Water Reliability

This section discusses Central Basin's plan of maintaining a reliable source of water

4.1 Overview

Among the future challenges of continued urbanization in southern California are the questions of water reliability. In other words, can southern California meet the necessary water demands of the region during times of drought? During consecutive dry years, southern California has historically seen demands increase by as much as 20% while supplies have decreased. Prior to recent significant improvements in water reliability, most cities and agencies were forced to mandate conservation efforts and restrict water use in some cases in order to maintain an adequate supply.[1]

This section will discuss how the regional supplier, MWD, in partnership with its member agencies like Central Basin, plans on ensuring future reliability through water management measures, long-term planning and investment in local resources; Central Basin's projections for meeting its service area's future demands during single and multiple dry-year conditions; and finally, a review of the District's Water Shortage Contingency Plan in the event MWD limits deliveries.

4.2 MWD Water Supply Reliability

With the experience of the droughts of 1977-78 and 1989-92, MWD has undertaken a number of planning initiatives to ensure water supply reliability. Among them include the Integrated Resources Plan (IRP), the Water Surplus and Drought Management Plan (WSDM Plan) and their local resource investments. Together, these initiatives have provided the policy framework for MWD and its member agencies to manage their water resources in such a way to meet a growing population even under recurrences of the worst historical hydrologic conditions locally, and in the key watersheds that supply southern California. Below is a brief description of each water management initiative MWD has undertaken to ensure 100 percent reliability over the next 20 years.

4.2.1 MWD Integrated Resource Plan

To meet the challenges of the supply shortages on the State and Colorado River Aqueducts under increases in population and growing State and Federal regulatory requirements, MWD's Board of Directors called for the development of an IRP in 1996. The IRP's objective was to determine the appropriate combination of water resources to

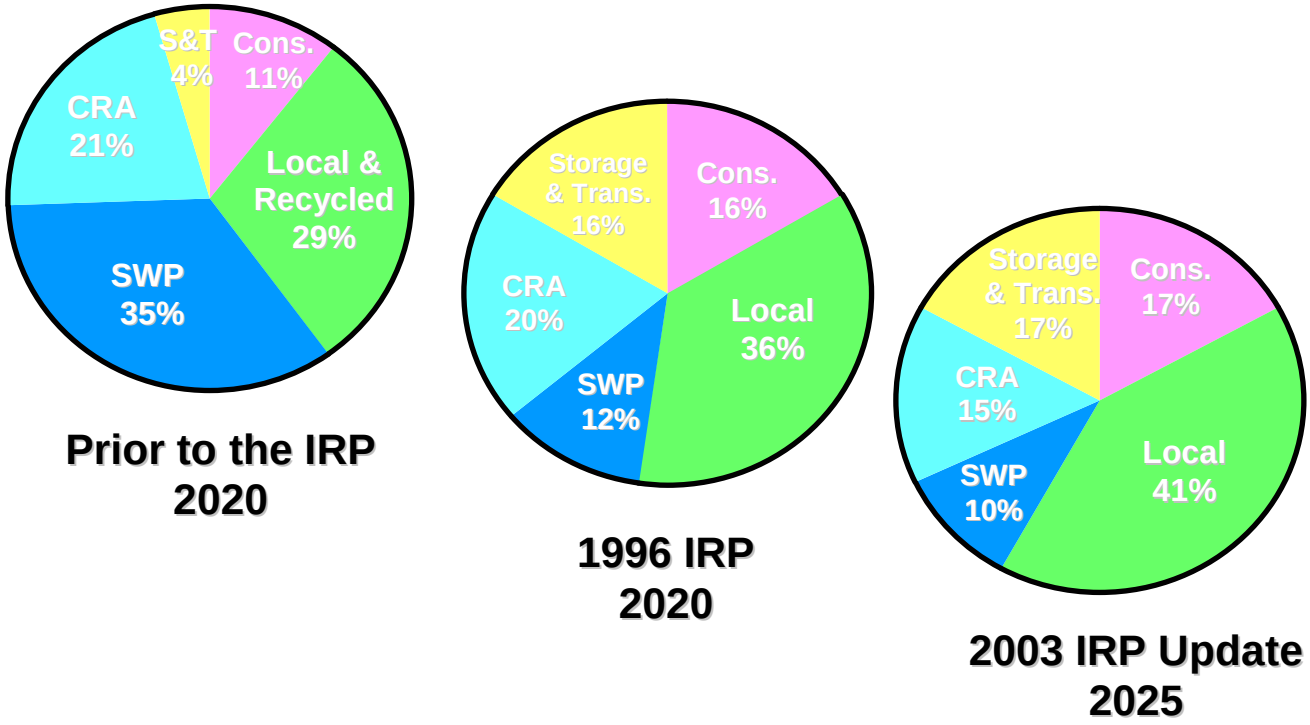
[1] By contrast, the loss of a large portion of our Colorado River supply in 2004 during an extended dry period in southern California did not cause hardship or require any drastic return on the part of the general population. This was a tribute to planning and investments made into water reliability over the past decade.

provide 100 percent reliability for full service demands over the next 20 years. With the support of its member agencies, MWD developed a preferred supply mix that includes conservation, local supplies (recycled, brackish, desalination), SWP supplies, CRA supplies, groundwater banking, and water transfers that could meet projected water demands under severe shortage conditions. The IRP identifies supply targets for each supply option and has become the blueprint for guiding investment and policy decisions for decades to come.

By design, the IRP is also subject to revision in recognition that conditions and opportunities change over time. In 2003, MWD completed its first update to the IRP, which includes revised projected demands and an updated resource supply mix. MWD has three clear objectives for the IRP update: (1) to review the goals and achievements of the 1996 IRP, (2) to identify changed conditions for water resource development and (3) to update the resource targets through 2025.

Among the most significant findings from the updated IRP was the increased participation of local agencies in developing local supplies, such as recycled water and brackish groundwater desalination, as well as promoting savings from conservation. The result of which revealed a greater source of local supply reliability than anticipated among MWD member agencies. However, it also identifies the limitations expected on the Colorado River and the need for local infrastructure improvements to provide the flexibility to manage and overcome supply risks.

Overall, the 2003 IRP Update reveals a decrease in the region's reliance on Colorado River and SWP supplies compared to the 1996 IRP, while continuing to provide 100 percent reliability through the year 2025.



4.2.2 MWD Water Surplus and Drought Management Plan

In order for MWD to be 100 percent reliable in meeting all non-discounted non-interruptible demands in the region, MWD adopted the Water Surplus and Drought Management Plan (WSDM Plan) in 1999. The WSDM Plan provides the policy guidance to manage the region's water supplies to achieve the reliability goals of the IRP. This is achieved by integrating the operating activities of surplus and shortage supplies through a series of stages and principles.

Of those principles are the water management actions to secure more imported water during times of drought by promoting efficient water usage, to increase public awareness, and to seek additional water transfers and banking programs. Should supplies become limited, to the point where imported supplies are truncated, the WSDM Plan would allocate water through a calculation on the basis of need, as opposed to any historical purchases through MWD. MWD and its member agencies have not yet decided on a formula for the allocation calculation.

4.2.3 MWD Local Resource Investments

A key element within MWD's IRP objectives to ensure region reliability is to further enhance local resources. Besides the traditional supplies of imported water and groundwater, MWD has looked to invest in numerous local resources projects and among them are: recycled water, conservation, groundwater and surface water storage and even ocean water desalination to meet the demands of the future.

Since 1982, MWD has provided financial assistance to over 75 projects in the areas of recycled water and groundwater recovery totaling approximately $124 million and $41 million, respectfully.

MWD has already invested over $290 million in water conservation, which has produced significant water savings for the past 15 years.

One of MWD's most significant investments is Diamond Valley Lake. Built in the saddle of two mountains, Diamond Valley Lake, southern California's newest and largest reservoir, is a vital link in the regional system that has brought water to southern California for the past 60 years. The lake nearly doubled the region's surface water storage capacity and provides additional water supplies for drought, peak summer and emergency needs. This newly created reservoir, located in southwestern Riverside County, holds enough water to meet the region's emergency and drought needs for six months and is an important component in MWD's plan to provide a reliable supply of water to the 18 million people in southern California who rely on this water. Water began pouring into the reservoir in November 1999 and the lake was filled by

early 2002. Diamond Valley Lake holds 800,000 AF, or 260 billion gallons of water. By comparison, Lake Havasu on the Colorado River holds just 648,000 acre-feet or 201 billion gallons. The lake nearly doubled the area's surface water storage capacity and provides additional water supplies for drought, peak summer and emergency needs.

4.3 Central Basin's Water Supply Reliability

Along with MWD's reliability initiatives, Central Basin has also taken important steps over the past decade to reduce the District's vulnerability to extended drought or other potential threats. The District's investments in recycled water to replace imported water for non-potable uses and the implementation of conservation devices and education have resulted in more self-reliance.

Based on the District's current water supply portfolio, as illustrated in Table 4-1, Central Basin provides an adequate supply for the single dry-water year and multiple dry-water year scenarios. The "Normal Water Year" used in this plan is based on the average rainfall year - FY 2000-01. According to the National Weather Service, the recorded rainfall in FY 2000-01 was 17.94 inches - one of the closest years to the historical average of 16.42 inches. The "Single Dry Year" is based on the lowest rainfall year - FY 2001-02. The recorded rainfall in FY 2001-02 was at 4.42 inches - the lowest recorded year in over one hundred years. The three "Multiple Dry-Water Years" used below were based upon the most recent multiple dry-year period - FY 2001-02, 2002-03, and 2003-04.

Table 4-1
Central Basin Municipal Water District
Retail Supply Reliability
(In Acre-Feet)

Supplies	Normal Water Year	Single Dry-Water Year	Multiple Dry-Water Years		
	FY 2000-01	FY 2001-02	FY 2001-02	FY 2002-03	FY 2003-04
Groundwater[1]	205,960	205,960	205,960	205,960	205,960
Imported Water	63,000	68,000	68,000	59,308	64,816
Recycled Water[2]	7,400	7,400	7,400	7,400	7,400
Total Supply	**276,360**	**281,360**	**281,360**	**272,668**	**278,176**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Spreading water
[1] Based upon the total allowable pumping allocation (APA) for each customer agency within Central Basin's service area, according to the 2004 DWR Central Basin Watermaster Report. Also included are groundwater rights (42,000 AFY) from Main San Gabriel Basin which are used in Central Basin.
[2] Includes the recycled water system of both Central Basin and the City of Cerritos.

Groundwater is shown constant in all scenarios due to the Basin's adjudication, which limits the total amount that each customer within Central Basin's service area is able to extract. Recycled water, which includes both Central Basin and the City of Cerritos systems, is also constant in all scenarios because the availability of recycled water is not subject to hydrologic variation. This leaves imported water as the only supply currently that can fluctuate under different hydrological scenarios.

The supply reliability scenarios described in this section focus exclusively on municipal and industrial usage within the District's service area, it does not include replenishment water.

Looking forward, Central Basin will continue to evaluate opportunities to increase its water supply portfolio within its service area. These opportunities include the expanded use of recycled water, brackish water recovery, additional conservation programs, as well as the exploration of investments in groundwater storage through Conjunctive Use programs.

4.3.1 Normal-Year Reliability Comparison

As discussed in the Section 2.0 Water Demand, Central Basin's normal demands are projected to increase modestly over the next 25 years. Increases in recycled water use over the 25-year planning period equate to a corresponding reduction in the need for imported water.

Table 4-2
Projected Normal Water Year Supply and Demand
(In Acre-Feet)

Supplies	2005	2010	2015	2020	2025	2030
Groundwater[1]	205,960	205,960	205,960	205,960	205,960	205,960
Imported Water	63,000	59,091	64,691	70,462	76,409	82,535
Recycled Water[2]	7,400	12,900	14,150	15,400	16,650	17,900
Total Supply	**276,360**	**277,951**	**284,801**	**291,822**	**299,019**	**306,395**
Total Demand[3]	**252,799**	**273,991**	**280,841**	**287,862**	**295,059**	**302,435**
Surplus/(Shortage)	**23,561**	**3,960**	**3,960**	**3,960**	**3,960**	**3,960**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Spreading
[1] Based upon the total allowable pumping allocation (APA) for each customer agency within Central Basin's service area plus the average amount produced and imported from Main San Gabriel Basin, according to the 2004 DWR Central Basin Watermaster Report.
[2] Includes the available supply of recycled water system for both Central Basin and the City of Cerritos.
[3] Total Demand includes Projected Groundwater within Central Basin's service area, Imported and Recycled M&I Demands

4.3.2 Single Dry-Year Reliability Comparison

Central Basin's projected single dry-year water supply is expected to call for additional imported supplies from MWD. According to historical demands, the total water demands in a single dry-year are projected to be 3.5% greater than normal year projections. Table 4-3 compares the dry-year supply and demand projections for the Central Basin MWD service area.

Table 4-3
Projected Single Dry-Year Water Supply and Demand
(In Acre-Feet)

Supplies	2005	2010	2015	2020	2025	2030
Groundwater[1]	205,960	205,960	205,960	205,960	205,960	205,960
Imported Water	68,000	68,000	70,560	76,577	82,776	89,160
Recycled Water[2]	7,400	12,900	14,150	15,400	16,650	17,900
Total Supply	**281,360**	**286,860**	**290,670**	**297,937**	**305,386**	**313,020**
Total Demand[3]	**261,647**	**283,581**	**290,670**	**297,937**	**305,386**	**313,020**
Surplus/(Shortage)	**19,713**	**3,279**	**0**	**0**	**0**	**0**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Spreading
[1] Based upon the total allowable pumping allocation (APA) for each customer agency within Central Basin's service area plus the average amount produced and imported from Main San Gabriel Basin, according to the 2004 DWR Central Basin Watermaster Report.
[2] Includes the available supply of recycled water system for both Central Basin and the City of Cerritos.
[3] Total Demand includes Projected Groundwater within Central Basin's service area, Imported and Recycled M&I Demands

4.3.3 Multiple Dry-Year Reliability Comparison

Under the multiple dry-year water scenarios, Central Basin is projected to meet demands by continuing to implement conservation and water recycling. Tables 4-4 through 4-8 illustrate the projected water supplies and demands within multiple dry-year reliability comparisons for the next 25 years.

Table 4-4
Projected Water Supply and Demand during Multiple Dry-Year 2008-2010
(In Acre-Feet)

Supplies	2008	2009	2010
Groundwater[1]	205,960	205,960	205,960
Imported Water	68,000	59,308	64,816
Recycled Water[2]	10,900	11,400	12,900
Total Supply	**284,860**	**276,668**	**283,676**
Total Demand[3]	**281,484**	**269,302**	**270,888**
Surplus/(Shortage)	**3,376**	**7,366**	**12,788**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Spreading
[1] Based upon the total allowable pumping allocation (APA) for each customer agency within Central Basin's service area plus the average amount produced and imported from Main San Gabriel Basin, according to the 2004 DWR Central Basin Watermaster Report.
[2] Includes the available supply of recycled water system for both Central Basin and the City of Cerritos.
[3] Total Demand includes Projected Groundwater within Central Basin's service area, Imported and Recycled M&I Demands

Table 4-5
Projected Water Supply and Demand during Multiple Dry-Year 2013-2015
(In Acre-Feet)

Supplies	2013	2014	2015
Groundwater[1]	205,960	205,960	205,960
Imported Water	68,000	59,308	64,816
Recycled Water[2]	13,650	13,900	14,150
Total Supply	**287,610**	**279,168**	**284,926**
Total Demand[3]	**283,128**	**270,875**	**277,661**
Surplus/(Shortage)	**4,482**	**8,293**	**7,265**

Table 4-6
Projected Water Supply and Demand during Multiple Dry-Year 2018-2020
(In Acre-Feet)

Supplies	2018	2019	2020
Groundwater[1]	205,960	205,960	205,960
Imported Water	69,346	59,308	64,816
Recycled Water[2]	14,900	15,150	15,400
Total Supply	**290,206**	**280,418**	**286,176**
Total Demand[3]	**290,206**	**277,647**	**284,602**
Surplus/(Shortage)	**0**	**2,771**	**1,574**

Table 4-7
Projected Water Supply and Demand during Multiple Dry-Year 2023-2025
(In Acre-Feet)

Supplies	2023	2024	2025
Groundwater[1]	205,960	205,960	205,960
Imported Water	75,351	62,228	69,108
Recycled Water[2]	16,150	16,400	16,650
Total Supply	**297,461**	**284,588**	**291,718**
Total Demand[3]	**297,461**	**284,588**	**291,718**
Surplus/(Shortage)	**0**	**0**	**0**

Table 4-8
Projected Water Supply and Demand during Multiple Dry-Year 2028-2030
(In Acre-Feet)

Supplies	2028	2029	2030
Groundwater[1]	205,960	205,960	205,960
Imported Water	81,538	68,094	75,150
Recycled Water[2]	17,400	17,650	17,900
Total Supply	**304,898**	**291,704**	**299,010**
Total Demand[3]	**304,898**	**291,704**	**299,010**
Surplus/(Shortage)	**0**	**0**	**0**

4.4 Water Shortage Contingency Plan

The State requires that each urban water supplier should provide a water shortage contingency analysis within its urban water management plan. Below is a brief description of the District's plan for water shortage according to the state's water code requirements.

4.4.1 Minimum Supply

Currently, the District's water supplies are groundwater, imported water, and recycled water. As it relates to the estimated minimum supply available during a severe drought, the District's groundwater supply, as stated in Section 3, is not affected by hydrology because the Basin is adjudicated. The available supply for each groundwater producer (Allowable Production Allocation), set by the Judgment, remains the same regardless of the Central Basin service area's rainfall. The same relates to recycled water, where the supply is not affected by hydrology but rather through the number of service connections and production capacity. The benefit of recycled water is that it is drought-proof and the supply of recycled water remains available regardless of the rainfall. Imported water, on the other hand, is the only supply affected by hydrology. As the wholesaler of imported water to the region, the District's minimum imported water supply is based upon the recent historical demand of imported water during a dry-year sequence of fiscal years 2001-02 to 2003-04; rainfall for these three years range among the lowest on record. The estimated minimum supplies over the next three years for the District is shown in Table 4-9.

Table 4-9
Three-year Estimated Minimum Water Supply
(In Acre-Feet)

Supplies	2006	2007	2008
Groundwater[1]	205,960	205,960	205,960
Imported Water	68,000	59,308	64,816
Recycled Water[2]	7,400	9,400	10,900
Total Supply	**281,360**	**274,668**	**281,676**
Total Demand[3]	**278,690**	**266,629**	**273,375**
Surplus/(Shortage)	**2,670**	**8,039**	**8,301**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Spreading
[1] Based upon the total allowable pumping allocation (APA) for each customer agency within Central Basin's service area plus the average amount produced and imported from Main San Gabriel Basin, according to the 2004 DWR Central Basin Watermaster Report.
[2] Includes the available supply of recycled water system for both Central Basin and the City of Cerritos.
[3] Total Demand includes Projected Groundwater within Central Basin's service area, Imported and Recycled M&I Demands

4.4.2 Stages of Action to Reduce Imported Deliveries

As the area's wholesaler of MWD imported water, the District's stages for reduction are subject to MWD's WSDM Plan, which guide the management of water supplies for the region during shortages conditions.

According to MWD's WSDM Plan, an array of water resource management measures would take place prior to any supply reductions. Through a series of seven shortage stages, MWD will seek the steps to encourage more efficient water usage with its member agencies. Not until the last stage, under an extreme shortage condition, will MWD discontinue imported water deliveries according to an allocation formula. Currently, however, MWD has not determined the shortage allocation methodology to complete the WSDM Plan. Conversely, MWD's 2005 Regional UWMP demonstrates 100 percent reliability in multiple dry years through 2030. Nevertheless, given the resources described in MWD's IRP, MWD fully expects to be reliable, under the most extreme supply shortage scenarios, over the next ten years.

However, if imported water supplies were discontinued according to MWD's WSDM Plan, the District would consider reducing supplies through a series of action stages, which would include an allocation methodology similar to MWD. Once MWD determined such an allocation, the District would work with each of its customer agencies to set a specific allocation level to cumulatively meet the District's allocation from MWD. Below is a four step stage rationing plan the District would implement to reduce imported deliveries up to 50%.

Central Basin Municipal Water District
Stages of Action

Minimum Shortage – The District would request for a voluntary effort among its customers to reduce imported water deliveries. In addition, the District would pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.

Moderate Shortage – In addition to the stage above, the District would work with its customer agencies to promote and adopt waste water prohibitions and ordinances to discourage unnecessary water usage.

Severe Shortage – In addition to the two stages above, the District would seek to adopt a rate structure that penalizes increased water usage among its customer agencies.

Extreme Shortage – In addition to all the stages above, the District would call for the discontinuance of imported water based upon an allocation methodology similar to MWD for each of its customer agencies.

Since these action stages are contingent upon MWD's WSDM Plan's allocation methodology and such a formula has yet to be determined, the District's shortage

stages will remain in draft form. Until MWD completes the WSDM formula, the District's implementation of any rationing stage will be subject to a variety of conditions, among them the severity of the drought, the District allocation level, and the current water supply mix available to each customer agency before the Board would apply any action stage listed above.

Once the Board determines action is necessary, the Board would adopt, by resolution, the appropriate stage of action, which would take effect immediately and the District customer agencies would be notified. A draft resolution is included in Appendix E.

4.4.3 Prohibitions, Penalties and Consumption Reduction Methods

Through the years the District has developed strong relationships with its customer agencies to promote community awareness of water conservation. Should water reductions become necessary, the District will work with each city and water agency within its service area to encourage the adoption of water waste prohibition measures that establish mandatory water use restrictions. Moreover, the District will provide the necessary assistance and information to apply the best suited water reducing practice(s) for each customer agency.

Additionally, the District will encourage behavioral change through the use of its water rates. As part of MWD's WSDM Plan, the District will pass through additional charges; where MWD will enforce water reductions by setting a minimum amount per AF for any deliveries exceeding a member agency's allotment up to 102 percent, once an allocation plan is determined. Any deliveries exceeding 102 percent will be assessed a surcharge equal to three times MWD's full-service rate. The District will impose MWD's penalties for excess use to its customer agencies that exceed their allocation.

4.4.4 Impacts to Revenue

The District will seek to recover the shortfall of revenue caused by water reductions from its Rate Stabilization Fund as well as from any surplus revenues collected from excess penalties. Moreover, the District will closely monitor its revenue and expenditure impacts on a monthly basis, and response with any rate adjustments needed at each action stage.

Through the District's imported water invoices per connection, the District will measure each customer agencies' actual performance on a monthly basis.

4.4.5 Catastrophic Supply Interruption

In the event imported water supplies are interrupted from a catastrophic event, the District, through coordination with MWD, can respond at both a regional and a local level.

In the event that an emergency such as an earthquake, system failure, or regional power outage, etc. affected the entire Southern California region, MWD would take the lead and activate its Emergency Operation Center (EOC). The EOC coordinates MWD's and the District's responses to the emergency and concentrate efforts to ensure the system can begin distributing potable water in a timely manner.

If circumstances render the Southern California's aqueducts to be out of service, MWD's Diamond Valley Lake can provide emergency storage supplies for its entire service area's firm demand for up to six months. With few exceptions, MWD can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted. Furthermore, should additional supplies be needed, MWD also has surface reservoirs and groundwater conjunctive use storage accounts that can be draw upon to meet additional demands. The WSDM plan guides MWD's management of available supplies and resources during an emergency to minimize the impacts of a catastrophic event.

Locally, the District has the Member Agency Response System (MARS) to immediately contact its customer agencies and MWD during an emergency about potential interruption of services and the coordination of critical resources to respond to the emergency, also known as mutual aid. The MARS is a radio communication system developed by MWD and its member agencies to provide an alternative means of communication in extreme circumstances. The District is currently in the process of enhancing its communication system in order to provide a more rapid response.