of conserved water going to meet urban needs in San Diego County. Costs in excess of the $85 million budget will be paid by the San Diego County Water Authority.

Much of the water that flows through the canal has traveled several hundred miles, diverted from the Colorado River into the All-American Canal at Imperial Dam, which is 18 miles north of Yuma, Arizona. Water flows in that canal for less than 36 miles until it is diverted into the 122-mile Coachella Canal.

The Coachella Canal

how different Coachella Valley would look had the canal not been built. Without imported water, the aquifer would have been overdrafted to a point it no longer could supply agriculture with irrigation.

Heavy equipment is used to line a new section of the Coachella Canal with concrete.

Without a reliable supply of groundwater, there would be few resorts or recreational facilities and virtually no residential growth. The canal is an engineering marvel. Water travels through the canal entirely by gravity flow, thus eliminating electricity costs normally associated with pumping. The waterway was among the very first in the world to be controlled by telemetry.
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Lake Cahuilla

Construction in 1969 of Lake Cahuilla gave CVWD greater control over the flow of canal water into the valley, which normally takes 24 hours to arrive after it’s ordered. Residents also gained a popular spot for fishing, camping and day-use recreation. The lake was built at a cost of slightly more than $1.5 million, and is located between Avenues 56 and 58, west of Jefferson Street. It’s three-quarters of a mile long, up to half that in width, 11-12 feet deep and holds about 1,500 acre-feet of water, a valuable surplus in the event of changing irrigation needs. When constructed it was the largest soil-cement lined reservoir in the world. Riverside County oversees the lake’s recreational uses and stocks it with fish.

The canal has the capacity to handle a flow of water up to 1,300 cubic feet per second; Close to 2,600 acre-feet of water could be delivered in a 24-hour period. This represents the potential annually to deliver nearly 950,000 acre-feet of water.

Construction of the canal began in the 1930s but was interrupted by World War II. Work resumed after the war. The first deliveries were made in the late 1940s. CVWD’s unique, 500-mile underground delivery system was built in the 1950s, at a cost of $13 million.

Water is delivered to the high point of every 40 acres of land within the district’s service area eligible for and signed up to receive it.

Initially, water delivered from the canal was used exclusively by agriculture. As residential growth has moved into the lower valley, however, more and more other types of irrigators — primarily golf courses and homeowners associations — are using Colorado River water.

The use of canal water for non-potable purposes helps to conserve the valley’s groundwater supply for domestic use.

Treating canal water to meet standards for drinking water would be much more costly than delivering groundwater.

In the future, two lower valley facilities have a potential to recharge up to 80,000 acre-feet of canal water to the aquifer. Lake Cahuilla is a popular Coachella Valley location for fishing and boating.
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Riverside County oversees the lake’s recreational uses and stocks it with fish.
Coachella Valley is a long way from the rivers and streams that provide water that flows several hundred miles from north to south in California, but the area holds the third largest State Water Project entitlement.

CVWD alone is fourth largest among State Water project contractors, and was joined by Desert Water Agency in the 1960s in seeking another reliable source of imported water. Only the Metropolitan and Kern County water agencies have larger entitlements than Coachella Valley.

The original entitlements were modest but both agencies aggressively seek new, “surplus” entitlements when available.

The region does not (yet) have its own aqueduct or pipeline to bring State Water Project Water into the Coachella Valley.

Instead, a unique “bucket for bucket” exchange agreement was reached with Metropolitan. CVWD and DWA trade their State Water Project entitlements to Metropolitan for Colorado River water, which is released from an aqueduct into the Whitewater River. This and natural runoff flow to 19 recharge ponds, where water percolates into the aquifer.

The agreement was modified in 1984, allowing Metropolitan to “bank” water it does not need in so-called “wet” years into the Whitewater River.

In “dry” (drought) years MWD receives the two Coachella Valley agencies’ state water entitlements, and does not have to deliver water to the region.

During recent negotiations, CVWD and DWA obtained long-term (although not permanent) access to 100,000 acre-feet of Metropolitan’s state water entitlement. In 2004, this district finalized permanent purchase of 9,900 acre-feet of entitlement from Tulare Basin Water Storage District, at a cost that was close to $20 million.

As this publication was going to press, CVWD and DWA were buying entitlement to another 16,000 acre-feet of state water from another agency. This will push this district’s access to State Water Project water to 133,100 acre-feet. With DWA’s access going to 54,000 acre-feet, the entire Coachella Valley entitlement to state water is at 187,100 acre-feet.

Drought-tolerant plants save water and are popular with hummingbirds and butterflies.
The State Water Project

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Efficient Water Management

Buying imported water as it becomes available is only one of the ways the district is ensuring Coachella Valley has reliable water sources well into the future.

Ensuring that from all available sources there are sufficient amounts of water to meet the needs of all current and future consumers is more complicated.

The Coachella Valley Water Management Plan is meant to serve as a blueprint for the entire region, not just those portions of the region within CVWD’s boundaries.

The plan anticipates the population will double by 2035, if not sooner. Reducing total water demand to half as much as the amount of growth lessens the burden to supply everyone’s needs.

Water Demand Reductions

<table>
<thead>
<tr>
<th>Domestic</th>
<th>10 percent by 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Includes homes and businesses; 70 to 80 percent of domestic water use is outdoors)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agriculture</th>
<th>7 percent by 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>(An aggressive conservation program using scientific irrigation techniques and salinity control is reaching this goal on land managed by participants.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Golf Courses</th>
<th>5 percent by 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Existing golf courses. New courses are reviewed for maximum water efficiency on a case-by-case basis, and must use recycled water if it is available.)</td>
<td></td>
</tr>
</tbody>
</table>
A comprehensive variety of new and existing policies and programs are and will be used to meet these goals.

CVWD staff with expertise in irrigation techniques and knowledgeable about native and drought-resistant plants work closely with golf course professionals, homeowners’ associations, businesses and other large-volume water users to maximize their water efficiency.

Free, detailed water audits are provided to golf courses and other large water users.

Landscape workshops are offered, for a small fee, and quickly booked completely.

Newsletters and other printed materials are sent to domestic and agricultural water users, encouraging greater conservation.
The Salton Sea

Coachella Valley Water District has been a part of efforts to “save” the Salton Sea for decades. The district supports a practical, reasonable solution to what is a complex environmental challenge.

The Salton Sea was created in 1905 as Colorado River floodwaters collapsed Imperial Valley irrigation facilities and poured for 18 months into an area with an elevation second only to Death Valley as the lowest in the United States.

Scientists predicted the desert’s intense heat would completely evaporate the sea in 8 to 14 years. But agricultural drainage of more than one million acre-feet a year, mostly from Imperial County farms, and to a lesser extent from the Coachella and Mexicali valleys, sustained the Salton Sea.

Some estimates place the cost of “saving” the Salton Sea at a $1 billion or more.
The sea, 34 miles long and between nine and 10 miles wide, was designated an irrigation drainage repository in 1928. In the decades that followed it became a popular recreation area — well stocked with marine fishes — and among the most visited tourist attractions in California.

The largest body of water entirely within the state became a crucial stop for birds seeking food along the Pacific Flyway.

Concerns about the sea’s future began to surface in the 1960s, and a variety of factors contributed to significant drops in its popularity as a recreation destination.

Because the sea is fed by farm drainage, high in salt, and has no outlet, as water evaporates it leaves the sodium behind. As a result, the sea is now more than 25 percent saltier than typical ocean water.

In addition to local efforts to address the sea’s problems through agencies such as the Salton Sea Authority, of which CVWD is a founding member, in the mid-2000s California assumed a larger role and took on more responsibility with respect to evaluating proposals to “save” the sea.

Several sea restoration plans are being considered by the state. While they differ in design, all will be costly to implement.

CVWD supports sea restoration and has played an active role in on-going efforts to discover whether reasonable and practical solutions exist to this challenging issue.
## Water Diverted Into Recharge Facilities at Windy Point

<table>
<thead>
<tr>
<th>Year</th>
<th>Water delivered (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>7,475</td>
</tr>
<tr>
<td>1974</td>
<td>15,396</td>
</tr>
<tr>
<td>1975</td>
<td>20,126</td>
</tr>
<tr>
<td>1976</td>
<td>13,206</td>
</tr>
<tr>
<td>1977</td>
<td>0 (drought)</td>
</tr>
<tr>
<td>1978</td>
<td>0 (flood damage)</td>
</tr>
<tr>
<td>1979</td>
<td>25,192</td>
</tr>
<tr>
<td>1980</td>
<td>26,341</td>
</tr>
<tr>
<td>1981</td>
<td>35,251</td>
</tr>
<tr>
<td>1982</td>
<td>27,020</td>
</tr>
<tr>
<td>1983</td>
<td>53,732</td>
</tr>
<tr>
<td>1984</td>
<td>83,708 (advanced deliveries began)</td>
</tr>
<tr>
<td>1985</td>
<td>251,994</td>
</tr>
<tr>
<td>1986</td>
<td>298,201</td>
</tr>
<tr>
<td>1987</td>
<td>104,372</td>
</tr>
<tr>
<td>1988</td>
<td>1,097 (drought)</td>
</tr>
<tr>
<td>1989</td>
<td>12,479 (drought)</td>
</tr>
<tr>
<td>1990</td>
<td>31,721 (drought)</td>
</tr>
<tr>
<td>1991</td>
<td>14 (drought)</td>
</tr>
<tr>
<td>1992</td>
<td>40,870</td>
</tr>
<tr>
<td>1993</td>
<td>60,183</td>
</tr>
<tr>
<td>1994</td>
<td>32,325</td>
</tr>
<tr>
<td>1995</td>
<td>61,318</td>
</tr>
<tr>
<td>1996</td>
<td>138,266 (additional water purchases from other entities is included from 1996 to 2002)</td>
</tr>
<tr>
<td>1997</td>
<td>113,677</td>
</tr>
<tr>
<td>1998</td>
<td>132,455</td>
</tr>
<tr>
<td>1999</td>
<td>90,601</td>
</tr>
<tr>
<td>2000</td>
<td>72,450</td>
</tr>
<tr>
<td>2001</td>
<td>707</td>
</tr>
<tr>
<td>2002</td>
<td>33,435 (drought)</td>
</tr>
<tr>
<td>2003</td>
<td>843 (drought)</td>
</tr>
<tr>
<td>2004</td>
<td>13,244 (drought)</td>
</tr>
<tr>
<td>2005</td>
<td>177,859 (includes Mission Creek recharge)</td>
</tr>
<tr>
<td>Total</td>
<td>1,975,558 acre-feet</td>
</tr>
</tbody>
</table>
Enclosed reservoirs are efficient, effective ways to store water until it is needed.

Colorado River Water Distribution In California After Quantification Settlement Agreement Is Approved

1.) Palo Verde Irrigation District  irrigation for 104,500 acres
2.) Yuma Project (California Division)  irrigation for 25,000 acres
3a.) Imperial Irrigation District  irrigation for 104,500 acres
3b.) Palo Verde Irrigation District  irrigation for 16,000 acres

3.) Coachella Valley Water District
4.) Metropolitan Water District

Subtotal (Agricultural Irrigation):

3,100,000 acre-feet
330,000 acre-feet
4,400,000 acre-feet

Total (Agricultural Irrigation): 4,850,000 acre-feet

Total: 4,400,000 acre-feet

*CVWD and IID totals are subject to adjustments because of various agreements.
### Average Annual Water Requirements Per Acre

<table>
<thead>
<tr>
<th>Crop*</th>
<th>Acre-feet</th>
</tr>
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<tbody>
<tr>
<td>Table grapes</td>
<td>6.5</td>
</tr>
<tr>
<td>Dates</td>
<td>9.5</td>
</tr>
<tr>
<td>Peppers (bell, chili)</td>
<td>5.1</td>
</tr>
<tr>
<td>Lettuce</td>
<td>2.0</td>
</tr>
<tr>
<td>Watermelons</td>
<td>4.4</td>
</tr>
<tr>
<td>Carrots</td>
<td>3.4</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>6.9</td>
</tr>
<tr>
<td>Oranges and tangerines</td>
<td>7.3</td>
</tr>
<tr>
<td>Broccoli</td>
<td>3.2</td>
</tr>
<tr>
<td>Green beans</td>
<td>3.2</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>3.6</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>4.7</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>7.5</td>
</tr>
<tr>
<td>Nursery</td>
<td>9.1</td>
</tr>
<tr>
<td>Household (1.3 acre-feet a household)</td>
<td>6.1</td>
</tr>
<tr>
<td>Golf course</td>
<td>7.4</td>
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</tbody>
</table>

*Crops among largest gross value 2005

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Coachella Valley farmers adapt quickly to consumer changes in produce purchases.
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</tr>
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</table>

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### Average Weather Conditions*

<table>
<thead>
<tr>
<th>Month</th>
<th>Average High</th>
<th>Average Low</th>
<th>Rain</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>70.9</td>
<td>39.0</td>
<td>0.71</td>
</tr>
<tr>
<td>February</td>
<td>75.1</td>
<td>43.3</td>
<td>0.66</td>
</tr>
<tr>
<td>March</td>
<td>80.4</td>
<td>48.5</td>
<td>0.35</td>
</tr>
<tr>
<td>April</td>
<td>86.9</td>
<td>54.7</td>
<td>0.08</td>
</tr>
<tr>
<td>May</td>
<td>93.9</td>
<td>62.3</td>
<td>0.06</td>
</tr>
<tr>
<td>June</td>
<td>102.6</td>
<td>68.9</td>
<td>0.03</td>
</tr>
<tr>
<td>July</td>
<td>106.5</td>
<td>74.8</td>
<td>0.17</td>
</tr>
<tr>
<td>August</td>
<td>104.9</td>
<td>74.4</td>
<td>0.44</td>
</tr>
<tr>
<td>September</td>
<td>100.3</td>
<td>68.0</td>
<td>0.35</td>
</tr>
<tr>
<td>October</td>
<td>90.5</td>
<td>56.5</td>
<td>0.17</td>
</tr>
<tr>
<td>November</td>
<td>75.9</td>
<td>42.5</td>
<td>0.22</td>
</tr>
<tr>
<td>December</td>
<td>70.6</td>
<td>37.6</td>
<td>0.38</td>
</tr>
<tr>
<td>Annual</td>
<td>88.4</td>
<td>56.0</td>
<td>3.61</td>
</tr>
</tbody>
</table>

*Thermal FAA Airport 1971-2000

### Measurements

- 1 acre-foot of water: 325,851 gallons, 43,560 cubic feet
- 1 hectare of land: 2.47 acres
- 1 acre of land: 43,560 square feet
- 1 cubic foot of water: 7.48 gallons, 62.4 pounds
- 1 gallon of water: 8.33 pounds, 231 cubic inches
- 1 miner’s inch: 9 gallons per minute
- 1 cubic foot per second: 50 miner’s inches
- 1 CFS: 448.8 gallons per minute
- 1 CFS for 1 hour: 1 acre-inch
- 1 CFS for 1 day: 1.983 acre-feet
- 1 CFS for 1 month: 59.5 acre-feet
- 1 CFS for 1 year: 724 acre-feet

Published June 2006 © Coachella Valley Water District

Photography by Robert Keeran and David Anderson
Coachella Valley Water District maintains publicly-accessible offices at two locations:

**85-995 Avenue 52, Coachella**  
(At Highway 111, west of Highway 86S)

**75-525 Hovley Lane East, Palm Desert**  
(Between Cook and Washington streets)

Payments can be made at both locations, 8 a.m. - 5 p.m., Monday - Friday. Offices are closed on most major holidays. For all other business, calling in advance for an appointment is recommended. All district personnel can be reached at:

**(760) 398-2651**

Emails can be sent to cvwdmail@cvwd.org.

Website information about CVWD is available at its: [http://www.cvwd.org/](http://www.cvwd.org/)

Payments can be mailed to:
**Coachella Valley Water District**  
Post Office Box 5000  
Coachella, CA 92236

Other correspondence can be mailed to:
**Coachella Valley Water District**  
Post Office Box 1058  
Coachella, CA 92236

Regularly scheduled board meetings are at 9 a.m. on the second and fourth Tuesday of each month at Coachella facilities.

Board of directors: Peter Nelson, president, Patricia A. Larson, vice president, Tellis Codekas, John W. McFadden, Russell Kitahara, members. General Manager-Chief Engineer: Steve Robbins.