2005 Update of the Urban Water Management Plan

Rancho California Water District

42135 Winchester Road
Temecula, CA 92590
(951) 296-6900

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Report Prepared by

CDM
1925 Palomar Oaks Way, Suite 300
Carlsbad, CA 92008
(760) 438-7755

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Introduction

1.1 Overview

The Rancho California Water District (RCWD) is a "Special District" organized and operated pursuant to the California Water Code. RCWD is governed by a seven member Board of Directors (Board) that is elected by the voters of the region. The District serves the area known as Temecula/Rancho California, which includes the City of Temecula, portions of the City of Murrieta, and unincorporated areas of Riverside County.

As an urban water supplier providing municipal and industrial water to more than 3,000 customers, RCWD is required to comply with The Urban Water Management Planning Act (Act). The Act became effective on January 1, 1984 and requires that urban water suppliers prepare and adopt an urban water management plan, in accordance with prescribed requirements

The Act was originally developed as a result of concerns for potential water supply shortages throughout the State. Therefore, it required information that focused primarily on water supply reliability and water use efficiency measures. Since its original passage in 1983, there have been several amendments added, the most recent adopted in 2004. Some of the recent amendments include: providing additional emphasis on drought contingency planning and recycled water, as well as incorporation of water quality issues and how they might affect water supply reliability.

With the passage of Senate Bills 610 and 221, in 2001, Urban Water Management Plans take on even more importance. SB 610 and 221 require that counties and cities consider the availability of adequate water supplies for certain new large developments. These statutes require written verification of sufficient water supply to serve the new development, and Urban Water Management Plans are identified as key source documents for this verification.

The RCWD 2005 UWMP updates the 2000 UWMP and takes into account new Act requirements and changes in demographics, water demand and supplies.

Compliance with the Act helps RCWD to fulfill its mission: "to deliver reliable, high quality water, sewer, and reclamation services to its customers and communities in a prudent and sustainable manner."

1.1.1 History

RCWD's history started when the developers of the Temecula/Rancho California formed the original "Rancho District" in 1965, which served 41,000 acres of the easterly portion of the community. In 1968, the Santa Rosa Ranches Water District was organized to serve the westerly 44,800 acres of the community. To gain access to

imported water to meet growing water demands and supplement local groundwater, the Rancho District was annexed in 1966 to the Eastern Municipal Water District (EMWD); while the Santa Rosa Ranches Water District was annexed into the Western Municipal Water District of Riverside County (WMWD) in 1968. Both EMWD and WMWD are member agencies of the Metropolitan Water District of Southern California (MWD). MWD operates the Colorado River Aqueduct and is a State Water Contractor, allowing imported water from Northern California to be delivered to Southern California.

In 1977, the Rancho and Santa Rosa water districts were consolidated under the name Rancho California Water District, in accordance with LAFCO resolutions. RCWD has the authority to operate, maintain, and furnish facilities for all water systems within the District's service area, and for the collection and treatment of wastewater for the Santa Rosa Division. EMWD remains responsible for wastewater treatment in the Rancho Division.

The District is about 85 miles southeast of Los Angeles and 65 miles north of San Diego. RCWD provides water for urban and agricultural uses to the City of Temecula, portions of the City of Murrieta, and unincorporated Riverside County lands in the surrounding area. The District's current service area is bounded on the southwest by the Santa Ana Mountains and on the northeast by Gavilan Hills. Figure 1-1 shows the RCWD service area.

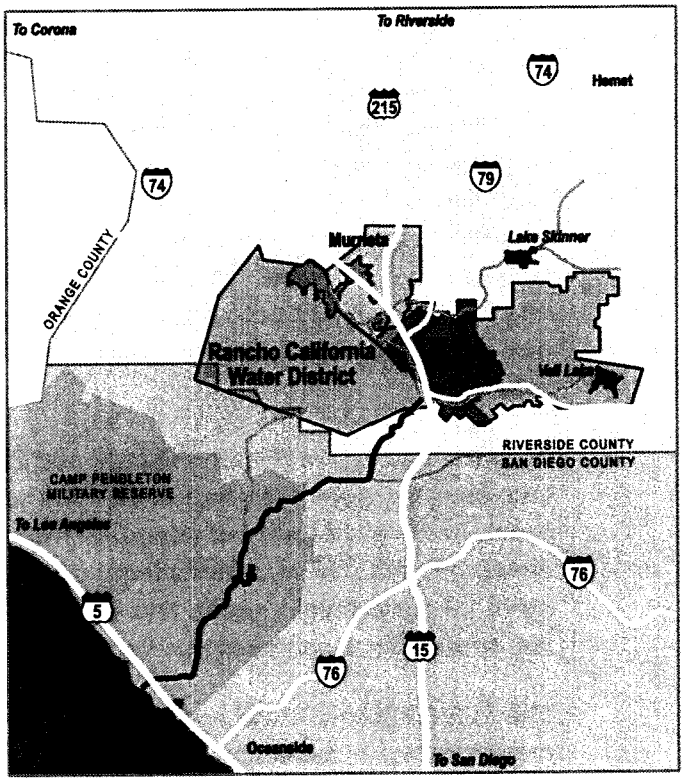

Figure 1-1
RCWD Service Area

The elevation of the valley floor range from 900 to 1,200 feet above sea level, however, the District pumps to a maximum elevation of 2,850 feet for some pressure zones in its service area.

1.1.2 Service Area Description

Land Use

RCWD comprises approximately 99,000 acres in the southwestern portion of Riverside County. Figure 1-2 shows the breakdown in land uses within RCWD.

Because of their proximity to major cities in Southern California and lower relative living prices, the cities of Temecula and Murietta are becoming more desirable places to live. Both cities are experiencing rapid population growth and have a need for reliable water supplies. RCWD includes about 18,000 acres of agriculture and ranch lands, primarily vineyards, avocado, and citrus trees. The Temecula Valley is becoming a premiere wine grape growing area in California, which coupled with other high-value crops, requires a consistent irrigation supply. Major agricultural acreage is concentrated in the southwestern and eastern portions of the district.

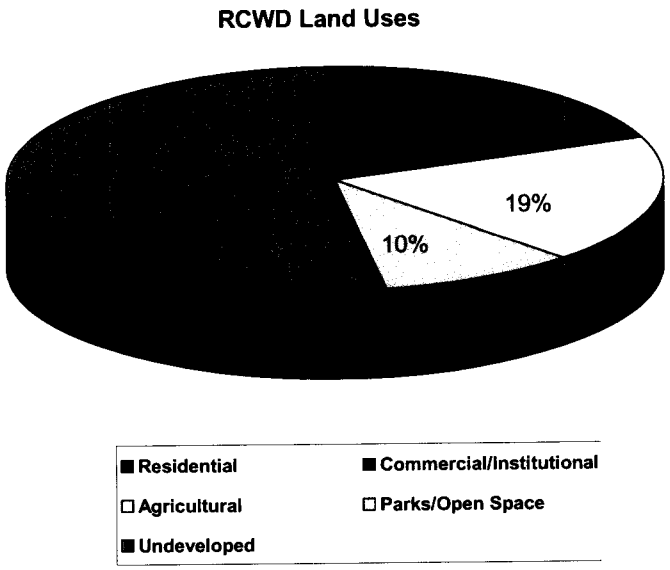

Figure 1-2
Land Use in RCWD's Service Area

Demographics

Current demographics were obtained for the RCWD service area from the Metropolitan Water District (MWD), using land-use and census tract level data from the Southern California Association of Governments (SCAG). Table 1-1 presents these demographics in five year intervals beginning in 2005 and ending in 2030.

Table 1-1
Demographic Projections for RCWD Service Area

	2005	2010	2015	2020	2025	2030
Population	109,123	121,324	134,184	145,631	155,772	165,151
Occupied Housing						
Single-Family	27,518	31,717	35,409	39,384	43,101	46,152
Multi-Family	6,336	7,084	8,223	8,951	9,652	10,923
Total Housing	33,856	38,802	43,633	48,336	52,754	57,075
Total Employment	33,838	43,848	52,947	62,273	71,656	81,277

Source: MWD, based on SCAG census tract data from SCAG RTP.

Within the RCWD service area population is expected to continue to grow over the next 25 years at an average rate of approximately 2,240 persons, representing a 2.6 percent annual growth rate per year for a total growth rate of approximately 66 percent over the projection period. Over the projection period this will lead to approximately 56,000 new residents.

Housing, as a whole, is projected to increase at a slightly slower pace of 2.4 percent annually for a total growth rate of approximately 59 percent over the projection period. Single-family and multi-family housing are projected to grow at similar rates over the projection period. Approximately 23,200 additional housing units are expected to be added over the projection period.

Total employment within RCWD's service area is expected to lag population and housing unit growth with an annual increase of approximately 1.7 percent and a total population increase of approximately 42 percent over the projection period. Total employment is expected to increase by approximately 47,000 by 2030. Employment growth that lags behind population growth indicates that many residents will commute out of the service area to their places of employment.

Climate

The climate within the RCWD service area is Mediterranean with hot, dry summers and cool, wet winters. Summer daytime temperatures are in the mid-80 to high-90 degrees range. The area's temperature is influenced by prevailing onshore winds from the Pacific Ocean and the rain shadow effect from the Santa Rosa Mountains. The "Santa Ana winds" can cause periods of extremely hot weather with dry winds. Winter daytime temperatures are mild, averaging in the mid-60 degree range. The region's average monthly maximum temperature is 80.63 degrees. This is based on weather data readings from October 1948 through December 2004 at the Elsinore weather station, the closest weather station to the service area. Table 1-2 presents average climate data for the RCWD service area.

Table 1-2
Climate Data for RCWD Service Area

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
Standard Average E to (feet per year)[1]	2.30	2.34	4.14	5.01	6.47	6.98	7.92	7.58	5.79	4.20	2.64	2.26	4.80
Average Rainfall (inches)[2]	2.33	2.31	1.78	0.65	0.17	0.02	0.07	0.10	0.24	0.40	1.03	1.63	10.74
Average Max Temperature (F) [2]	65.4	67.9	71.0	76.5	82.0	90.6	98.2	98.3	93.4	83.8	73.6	66.8	80.6

[1]Source: http://www.cimis.water.ca.gov/cimis/frontMonthlyReport.doc. Station #137 - Temecula East II 11/97 through 7/05
[2] October 1948 through December 2004 for Station ID 2805, Elsinore

The standard annual average evapotranspiration rate (ETo) for the region is 4.80 feet per year with the highest rates occurring during the summer months. ETo measures the loss of water to the atmosphere by evaporation from soil and plant surfaces and transpiration from plants. ETo serves as an indicator of how much water plants need for healthy growth.

Total annual precipitation at the Elsinore weather station averages 10.74 inches per year. During very wet years, rainfall can exceed 25 inches, while during very dry

years rainfall can be less than 4 inches. Rainfall is more prevalent during the months of November through April.

1.2 Regional Integrated Resources Plan

To help achieve its mission, RCWD recently developed a Regional Integrated Resources Plan (CDM 2005). The purpose of the Regional Integrated Resources Plan (or IRP) was to develop a long-range water supply plan to reliably meet the needs of the District from now until 2050. The IRP examined different alternatives such as increased water conservation, additional groundwater, conversion of agriculture currently using treated imported water to raw imported water and/or advanced-treated recycled water, groundwater recharge using advanced-treated recycled water, and water transfers.

These alternatives were evaluated against a set of objectives such as:

- Reliably meet water demands
- Provide sustainable supply
- Maximize local control
- Manage costs
- Manage water quality
- Maintain quality of life
- Maximize implementation potential

Over a dozen alternatives were evaluated. The preferred plan, called Hybrid 1, involves the following components:

1. Implement baseline water conservation measures
2. Connect imported water connection EM-21 to Vail Lake to expand groundwater recharge
3. Convert eastern area agriculture, currently using treated imported water, to raw water, delivered from Vail Lake
4. Construct up to 18 new groundwater wells, along with increased imported water for recharge during non-drought years
5. Construct a MF/RO treatment facility to reduced the salinity of recycled water so that it can be used to meet western area agricultural demands, as well as potential groundwater replenishment in the future

The benefits of this preferred IRP alternative are:

- Increased groundwater production of about 18,000 acre-feet per year
- Increased use of recycled water of about 13,600 acre-feet per year
- Reduction in peaking on MWD by about 144 cubic feet per second (cfs)
- Cost efficiency by: (1) converting eastern area agricultural users from treated imported water to untreated, (2) reducing the peaking charge paid to MWD, and (3) by maximizing MWD's discounted replenishment water rate for groundwater recharge

1.3 Agency Coordination

To develop the IRP and 2005 UWMP, RCWD worked with its wholesale water agencies, EMWD, WMWD and MWD. Table 1-3 shows this coordination.

Table 1-3
Agency Coordination in Preparation of 2005 UWMP

	Participated in Plan Development	Commented on the Draft Plan	Attended Public Meetings	Was Contacted for Assistance	Was sent a Copy of the Draft plan
Eastern MWD	Yes*	No	Yes*	Yes	Yes
Western MWD	Yes*	No	Yes*	Yes	Yes
MWD	Yes*	No	Yes*	Yes	No

* Participated in agency stakeholder meeting for RCWD's Regional Integrated Resources Plan (2005).

Section 2
Water Supply Sources

2.1 Current Water Supply Sources

RCWD's current water supply sources include local groundwater, imported water from MWD, and recycled water. Historically, groundwater has supplied between 25 to 40 percent of total water supply and imported water has supplied between 60 to 70 percent. Recycled water has provided less than 5 percent of the total water supply. Table 2-1 summarizes RCWD's water supplies for 2005.

Table 2-1
Current Water Supplies (AF/Y)

Water Supply Sources	2005
Imported Water (MWD)	
Treated	33,000
Untreated [1]	18,000
Local Groundwater Pumping	38,000
Recycled Water	6,700
Total	**95,700**

Source: RCWD Regional Integrated Resources Plan (CDM, 2005)
[1] Used for groundwater recharge and for flows to Gorge.

RCWD pumps groundwater from 54 district wells and recycles water at its Santa Rosa Water Reclamation Facility (SRWRF). Additional recycled water is available from EMWD's Temecula Valley Regional Water Reclamation Facility (TVRWRF).

RCWD owns and operates 37 storage reservoirs and one surface reservoir, Vail Lake. The storage capacity of Vail Lake is 50,000 acre-feet and it is used to help recharge groundwater, using natural runoff.

RCWD receives its imported water (treated and untreated) directly through six MWD water turnouts, three in EMWD's service area and three in WMWD's service area.

RCWD's transmission system includes about 900 miles of water pipelines to convey water from its source to water customers.

2.1.1 Groundwater

RCWD overlies the Temecula and Pauba groundwater basins, and numerous studies have been conducted regarding these basins. However, it was not until 1980 that studies and reporting were officially documented on a regular basis. Since 1980 RCWD has annually prepared a Groundwater Audit and a Recommended Groundwater Production Report (RGPR).

Surface water and groundwater supporting surface water have been under some form of court jurisdiction since 1928. Rights to utilize the groundwater and the water

stored in Vail Lake are defined in the 1940 Stipulated Judgment in the case of Santa Margarita versus Vail and Appropriations Permit 7032 issued by the State Water Resources Control Board. A Watermaster has been assigned by the court to oversee all uses within the Santa Margarita Watershed. Specific water rights have not been adjudicated. However, the Stipulated Judgment assigns two-thirds of all natural waters to the United States of America (Camp Pendleton) and the remaining one-third to RCWD. Thus, inflow to Vail Lake is not stored, but rather is passed through to Temecula Creek from May through October as required by State permits.

RCWD relies on eight groundwater basins for its local water supply. The amount of groundwater produced annually from these basins varies depending on rainfall, recharge, and the amount and location of pumping.

Groundwater basin inflows occur through a variety of processes:

- Areal recharge - deep percolation of direct precipitation on the ground surface that eventually recharges the aquifers within the basins
- Return flow - portion of water applied to the ground surface that reaches the groundwater as a result of deep percolation; sources of return flow include agricultural, domestic, and commercial irrigation
- Stream percolation - the stream loses water to the aquifer because of a higher hydraulic head in the stream than in the aquifer
- Underflow - flow from one basin to another
- Artificial recharge – spreading imported water at the Valle del los Caballos (VDC) spreading basins

A real recharge, return flow, stream percolation and underflow are classified as "natural inflow". According to the District's groundwater model, the average natural inflow for all eight basins is 41,000 acre-feet/year (AFY) when no artificial recharge is occurring. Figure 2-1 presents the annual estimated natural inflow for all eight basins from 1935 to 1998. As shown, there are seven years in which the natural inflow exceeds 70,000 AFY. Most of the years of record, however, show natural inflow at approximately 30,000 AFY.

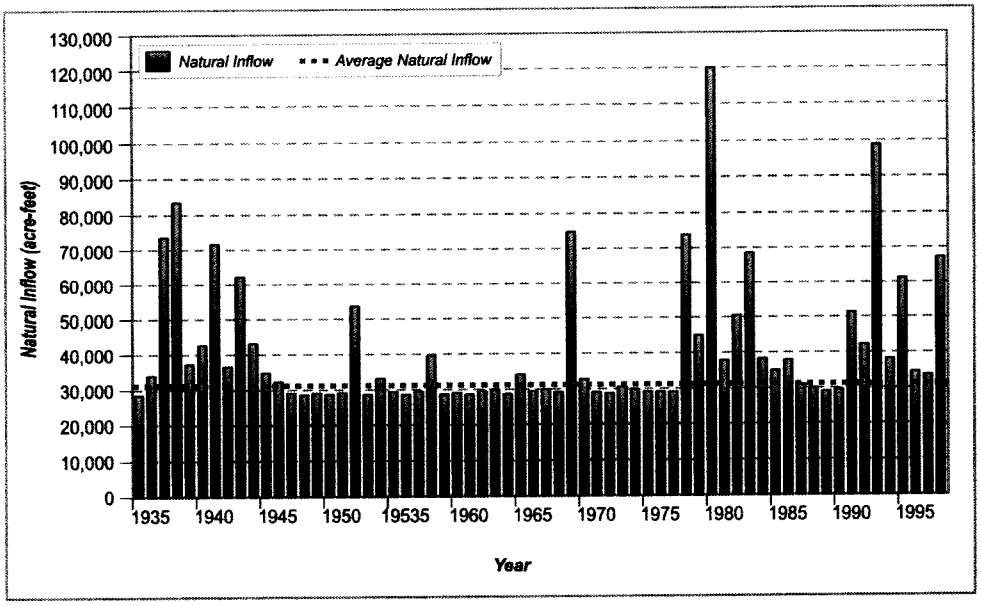

Figure 2-1
Natural Inflow for Eight Ground Water Basins Used by RCWD

Natural basin outflows also occur in several ways:

- Evapotranspiration - direct evaporation from surface water and bare soil as well as the transpiration of water by plants such that the water is not available for groundwater recharge
- Gaining streams – the stream gains water because the hydraulic head in the stream is lower than the head in the aquifer
- Underflow - flow from one basin to another

The average natural basin outflow for all eight groundwater basins from 1935 to 1998 was 6,600 AFY.

The natural yield of the eight basins equals the natural inflows less the natural losses, which would be 34,400 AFY (41,000 AFY less 6,660 AFY). However, besides RCWD, others pump from the eight basins, including: Eastern Municipal Water District (EMWD), Murrieta County Water District (MCWD), Pechanga and other private pumpers. Accounting for these users, the total natural yield available to RCWD is approximately 29,500 AFY.

RCWD currently has 52 production wells in the eight basins with a total instantaneous capacity of 46,400 gallons per minute (or 104 cfs), not including four existing recovery wells in the VDC area (VDC recovery wells). Table 2-2 summarizes the number of production wells per pressure zone and basin.

Table 2-2
Summary of Existing Production Wells

Pressure Zone	Basin	No. of Production Wells
1305	Pauba Valley	16
	Lower Mesa	3
	North Murrieta	3
	San Gertrudis	4
	South Murrieta	2
	Wolf Valley	3
1380	Pauba Valley	5
	Lower Mesa	3
1610	Upper Mesa	5
	Lower Mesa	1
1790	Palomar	1
1500	North Murrieta	2

Groundwater Recharge with Imported Water

In addition to the extraction of the natural yield of the basins, RCWD artificially recharges the Pauba Valley Basin with untreated imported water for enhanced groundwater production. RCWD purchases imported water from the MWD and delivers it from the San Diego aqueduct turnout EM-19 to the VDC recharge basins. In the past, the VDC recharge basins have provided up to 16,000 AFY of artificial groundwater recharge.

Groundwater Recharge from Vail Lake

RCWD stores local runoff in Vail Lake, which was created in 1948 through construction of Vail Dam on Temecula Creek. RCWD has a surface water storage permit in Vail Lake for up to 40,000 AF from November 1 to April 30. During these months, RCWD releases available water from Vail Lake to the Valle de los Caballos (VDC) spreading basins, about 1.5 miles downstream, for groundwater recharge. From May through October, existing State permits prohibit storage and require inflow to pass through Vail Lake to Temecula Creek.

The amount of local runoff reaching the lake can vary widely depending on hydrological conditions. From 1962 to 2000, flows into Vail Lake ranged from 218 AFY to 29,570 AFY, with an average flow of 5,150 AFY.

The storage capacity of the lake is approximately 40,000 AF, with a surface area of 1,000 acres. Currently, RCWD only uses Vail Lake to store local runoff. The historical available storage of the lake has varied widely as well, including two periods when the reservoir was full in March 1984 and February 1997. Figure 2-2 illustrates available storage capacity from 1962 to 2002. The average available storage is approximately 30,900 AF.

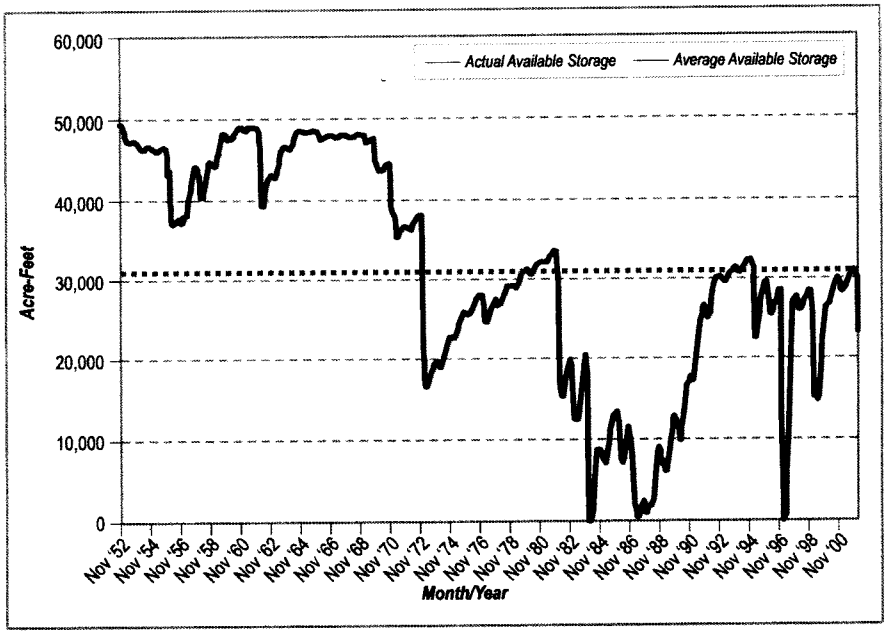

Figure 2-2
Historical Available Storage in Vail Lake

Historical Pumping from Groundwater Basins

Figure 2-3 illustrates historical total groundwater recharge and total pumping in the last 10 years. Table 2-3 shows the amount of groundwater pumped by each sub-basin in 2005. RCWD has increased pumping over the past 10 years to meet increased demands. Groundwater recharge from Vail Lake after 1999 has been unavailable due to local drought conditions, and RCWD has increased recharge by purchasing additional imported water.

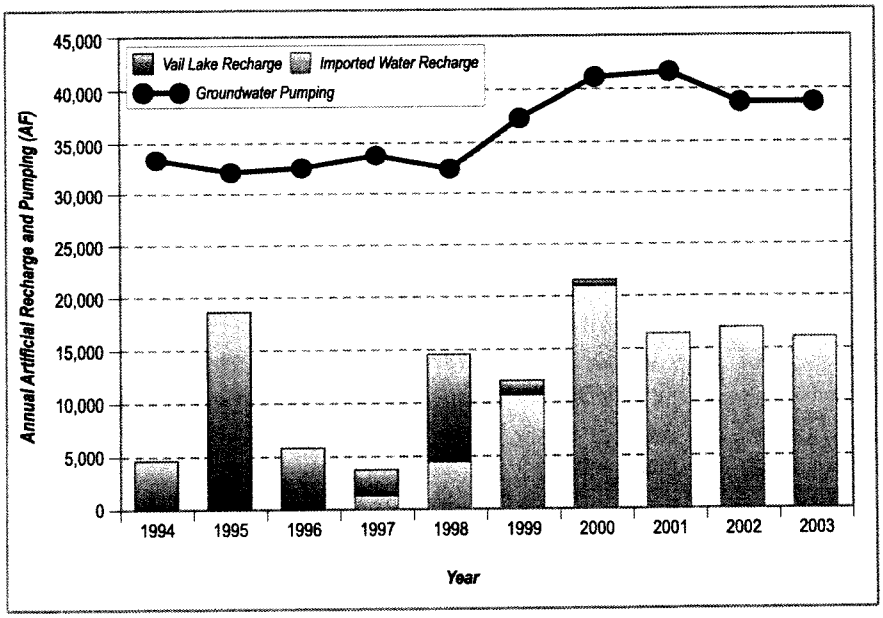

Figure 2-3
Historical Annual Artificial Recharge and Pumping

2.1.2 Imported Water

RCWD is a member agency to both EMWD and WMWD, which are member agencies to MWD. MWD is the regional water wholesaler for Southern California. Imported water, treated and untreated, is received through six MWD turnouts (three in each of EMWD's and WMWD's service areas). However, EMWD and WMWD do not convey the water through their facilities to RCWD, rather RCWD receives the water directly at these turnouts. As shown in Table 2-1, RCWD currently obtains approximately 33,000 AFY of treated water and 18,000 AFY of untreated water from MWD. Untreated, or raw imported water purchases did not begin until 1998. Figure 2-4 shows historical MWD water purchases from 1990 to 2003. During this period imported water purchases have increased from approximately 25,000 AFY to almost 51,000 AFY, including imported water used for groundwater recharge.

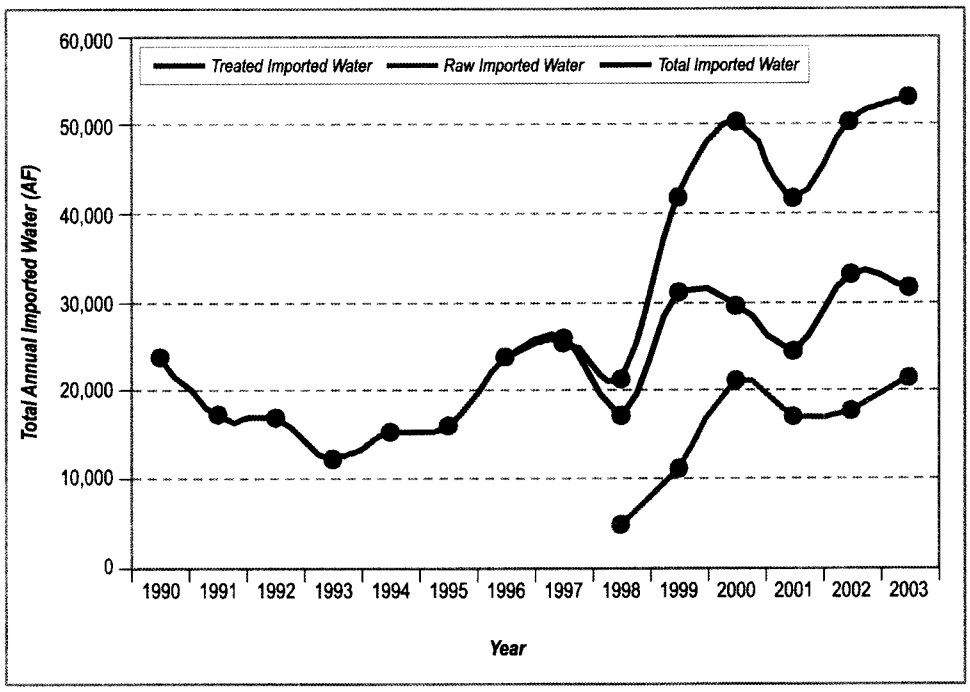

Figure 2-4
Historical Imported Water Purchased by RCWD

MWD owns and operates the Colorado River Aqueduct (CRA) along with major reservoirs such as Diamond Valley Lake and Lake Skinner, 5 regional water treatment plants, and large transmission pipelines to move imported water to its 26 public member agencies. MWD is also the largest State Water Contractor, with a contract of 2.0 million acre-feet for State Water Project (SWP) supply. Over the last few years CRA supply, historically providing over 1.2 million AFY to the region, has been severely cut. This was due to the development of the California Plan for Colorado River, which forces California to live within its 4.4 million AF entitlement of Colorado River.

The SWP is subject to extreme variability in hydrology due to a lack of storage. The SWP has also been affected by the Endangered Species Act (ESA), which has limited the amount of water coming from Bay-Delta. Although MWD has a contract for 2.0 million AFY, it rarely has received that amount (only in the very wettest of years). Average deliveries have been closer to 1.2 million AFY. In severe droughts, SWP supplies to MWD have been less than 0.5 million AFY.

MWD augments its imported water from the CRA and SWP with stored water in water banks such as Semitropic and Arvin-Edison, conjunctive use storage in local groundwater basins, and voluntary water transfers during certain dry years. In addition, MWD's recently completed Diamond Valley Lake can store 800,000 AF of imported water, which is used to meet demands during dry years and emergencies.

2.1.3 Recycled Water

Recycled water is produced to from two facilities, the Santa Rosa Water Reclamation Facility (SRWRF) operated by RCWD, and the Temecula Valley Regional Water Reclamation Facility (TVRWRF) operated by EMWD. Both plants treat wastewater to Title 22 standards. Currently, RCWD is maximizing recycled water from these two plants to meet landscape irrigation demands. Additional recycled water from TVRWRF could be used if advanced treatment beyond Title 22 standards was applied. As a result, not all of the recycled water from TVWRF is beneficially used and must be discharged to Temescal Creek. Currently, recycled water use is 6,700 AFY as summarized in Table 2-1. The recycled water system is discussed in further detail in Section 6.

2.2 Planned Water Supply Sources (the "IRP")

RCWD recently completed its Regional Integrated Resources Plan, or IRP, in order to develop a long-term water supply that can meet demands from now until 2050 (CDM, 2005). The IRP was developed in conjunction with RCWD's senior staff and Board of Directors by applying a multi-objective approach, integrating both demand and supply-side options.

The approach first develops and weights key objectives, which along with associated performance measures, will be used to evaluate alternatives to meet future demands (see Figure 2-5). The objectives and performance measures developed for the IRP are summarized in Figure 2-6.

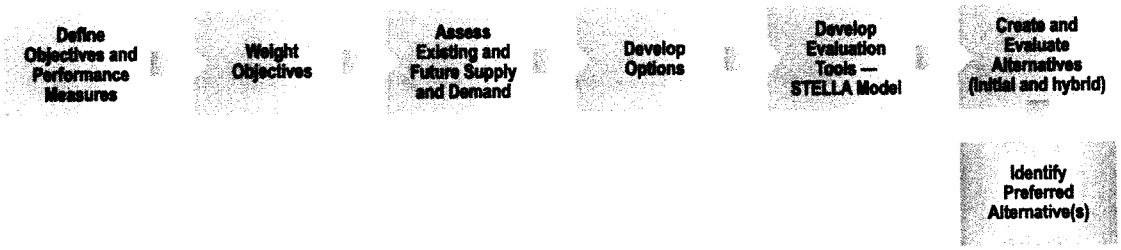

Figure 2-5
RCWD's IRP Process

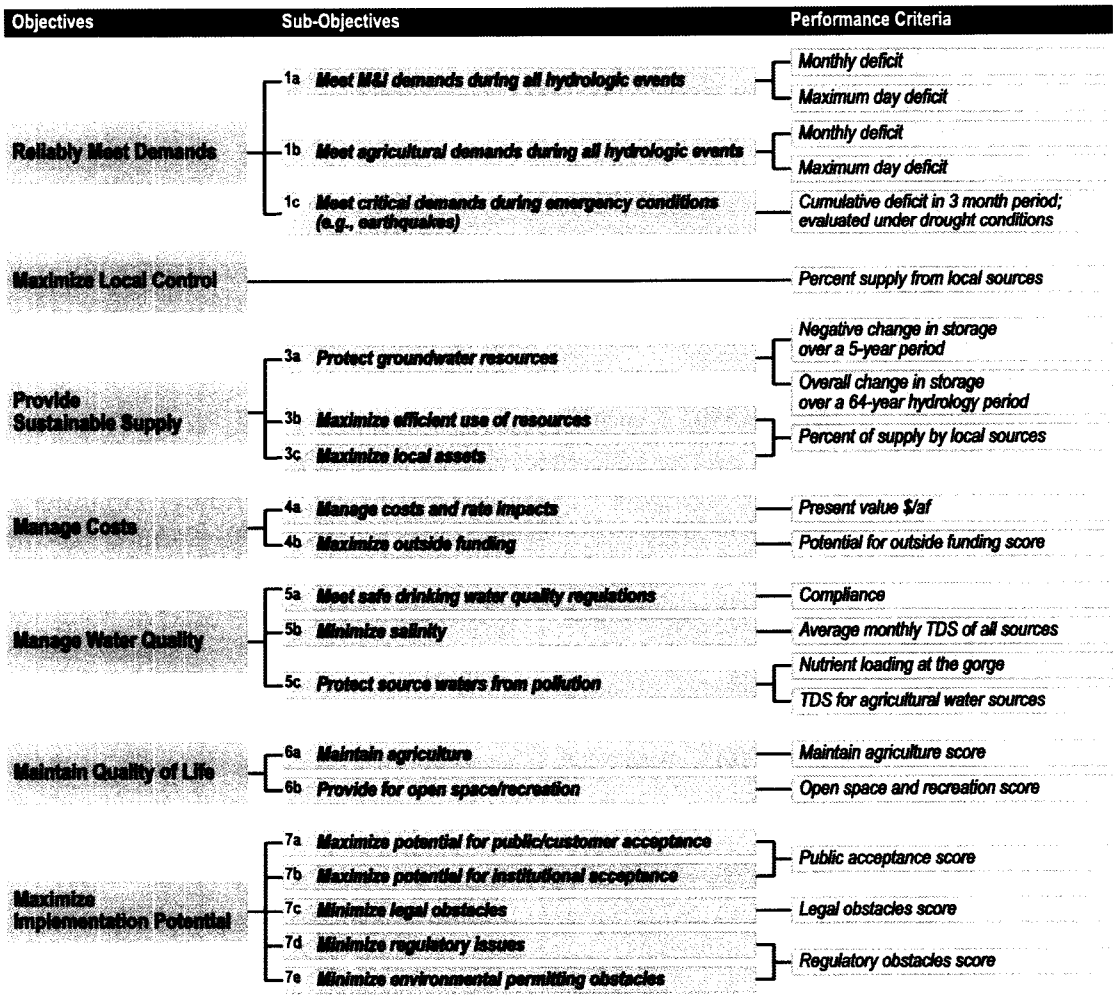

Figure 2-6
IRP Objectives, Sub-Objectives and Performance Measures

Over a dozen alternatives were evaluated using a systems model called STELLA. The model was able to simulate demands and supplies (existing and potential) under different climate and hydrologic scenarios, as well as identify distribution constraints. The model was also able to simulate water quality, storage conditions in the groundwater basins and Vail Lake, and estimate the total cost (capital and O&M) for any potential supply or demand-side management option(s).

The output from the model was used along with the objectives in Figure 2-7 to develop a comprehensive score card for each alternative. RCWD senior staff and Board weighed the objectives in terms of relative importance in order to rank the IRP alternatives (see Figures 2-7 and 2-8 for this ranking).

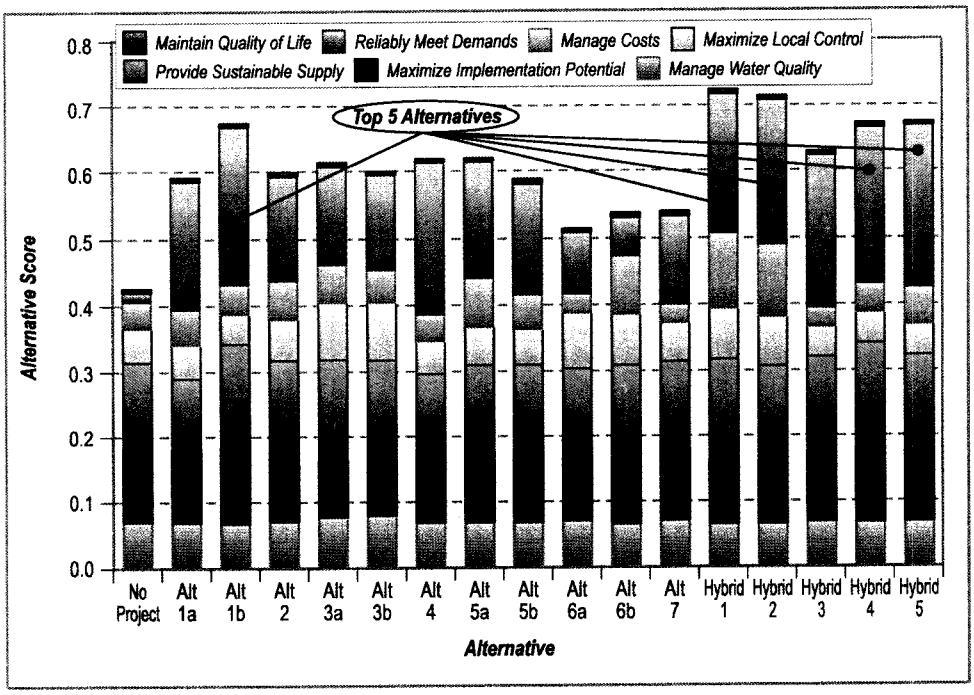

Figure 2-7
Alternatives Ranking for the Average of RCWD Senior Staff

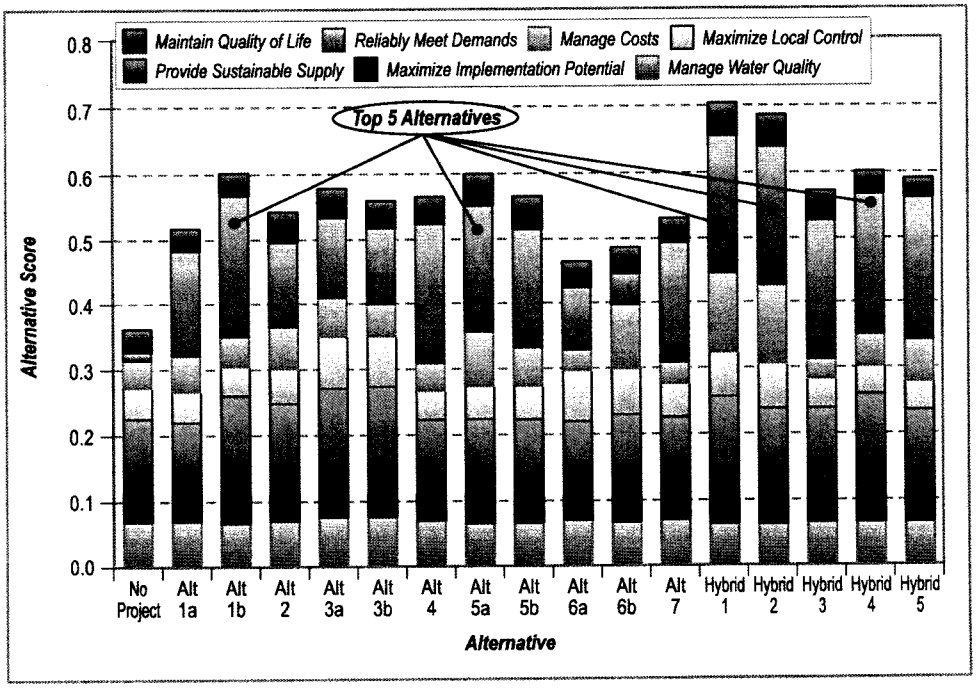

Figure 2-8
Alternatives Ranking for the Average of RCWD Board Members

The preferred plan, called Hybrid 1, involves the following components:

1. Implement baseline water conservation measures
2. Connect imported water connection EM-21 to Vail Lake to expand groundwater recharge
3. Convert eastern area agriculture, currently using treated imported water, to raw water, delivered from Vail Lake
4. Construct up to 18 new groundwater wells, along with increased imported water for recharge during non-drought years
5. Construct a MF/RO treatment facility to reduced the salinity of recycled water so that it can be used to meet western area agricultural demands, as well as potential groundwater replenishment in the future

The benefits of this preferred IRP alternative are:

- Increased groundwater production of about 18,000 acre-feet per year
- Increased use of recycled water of about 13,600 acre-feet per year
- Reduction in peaking on MWD by about 144 cubic feet per second (cfs)
- Cost efficiency by: (1) converting eastern area agricultural users from treated imported water to untreated, (2) reducing the peaking charge paid to MWD, and (3) by maximizing MWD's discounted replenishment water rate for groundwater recharge

Although the conversion of eastern area agricultural demands from treated to raw imported water is beneficial in terms of meeting peak day demands and reducing costs to RCWD, it does not produce "new" wet water supply. However, the construction of 18 new groundwater wells and a MF/RO treatment facility does produce additional water supply.

Because demands and supplies vary from year to year due to weather and hydrologic conditions, it is also important to plan for this variation. Because of the semi-arid climate of RCWD's service area, water demands can be as much as 9 percent greater than normal during dry years and 15 percent lower during wet years (see Figure 2-9).

Groundwater pumping can also vary due to hydrologic conditions. Based on RCWD's groundwater model, groundwater production from new wells averages 18,000 AFY. But in dry and critically dry years, groundwater production can be as low as 15,000 AFY.

Table 2-3 summarizes the hydrologic years used to assess supply reliability for the 2005 UWMP. The hydrologic years were selected based on local weather and hydrology.

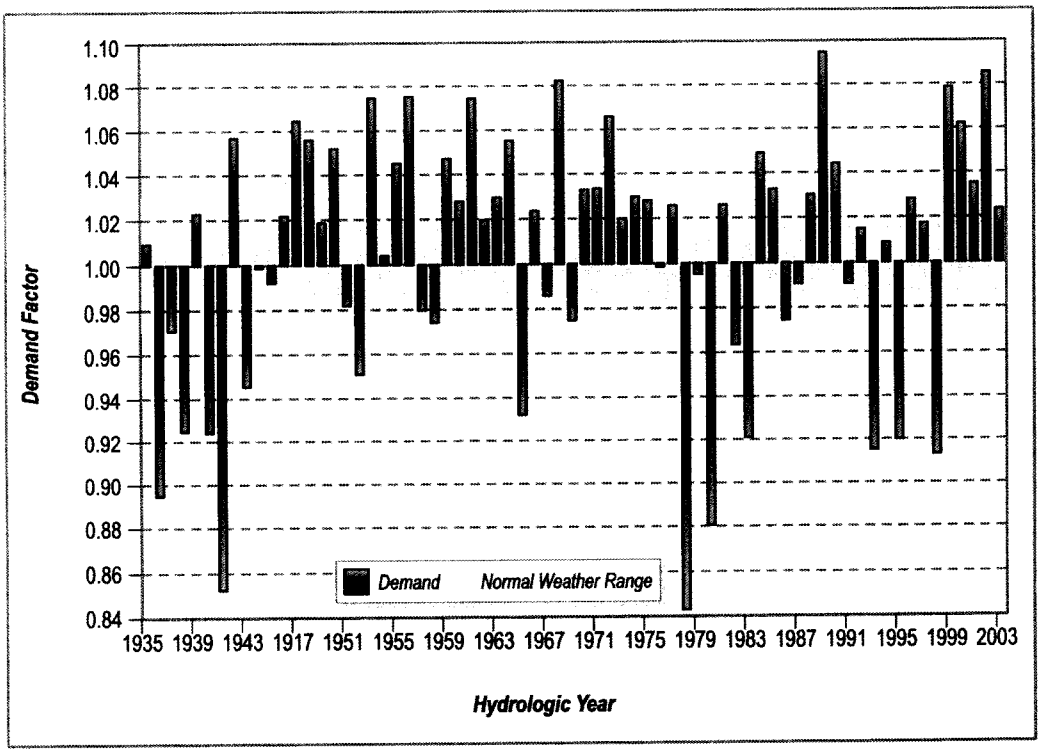

Figure 2-9
Weather Factors for RCWD Water Demands

Table 2-3
Basis of Water Year Data

Water Year Type	Base Year(s)	Historical Sequence
Normal Water Year	Average*	1935-1998
Single-Dry Water Year	1989	1935-1998
Multiple-Dry Water Years	1987-1991	1935-1999

* Average of historical sequence.

Based on RCWD's IRP, Table 2-4 summarizes the timing of new water supplies, as well as the reliability of these supplies under different water year types. As shown on the table, only the new groundwater supply is subject to hydrologic variation. The new recycled water as a result of the MF/RO facility is essentially drought proof.

Table 2-4
Future Water Supply Projects (AF/Y)

Project Name	Project Start	Average Year	Single Dry Year	Multiple- Dry Years				
				Year 1	Year 2	Year 3	Year 4	Year 5
18 New Groundwater Wells	2020	18,000	16,700	16,700	15,900	15,500	15,500	14,000
MF/RO Facility for Recycled Water	2025	13,600	13,600	13,600	13,600	13,600	13,600	13,600

Note: Supply reported are for years in which project starts

Table 2-5 summarizes the planned water supply for RCWD through 2030, under normal weather conditions. The planned supply includes existing as well as the future projects shown in Table 2-4.

As the new conversion of eastern agricultural demands from treated to raw imported water, new groundwater wells, and MF/RO facility for recycled water are brought online, the amount of treated imported water from MWD decreases from almost 40,000 AFY in 2010 to 20,700 AFY in 2030.

Table 2-5
Planned Water Supplies (AF/Y)

Water Supply Sources	2010	2015	2020	2025	2030
Imported Water (MWD)					
Treated	39,310	32,410	20,010	14,100	20,700
Untreated [1]	15,500	28,500	38,500	38,500	38,500
Local Groundwater Pumping	38,000	38,000	56,000	56,000	56,000
Recycled Water	7,890	9,090	9,890	24,300	25,200
Total	**100,700**	**108,000**	**124,400**	**132,900**	**140,400**

Source: RCWD Regional Integrated Resources Plan (CDM, 2005)
[1] Used for groundwater recharge, flows to Gorge, and eastern service area agriculture (after conversion of system).

2.2.1 Future Groundwater Supplies

With implementation of the Hybrid 1 Alternative identified in RCWD's IRP, groundwater supplies are expected to increase from their current level of 38,000 AFY to 56,000 AFY by 2020. Increased pumping and groundwater recharge is necessary to compensate for higher demands as growth in the area increase. Up to 18 new groundwater wells will be constructed. The Pauba Valley sub-basin will experience the gain in groundwater pumping; as this is the sub-basin that receives recharge from imported water (see Table 2-6).

Table 2-6
Groundwater Pumping in RCWD Service Area (AF/Y) [1]

Sub-Basin Name	2005	2010	2015	2020	2025	2030
Pauba	22,216	27,766	27,766	45,766	45,766	45,766
South Murrieta	1,881	260	260	260	260	260
Lower Mesa	5,966	3,646	3,646	3,646	3,646	3,646
North Murrieta	1,289	404	404	404	404	404
Wolf Valley	2,536	1,566	1,566	1,566	1,566	1,566
San Gertrudis	4,480	4,056	4,056	4,056	4,056	4,056
Upper Mesa	13	76	76	76	76	76
Palomar	567	226	226	226	226	226
Total	**38,948**	**38,000**	**38,000**	**56,000**	**56,000**	**56,000**
% of Total Water Supply [2]	51%	38%	35%	45%	42%	40%

Source: RCWD Regional Integrated Resources Plan (CDM, 2005)
[1] 2005 data is actual, 2010 to 2030 is projected based on normal hydrologic conditions.
[2] Net total supply, which does not include imported water for groundwater replenishment.

2.2.2 Future Imported Water

To support the increase in groundwater pumping, a new untreated (raw) water connection is being built by MWD, called EM-21. Once constructed it will increase the ability for RCWD to recharge the groundwater basin and maximize a vital local resource.

Between 2025 and 2030, MWD may also increase treated imported water capacity for use by RCWD and others by constructing a new imported water line from its Skinner Treatment Plant or a new treatment plant that is being explored.

2.2.3 Future Recycled Water

Currently, recycled water from RCWD's SRWRF is being used 100 percent to meet landscape irrigation demands. However, another 16,000 AFY of recycled water from EMWD's TVRWRF could be used if the salinity of the product water was under 500 parts per million. This salinity target is needed if recycled water is to be used for crop sensitive agriculture and/or groundwater recharge. Therefore, as part of the IRP, RCWD will construct a MF/RO facility to treat recycled water so it can be used to meet western area agricultural demands currently using treated imported water. Because of the waste or brine produce produced by the advanced treatment, 15 percent of the water is lost. Therefore, the new recycled water supply is 13,600 AFY. A more detailed discussion of recycled water is presented in Section 6.

2.2.4 Future Water Transfers

During the IRP process, RCWD investigated obtaining water transfers to bolster supplies. Water transfers are the voluntary exchange of water between a willing buyer and a willing seller. The IRP examined wet water transfers and dry water transfers, the difference being that wet water transfers occur in years of above normal

rainfall and dry water transfers occur in years of below normal rainfall. The IRP recommendations allow for the possibility of such transfers to be executed should RCWD and its customers deem them cost-effective.

2.2.5 Desalination

Desalination (seawater or brackish) was not examined as an option in the IRP. Desalination of ocean water is not viable for RCWD given its distance from the Pacific Ocean. Desalination of brackish groundwater is not necessary, given the water quality of the sub-basins used by RCWD.

Section 3
Water Demands

3.1 Overview

Because of affordable housing, relative to Los Angeles and Orange Counties, and a Mediterranean climate, the Cities of Murietta and Temecula (and surrounding communities) are desirable places to live. As such, population within RCWD's service area has grown significantly. Even agriculture, which is mainly orchards, citrus, avocados, and vineyards has grown, unlike in many other areas in Southern California.

This urban and agricultural growth has lead to increases in water demands. And because of the semi-arid climate, summer peaking in demands is fast becoming an issue.

3.2 Historical Water Demands

Combined agricultural and urban water demands have steadily increased in the RCWD service area between 1978 and 2003 as illustrated in Figure 3-1.

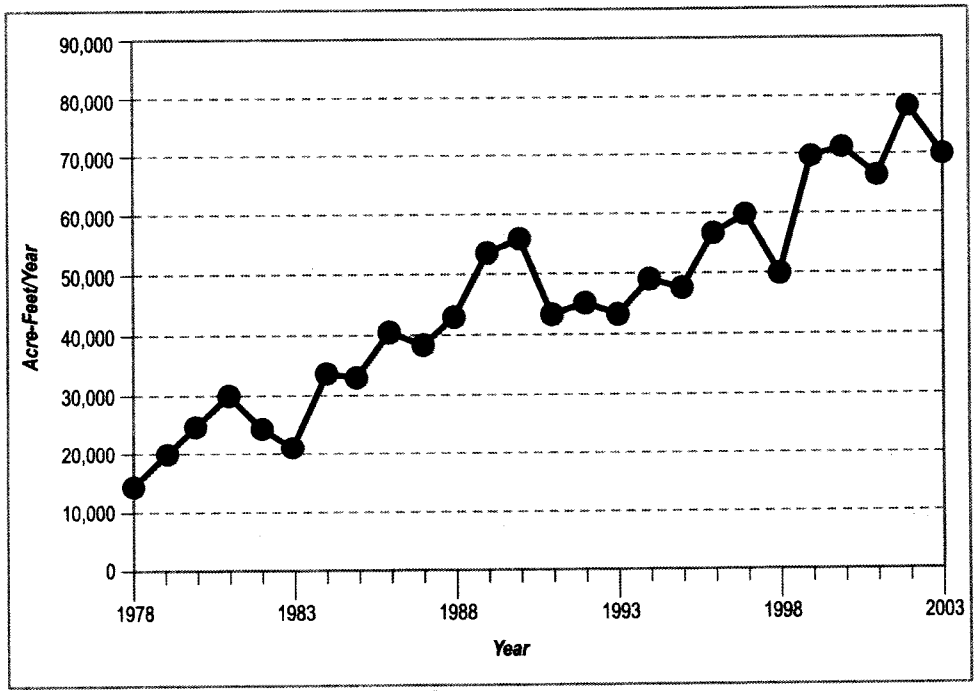

Figure 3-1
RCWD Historical Water Demands

Table 3-1 shows the distribution of actual billing accounts by customer class. "AG & A/D" refers to agricultural and agricultural/domestic areas. "Domestic" is inclusive of very low density, low density, medium density, and medium high density single family residential. "Multiple Dwelling" is multi-family residences, such as apartments and condos. The "Other" category includes freeway, and construction meters. Most water users classified in the "Other" category have either little or no reported water use.

Table 3-1
RCWD Customer Accounts

Customer Class	2000	2005
AG & AG/D	1,310	1,699
Domestic	23,320	33,378
Multiple Dwelling	160	178
Commercial	827	1,280
Landscape	674	1,059
Schools, Etc	51	65
Golf	6	6
Reclaimed	54	130
Others[1]	143	1,391
Total	**26,545**	**39,186**

[1] Mostly construction and other temporary accounts.

3.3 Future Water Demands

Projecting water demands allows RCWD to determine future water supply investments needed to match expected demands. Water demand projections are used to schedule these investments to ensure they are online when needed thus minimizing cost impacts of idle facilities. Future water demands included here were developed as a part of the IRP to aid in the selection of a preferred alternative for meeting future water demands.

3.3.1 Forecast Methodology

Projected water demands to 2050 were estimated using RCWD's 2000 billing data and water demand projections at ultimate build-out from the 2005 RCWD Water Facilities Master Plan. In the IRP demands were forecasted to 2050, but only forecast demands to 2030 are included in the 2005 UWMP.

The 2000 billing data was used to determine the starting point in the demand projection, while the ultimate build-out demands in the Master Plan represent the end-point. The 2000 billing data contains different classifications than the Master Plan classifications. Billing data is based on customer classes while Master Plan classification is based on land use categories. Thus, the first step was to match the two classification systems. Matching the two systems resulted in the IRP Sectors in Table 3-2. IRP Sectors are the sectors used in the demand forecast.

Table 3-2
Matching of Billing Data Classifications and Land Use Categories

2000 Billing Data Classifications	IRP Sectors	Master Plan Classifications
AGRICULTURAL AG/DOMESTIC	Agricultural and Agricultural Domestic	Ag/Vineyard Planning Area Estate 20 Estate 10 Estate 5 Estate 2
DOMESTIC	Single-Family	Very Low Density Low Density Medium Density Medium High Density High Density
MULTIPLE DWELLING	Multi-Family	Multi-Family
COMMERCIAL SCHOOLS MISC GOV OTHER	Commercial/Institutional	Commercial Business Park / Industrial
GOLF LANDSCAPE RECLAIMED WATER	Landscape/Golf	Open Space – Recreational

Source: RCWD Regional Integrated Resources Plan (CDM, 2005)

Estimating Year of Build-Out

The term "build-out" indicates a city is no longer growing, and the associated water demand would be at the maximum or ultimate demand. The build-out forecast obtained from the 2005 RCWD Water Facilities Master Plan did not specify the estimated year for build-out. It did, however, provide an estimated number of dwelling units for each land-use category. The IRP analysis estimated a year for build-out by comparing the number of build-out dwelling units in the Master Plan with the demographic projections developed by the SCAG Regional Transportation Plan discussed in Section 1.1.2. The SCAG demographic data contains single-family and multi-family data that correlate with the domestic and multiple dwelling categories under the Master Plan classifications.

SCAG projects demographics out until year 2030. Because the SCAG housing units were lower than those reported at build-out in the Master Plan, it was deemed that build-out was beyond 2030. To determine the year of build-out, a linear extrapolation of the SCAG housing projections was done. The SCAG demographic data for population and housing largely follow a linear pattern as shown in Figure 3-2. Although the rates of growth are not perfectly linear, there is not enough variation in the growth rate to warrant a non-linear growth pattern for demand projections.

Comparing the estimated number of dwelling units from the Master Plan build-out forecast and the extrapolated SCAG demographic data indicated that overall build-out would occur around 2050.

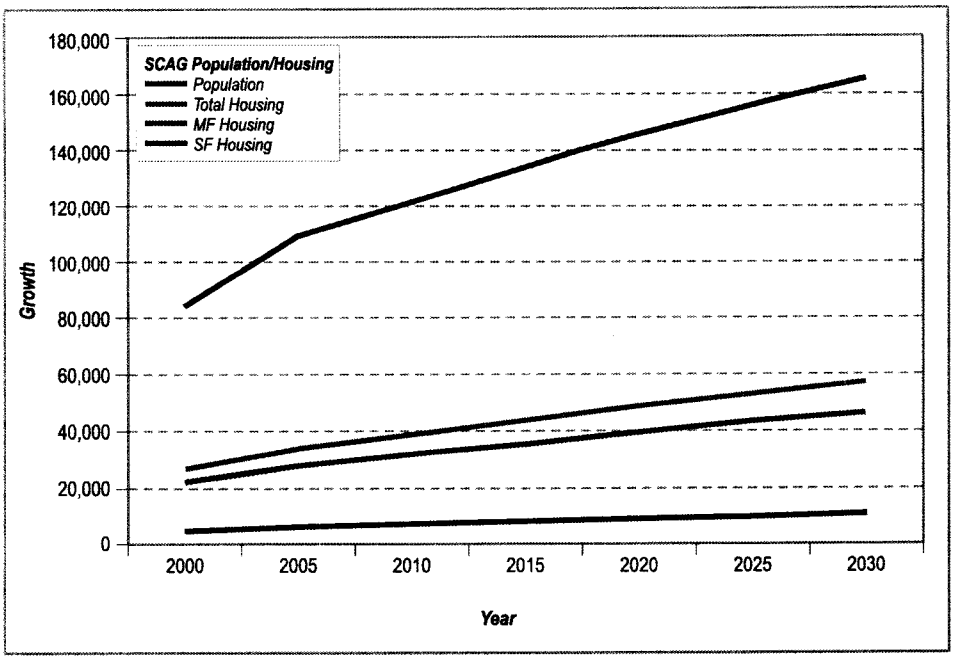

Figure 3-2
Demographic Projections for RCWD Service Area

3.3.2 Consumptive Water Demand Forecast

Projected water demands in the IRP were estimated in 5-year intervals up to 2050 based on water billing data and the 2005 RCWD Master Plan build-out demand projections. For purposes of the UWMP, estimated demand projections are provided to 2030.

Results of the water demand forecast for normal weather conditions are summarized by sectors in Table 3-3. Total annual average water demands are projected to increase from the current 76,100 AFY to 112,700 AFY in 2030, a 36,600 AF increase. The largest growth is expected to occur in the Single-Family Domestic Sector from 25,500 AFY in 2005 to 44,300 in 2030.

Table 3-3
Annual Average Consumptive Water Demands in RCWD Service Area

Year	2000	2005	2010	2015	2020	2025	2030
Agriculture/Ag Domestic Demands	33,900	35,900	38,000	40,000	41,00	44,000	46,000
Single-Family Domestic	21,700	25,500	29,300	33,000	36,800	40,600	44,300
Multi-Family Domestic	1,400	1,900	2,300	2,800	3,200	3,700	4,200
Commercial/Institutional	3,500	4,100	4,800	5,400	6,100	6,700	7,400
Landscape/Golf Course	8,300	8,700	9,100	9,500	9,900	10,300	10,800
Total	**68,800**	**76,100**	**83,500**	**90,700**	**97,00**	**105,300**	**112,700**

2000 represents actual demand, 2005-2030 projected based on average weather conditions

3.3.3 Sales to Other Agencies

RCWD does not engage in water sales to other agencies, including wholesale water, exchanges, and non-recurring agreements, at this time nor are any projected in the forecast period ending in 2030.

3.3.4 Additional Water Uses

Additional water uses include imported water purchased for groundwater recharge, water required to meet the Gorge discharge requirements due to the water rights settlement, and unaccounted for water. Given RCWD's system is relatively new and modern, unaccounted for water is very small, averaging around 2 percent. Table 3-4 summarizes this additional water use.

Table 3-4
Additional Water Uses and Losses (AF/Y) [1]

Water Use	2005	2010	2015	2020	2025	2030
Groundwater Recharge with Imported Water	13,000	13,000	13,000	23,000	23,000	23,000
Gorge Discharge (per water rights agreement)	2,500	2,500	2,500	2,500	2,500	2,500
Unaccounted Water	1,500	1,700	1,800	1,900	2,100	2,200
Total	**17,000**	**17,200**	**17,300**	**27,400**	**27,600**	**27,700**

[1] Based on average runoff and weather conditions.

3.3.5 Total Water Uses

Total water use is the summation of the consumptive water demands presented in Table 3-3 and the additional water uses in Table 3-4. Table 3-5 summarizes the total future water uses under normal weather conditions.

Table 3-5
Total Water Use (AF/Y) [1]

Water Use	2005	2010	2015	2020	2025	2030
Consumptive Demand	76,100	83,500	90,700	97,000	105,300	112,700
Sales to Other Agencies	0	0	0	0	0	0
Additional Water Uses and Losses	17,000	17,200	17,300	27,400	27,600	27,700
Total Projected Water Use	**93,100**	**100,700**	**108,000**	**124,400**	**132,900**	**140,400**

[1] Based on average runoff and weather conditions.

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Section 4
Conservation

4.1 Introduction

Increasing urban water conservation is a means towards providing additional water supply by reducing demands. Effective water conservation practices are necessary to be able to provide adequate supplies to meet growing demands in the RCWD service area. Demographic projections indicate that agriculture land use will continue to decline in the future as RCWD's service area continues to become more urbanized. Through its membership in the California Urban Water Conservation Council (CUWCC), initiatives of EMWD and WMWD, and its own initiatives RCWD is committed to increasing water conservation.

RCWD is a recent signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) developed by the members of the CUWCC. As a signatory to the MOU, RCWD is obligated to implement a set of 14 water conservation Best Management Practices (BMPs) also commonly referred to as Demand Management Measures. The MOU established the CUWCC in 1991 to monitor implementation of the BMPs and to maintain the list of BMPs. Biennially member agencies are required to submit a report to CUWCC detailing progress towards implementing the 14 BMPs. Participation and compliance with the BMPs is monitored by CUWCC which offers guidelines on the implementation and assessment of the BMPs.

4.2 Urban BMP Implementation

The MOU commits RCWD and other signatories to develop comprehensive conservation programs utilizing feasible economic criteria and to consider water conservation as a viable water management option through the implementation of Urban BMPs. BMPs are defined in the MOU as:

(a) An established and generally accepted practice among water suppliers that results in more efficient use or conservation of water.

(b) A practice for which sufficient data are available from existing water conservation projects to indicate that significant conservation or conservation-related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out.

RCWD is obligated to implement all of the BMPs, except BMP 10. BMP 10 pertains to wholesale agencies only. Table 4-1 provides a listing of each BMP and summarizes RCWD's status in implementing the BMPs. As a recent signatory to the MOU, RCWD has only submitted the reports once, thus prior years are not included in the plan.

Table 4-1
CUWCC BMPs For Urban Conservation In California

BMP #	PRACTICES	STATUS
1	Water surveys programs for single-family residential and multi-family residential customers	Implemented
2	Residential plumbing retrofit	Implemented
3	System water audits, leak detection and repair	Implemented
4	Metering with commodity rates for all new connections, and retrofit of existing connections	Implemented
5	Large landscape conservation programs and incentives	Implemented
6	High efficiency washing machine rebate program	Implemented
7	Public information programs	Implemented
8	School education programs	Implemented
9	Commercial/Industrial/Institutional water conservation	Outdoor Only
10	Wholesale agency assistance program	Not applicable
11	Conservation pricing	Implemented
12	Water conservation coordinator	Implemented
13	Water waste prohibition	Implemented
14	Residential ULFT replacement program	Implemented

BMP 1: Water Survey Programs for Single-Family and Multi-Family Residential Customers

RCWD is currently surveying outdoor water use of single-family accounts that use two hundred percent more water than the district-wide average. During these surveys RCWD checks the irrigation system and makes necessary adjustments such as changing the irrigation timers, there is no cost to the customer. The CUWCC suggests an estimated savings of ten percent when quantifying savings for outdoor surveys under this BMP.

RCWD began this program in July 2004 and has an annual budget of $100,000 for five hundred surveys. The savings for this BMP were calculated by taking the average gallons per day per account water use and multiplying it by two hundred percent. This results in an estimated value that represents per account per day water use among the households target by the program. This value was then multiplied by the percent of total water use that is used outdoors. After assessing annual water use patterns, outdoor water use was estimated to be fifty-one percent of total water use. CUWCC estimates a ten percent reduction in outdoor use will result from the surveys. The average outdoor water use of the targeted accounts (848.47 gpd per account) was multiplied by ten percent. The resulting 85 gpd per account was multiplied by 500 (number of surveys per year) to calculate total annual savings in gallons. The resulting 15.48 MG (or 47.52 AF) was further processed into a lifetime savings and a cost per lifetime savings. Savings resulting from this program were

estimated to have a life of three years. Under this assumption the lifetime savings are estimated to be 142.56 AF at a cost of $701.45 per AF.

RCWD currently offers multifamily outdoor surveys on a voluntary basis. However, up to this point they have received no requests. In 2007, RCWD will begin indoor multifamily surveys; they plan to conduct 50 surveys per year. The surveys will include leak detection and flow rate tests for faucets and showerheads. Leaks will be resolved and faucet aerators and low flow showerheads will be provided when necessary. Toilets will also be checked for flush volume and leaky flappers. When appropriate the customer will be directed to the ULFT program. These surveys will augment RCWD's plumbing retrofit program and the ULFT program.

CUWCC's methodology for calculating savings resulting from indoor water surveys assumes savings for showerhead retrofits, ULFT retrofits, and leak repairs. It is not reasonable to assume each survey will result in all or any of these changes. Further this methodology introduces potential double counting of toilet and showerhead retrofits because these fixtures are offered as part of separate BMPs (BMP 2 and 14).

Table 4-2
CUWCC BMP 1 Savings Assumptions

	Pre-1980 Construction	Post-1980 Construction
Low-Flow Showerhead Retrofit	7.2 gcd	2.9 gcd
Toilet Retrofit (five year life)	1.3 gcd	0.0 gcd
Leak Repair	0.5 gcd	0.5 gcd
Landscape Survey (outdoor use reduction)	10%	10%

Source: CUWCC
http://www.cuwcc.org/m_bmp1.lasso

Grossly assuming 0.5 gcd savings per survey, and 2.84 persons per multifamily household[1], 50 multifamily surveys will save 25,915 gallons per year. RCWD estimates the MF surveys will cost $75 per survey, therefore conducting 50 surveys in one year will cost $3,750.

BMP 2: Residential Plumbing Retrofit

RCWD is fulfilling BMP 2 through the dissemination of a residential plumbing retrofit kit free of charge to eligible RCWD customers. Eligible customers pick up the retrofit kits in the RCWD reception area. The kit includes low-flow shower heads, garden hose shut-off nozzles, faucet aerators, and toilet leak detection tablets. The kit is available to customers living in homes that were built prior to 1994. The low-flow

[1] Census SF3 Data for City of Temecula.

shower heads are limited to two per household, and the aerators and the shut-off valves are limited to one per household.

RCWD began this program in September 2004 and through March 2005 distributed 327 low-flow shower heads, 442 faucet aerators, and 240 garden hose shut-off nozzles. The faucet aerators and the shut-off nozzles are considered to have nominal savings for this analysis. Savings were calculated for the shower heads based on a gallon per capita per day assumption recommended by the CUWCC. They recommend a gallon per capita per day savings of 7.2 gpcd for pre-1980 homes and 2.9 gpcd for post-1980 construction. The percent of homes in the RCWD service area that were built prior to 1980 is estimated using 2000 Census SF3 data for Temecula California. Census data lists housing units built by decade up to 1980 and then in smaller increments through 2000. Based on this data, fourteen percent of the homes in the RCWD service area are estimated to be built prior to 1980. Thus it was assumed that 42 of the low-flow showerheads (fourteen percent) distributed by RCWD went to homes built prior to 1980 and the remaining 258 (eighty-six percent) went to post-1980 construction homes. The 42 showerheads assumed to be retrofit in pre-1980 housing were multiplied by 7.2 gallons per capita per day, and the 258 showerheads that were assumed to be retrofit in post-1980 homes were multiplied by 2.9 gallons per capita per day. The products of these multiplications were then added, multiplied by the average number of persons per household (as obtained from the U.S. Census Bureau's 2000 SF3 data for Temecula California), and then divided by the total number of showerhead retrofits. This resulted in an average savings in gallons per day per account for each low-flow shower head distributed. This value was then multiplied by the total number of shower heads distributed by RCWD and 365 days to estimate annual savings.

As noted above, RCWD began this program in September 2004 and the data are for seven months. To make savings and costs reflect an annual time period a monthly participation rate was estimated and multiplied by twelve. The estimated participation for a year is 514 low-flow showerhead retrofits, resulting in an annual water savings of 6.35 AF. The lifetime of a showerhead is estimated to be ten years making the lifetime savings of this program 63.51 AF and the cost per lifetime savings $134.93 per AF.

The CUWCC methodology described above was used in estimating savings from low-flow showerheads for RCWD. However, it is important to note that this methodology is nearly outdated. If indeed showerheads have a ten year life then it is likely that all pre-1980 homes have been retrofitted. Further, it could be argued that homes constructed pre 1994 also have retrofitted showerheads, or will in the very near future. The efficacy of this program may need to be reevaluated.

Currently there is not a local enforceable ordinance in effect in the RCWD service area requiring the replacement of high-flow showerheads and other water using fixtures with low flow counterparts. However, California State law since 1992 prohibits the sale or installation of non conserving showerheads. RCWD is a recent signatory to the MOU and has not completed the required customer surveys regarding low-flow

showerhead installation. These surveys are to demonstrate that 75 percent of the single-family and multifamily households built prior to 1992 in the RCWD service area have been retrofitted with low flow showerheads.

BMP 3: System Water Audits, Leak Detection, and Repair

RCWD conducts water audits of its distribution system on a monthly basis to determine if leaks are occurring and/or repairs are necessary. Sales in each pressure zone, inclusive of construction, water, sewer flushing, and mainline flushing, are compared to delivery records and sales production. Monthly auditing results in the ability to implement corrective actions prior to excessive losses. Unaccounted water has historically ranged between 3 and 6 percent. In 2004 unaccounted water averaged 4.7 percent. RCWD strives to maintain average yearly system losses to less than 5 percent.

RCWD is proactive in reducing system water losses. Through its corrosion control program RCWD determines the corrosion potential of soils by measuring pipe to soil potential and if necessary installing cathodic protection equipment for both new and existing infrastructure. RCWD also verifies the integrity of valves within the system. A special truck is outfitted with equipment to check all valves within the system on a periodic basis. Valves that are not maintained can leak or malfunction. Inoperable valves are replaced or repaired.

BMP 4: Metering with Commodity Rates for all new Connections and Retrofit of Existing Connections

All of RCWD's customers are metered and charged a commodity rate for water service (see Appendix A for water rate schedules).

BMP 5: Large Landscape Conservation Programs and Incentives

RCWD provides a large landscape water audit program to its customers. In August 2005, RCWD began conducting commercial outdoor water use surveys. Under this program, RCWD performs a large landscape water audit and incorporates a demonstration garden and various educational seminars. RCWD is also taking advantage of MWDSC's WBIC (weather-based irrigation controllers) incentive program for large landscape customers. Under this program it is estimated the RCWD will perform up to 40 landscape audits and install up to 40 WBIC systems. As of October 2005, RCWD has completed 30 survey/installations.

MWDSC offers incentives to commercial/industrial/institutional (CII) accounts for the utilization of WBIC's MWDSC offers $500 per acre of CII land that is irrigated with a WBIC and $5.50 per station. A station is a valve on the WBIC unit.

These survey/installations cost $1,200 on average. The CUWCC methodology recommends estimating a 15 percent reduction in outdoor commercial water use. Water demand for CII in RCWD in 2000 was 3,482 AF. There are 877 commercial accounts giving an annual average of 3.97 AF water demand per account. It is estimated that 51 percent of water use is outdoor. Therefore, estimated annual

outdoor water use per account is 2.02 AF. RCWD has conducted 30 survey/installations in three months. If this trend continues they will be able to complete 120 in one year. In 2000 these 120 accounts had a total annual water demand of 243 AF. Reducing this by the CUWCC suggested 15 percent equals 36.45 AF of savings in one year. The life of a WBIC is estimated at 10-15 years, or an average of 12.5 years[2]. The lifetime savings of this program is 455.60 AF and the cost per lifetime savings is $316.07 per AF.

BMP 6: High-Efficiency Washing Machine Rebate Program

MWDSC offers rebates ranging from $85 to $150 for purchases of high efficiency clothes washers. As part of RCWD's conservation efforts they facilitate a pass-through of the MWD rebates to their customers. Customers receive the rebate via a credit on their water account. The only costs RCWD incur are administrative, at $10 per unit. This program began in 2003 and through March 2005 had 499 participants. Savings and costs were estimated based on rebates given in 2004.

Three hundred ninety-seven rebates were given in 2004 for purchases of high-efficiency clothes washers with varying efficiency ratings. Clothes washers are assigned a water factor to describe their efficiency. The water factor is the number of gallons required by the washing machine for each cubic foot of laundry. Thus, lower water factors indicate more water efficiency. The water factors for the washers rebated in 2004 range from 4.0 to 9.47.

RCWD keeps track of the water factors of each high-efficiency washing machine that receives a rebate through MWDSC's program. This is very important in calculating the savings of clothes washers based on the methodology put forth by the CUWCC. In this analysis, the CUWCC methodology was slightly modified. The CUWCC equation for estimating savings is:

$$GWS = 14\ \text{yr.} \times \sum_i N_i \times (13.3 - i) \times 1{,}170\ \frac{\text{gal.}}{\text{yr.}}$$

GWS is gross water savings, 14 yr. is the average life of a clothes washer, N is the number of machines replaced with the water factor i, 13.3 is the baseline water factor for machines sold in 1994 as supplied to DOE by the Association of Home Appliance Manufacturers (AHAM), and 1170 is the average unit change in water use per unit change in water factor (developed by the California Energy Commission).

This analysis used all of the factors in the CUWCC equation, however the summation was modified. The frequency (N) of rebates for each water factor was determined.

[2] Assumption taken from: Residential Weather-Based Irrigation Scheduling: Evidence from the Irvine "ET Controller" Study June 2001
"The useful life is expected to be between 10 and 15 years" (pg. 7).

Then the equation was applied to each water factor independently. In the example below 4.5 is the water factor and 10 is the frequency, or number of retrofits for the water factor 4.5:

[14year*(10*[13.3-4.5])*1170]

Results calculated for each water factor were summed to derive total water savings.

Program lifetime savings based on the rebates given in 2004 are estimated to be 145.99 AF, the program cost per lifetime savings $27.19 per AF.

BMP 7: Public Information Programs

RCWD along with EMWD, WMWD, and MWDSC have public information programs in place designed to educate the public and businesses on how to reduce water consumption and learn about water supply issues. As a member agency of both WMWD and EMWD, RCWD participates in both of their conservation programs and MWDSC's conservation programs. The public information program at RCWD is designed to reach as many residents as possible. RCWD budgets approximately $30,000 per year for its program.

Various mediums are used to convey information to residents and businesses within the service area by RCWD. Media outlets include news releases, community events, seminars, internet, and newsletters. RCWD creates feature public information articles for distribution to local newspapers and radio stations. During community events RCWD participates through its commitment, membership, and representation to local service organizations. Seminars for professional landscapers and homeowners are also sponsored by RCWD. Quarterly, RCWD publishes *Waternews*, for its customers. Articles are included on water conservation measures. RCWD's lobby has a plethora of hand outs, including handouts such as water conservation, water wise gardening, water use outdoors, and indoor water use, available for free in the reception area.

BMP 8: School Education Programs

Since 1984 RCWD has implemented a water education program to provide water and wastewater knowledge to teachers, students, and parents. Through its program, RCWD is able to educate students at an early age on the benefits of conserving water so that this knowledge flows into their homes and develops future water conserving habits.

Coordination between schools and RCWD's water education program occurs through RCWD's Public Information Specialist. The Public Information Specialist is tasked with managing the relationship between RCWD's various departments and other work groups with local school districts and external agencies. A key highlight of the program is to encourage and assist teachers in educating students about water. Through the program students develop an early appreciation for water.

RCWD's water education program involves all elementary and secondary schools within the service area encompassing18 public schools and 6 private schools. Training

is provided for teachers at all grade levels. Distributed materials meet the Science Framework for California Schools and the Murrieta and Temecula Valley Unified School District's Science Curriculum Guide. Materials are appropriate for respective grade levels. Teachers can choose to participate by ordering education materials from RCWD with all costs paid by RCWD.

Approximately 9,000 students are contacted per year through school assemblies, educational theater productions, field trips, and classroom presentations. On average RCWD provides over 20,000 brochures, booklets, stickers, and other water related items to students per year. RCWD also has sponsored such items as an essay contest, t-shirt design contest, and local science fairs.

Between 2001 and 2005 the approximate average yearly basis for impressions on students was:

Number of schools served: 24

Number of teachers served: 150

Number of students served: 5,000

Number of education materials distributed: 25,000 pieces

Number of classroom presentations: 40

BMP 9: Commercial/Industrial/Institutional Conservation Programs

Currently RCWD has implemented outdoor commercial, industrial, and institutional (CII) conservation programs in the form of surveys, but has not implemented indoor CII conservation programs. The outdoor program is discussed in detail for BMP 5.

RCWD could implement programs such as the Commercial and Industrial Rebate Program and CII indoor surveys. The CI rebate program offers rebates on seven water using devices. RCWD could implement this rebate program with a cost similar to their ULFT and high-efficiency clothes washer programs. Since MWDSC pays for the rebate, RCWD pays only a small administrative cost for significant savings. Table 4-3 below lists available rebate amounts and estimated savings.

Table 4-3
MWDSC CII Rebate Programs

Device:	MET Rebate Amount	Savings per Unit GP Year	Savings per Unit GPD
Cooling Tower Conductivity Controller	$500.00	800,000	2,191
Water-saving Toilet/Urinal	$60.00	14,600	40
High-efficiency Washing Machine	$100.00	150,000	411
Pre-rinse Kitchen Sprayer	$50.00	75,000	205
Dual Flush Toilets	$80.00	14,600	40
Water-pressurized Broom	$100.00	50,000	137
Film Processor Recirculating System	$2,000.00	1,000,000	2,740

Source: CUWCC
http://www.mwdh2o.com/mwdh2o/pages/conserv/program02.html

Another incentive program available is the CII weather-based irrigation controllers discussed in detail under BMP 5.

In 2009 RCWD will begin indoor commercial surveys. While this program is still in the planning stages it will likely follow standard survey methods and focus. Because this is a future program actual costs are unknown. Based on an assessment of agencies currently participating in this portion of BMP 9 and review of a paper by Santa Clara Valley Water District, a cost per survey was estimated to be about $3000. The other cost figures were found in the CUWCC BMP reporting data base for the following agencies: City of San Diego, City of Pasadena, East Bay Municipal Utility District, and San Juan Water District. The database was randomly searched and these four were found to have realistic data (i.e., some agencies reported doing surveys but did not report a cost, or reported extremely high costs). Costs for these agencies ranged from $950.00 to $6,500.00 per survey.

CUWCC recommends estimating a savings of 12 percent of the current gallons per employee per day for the CII surveys. A gallons per employee per day (GED) value was calculated for RCWD from CII water use for 2000 and the total number of employees in 2000. The employment data was furnished by SCAG. The resulting GED is 112.61 for RCWD. Potential savings are estimated as12 percent, or 13.51 GED.

CUWCC's guidelines indicate that 10 percent of CII accounts are to be surveyed in 10 years . There are 877 commercial accounts in RCWD and no industrial accounts.

Thus, it is assumed that RCWD will conduct 88 surveys in ten years or 9 surveys per year.

SCAG data reported 27,602 employees in 2000 for the RCWD service area. Given the 877 CII accounts, this is an average of 31.5 employees per account.

With these assumptions each account surveyed is estimated to save 426 gallons per day; this is derived by multiplying the 13.51 GED savings by 31.5 employees per account. Savings per year can be estimated by multiplying 426 gallons per day (savings per account) by 9 (the number of surveys conducted annually) and by 365 days. The resulting estimate of annual savings is 1.4 MG. Assuming a five year life of savings resulting from the indoor surveys , the lifetime savings is 21.45 AF and the cost per lifetime savings is $1,256.53 per AF.

BMP 11: Conservation Pricing

RCWD has implemented two tier blocks to encourage conservation for all customer classes effective as of July 2005. Water and wastewater rates are different depending upon the location of the service address. RCWD is divided into the Rancho and Santa Rosa Divisions for water service and is further divided into pressure zones. Wastewater service is provided by both RCWD and EMWD.

Water customers pay a base rate per hundred cubic feet (HCF), an energy rate based on pressure zone locations, and a monthly service charge based upon meter size. Agricultural and domestic rates are calculated at the domestic rate for water use up to 16 HCF. Water use in excess of 16 HCF is calculated at the lower Agricultural Rate. The Tier 2 conservation rate is an additional $0.18595 per hundred cubic feet. This additional rate applies to customers that exceed their water allocation as determined by customer class.

Recycled water customers are billed based on a monthly service charge and use per acre-foot. Acre-foot charges vary based upon whether the user requires tertiary treated water, agricultural treated water, or uses the water for construction activities.

Wastewater customers pay a flat fee based on location and the service provider, RCWD or EMWD. For RCWD the flat rate is based on equivalent dwelling units per customer, while EMWD is a flat rate regardless of equivalent dwelling units.

Appendix A contains a copy of the water and sewer rate structures.

BMP 12: Conservation Coordinator

RCWD employs one full-time water conservation coordinator. The coordinator is tasked with interacting with coordinators from other agencies, overseeing all aspects of water conservation, and developing new programs. Since 2000 RCWD has spent approximately $150,000 to satisfy this BMP.

BMP 13: Water Waste Prohibition

RCWD has actively enforced "No-Waste" water provisions included in its water conservation program for dealing with water supply shortages (see Appendix B). This program was adopted in January 1991 (Resolution 91-1-3), then later amended in February 1991 (Resolution 91-2-3) and again in May 1991 (Resolution 91-5-8). The program contains four stages of water supply conditions. Under each stage the condition of the supply is defined along with prohibited uses. RCWD does respond to customers who complain about wasteful use of water. On average, RCWD send out approximately 10 letters per year to customers who have been identified as using water in a wasteful manner.

RCWD does not have a water softener ordinance nor does it conduct water softener checks as part of its home surveys.

BMP 14: Residential ULFT Replacement Programs

Since 1997 RCWD has participated in MWDSC's Ultra Low Flush Toilet (ULFT) rebate program. MWDSC offers a rebate of $60 for a ULFT and RCWD passes this through to their customers as a credit in their water account. The only costs RCWD incurs are administrative, at $10 per unit. This program began in 1997 and through March 2005 has had 1,089 participants. RCWD has also distributed toilets in coordination with the Temecula Valley High School's Rotary Interact Club. Cooperative Technologies & Services International trained students to market and assist distribution of ULFT's for a $20 co-pay. Through this program the ULFTs provide long term water savings throughout their usable life, RCWD gains public exposure, students gain skills, and the high school earned money for academic and extracurricular activities. Through these programs starting in 1997 and through March 2005 RCWD has had 1,089 participants.

An annualized savings and cost estimate were based on an average from 1997 through 2004. On average annual participation in the ULFT program is 155. Total annual savings for an average year (based on participation from 1997 through 2004) is 6.25 AF based on CUWCC's methodology. Assuming a 25 year life for a toilet, the lifetime savings is 156.36 AF and the cost per lifetime savings is $9.98 per AF.

4.3 Agricultural Conservation Programs

In conjunction with other agencies, RCWD has funded numerous programs with the goal of increasing conservation of water used in agriculture. Agricultural water use represented 36 percent of RCWD's total water use during fiscal year 2003-2004. The potential for water savings from conservation in the agricultural sector are great and reductions in agricultural water use may have a considerable impact on RCWD's total demand. RCWD's current efforts to save water in the agricultural sector include:

- Irrigation system evaluations.
- The PRISM Winegrape Irrigation Scheduling and Regulated Deficit Program.

- The development of an agricultural discount program that has yet to be funded and implemented.

Irrigation System Evaluations

RCWD, in conjunction with San Jacinto Basin Conservation District, conducts agricultural irrigation system evaluations under its Irrigation System Evaluation Program. This program began in 2003 and to date 32 evaluations have been completed. The goal of the program is to conduct 45 evaluations by 2006. Of the 32 evaluations performed average farm acreage ranges from 5 to 55 acres with an average of 12 acres. Per farm savings resulting from the evaluations ranges from . 23 AFY to .47 AFY with an average of .40 AFY. The 32 evaluations covered 384 acres and save approximately 154 AFY. Savings from this program result primarily from improvements in application uniformity and scheduling accuracy. The irrigation evaluation program has cost RCWD about $15,000 since 2003. The program expires in 2006, but with its success will likely continue.

PRISM Scheduling and Regulated Deficit Program

The Precision Irrigation Scheduling Method (PRISM) uses a high frequency radio wave emitting soil probe that collects soil moisture information that can be downloaded to a computer. Once downloaded, PRISM software can be employed to determine irrigation needs. Originally the (PRISM) Wine Grape program was funded by growers at $15 per week per site for a 30 week season. Twelve vineyards participated in the program. Crop losses suffered by farmers due to Pierce Disease prompted the United States Bureau of Reclamation (USBR) to invest in the program in 2000.

The program provided weekly soil moisture monitoring with a portable Time Domain Reflectometry (TDR) device and irrigation scheduling designed to prevent water stress in an environment with Pierce Disease. In 2001, 20 additional vineyards were added to the program and the program added a new component for computing site-specific crop coefficients. The California Department of Conservation provided matching funds to aid the expansion of services. In 2002 the program added weekly shoot length measurements in order to monitor growth rates. In 2003 RCWD provided funding for a new component to the program, the Vine Moisture Stress Component.

For the years 2003-2005 RCWD provided a total of $43,000 in funding to this program. Vine moisture stress or more commonly known as Regulated Deficit Irrigation, utilizes techniques that apply less water than the vine requires thereby causing mild stress. This technique reportedly results in improved wine quality and conservation of water and energy. Yields may be reduced but the wine grower may find this an acceptable tradeoff for improved wine quality. Savings data for the PRISM Wine Grape Irrigation Scheduling and Regulated Deficit Program are provided in Table 4-4.

Table 4-4
PRISM and Regulated Deficit Savings

2002	0.077	1,242	95.63
2003	0.444	1,213	538.40
2004	0.208	1,224	254.51
Total			**888.54**

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Section 5
Water Shortage Contingency Plan

5.1 Overview

In order to ensure a reliable water supply in a water shortage situation, RCWD developed a water shortage contingency plan in accordance with the Urban Water Management Planning Act. A water shortage situation may be brought on by drought conditions caused by hot and dry weather, or a failure of the water delivery system due to seismic activity or other catastrophic event. A large portion of the water RCWD sells to its customers is imported from the MWD via EMWD and WMWD. Therefore, as part of RCWD's Water Shortage Contingency Plan it is important to present MWD's plan in the case of a water shortage. The next section discusses MWD's Water Surplus and Drought Management Plan and EMWD and WMWD's Water Shortage Contingency Plans. Section 5.5 discusses RCWD's compliance with Water Code Section 10632.

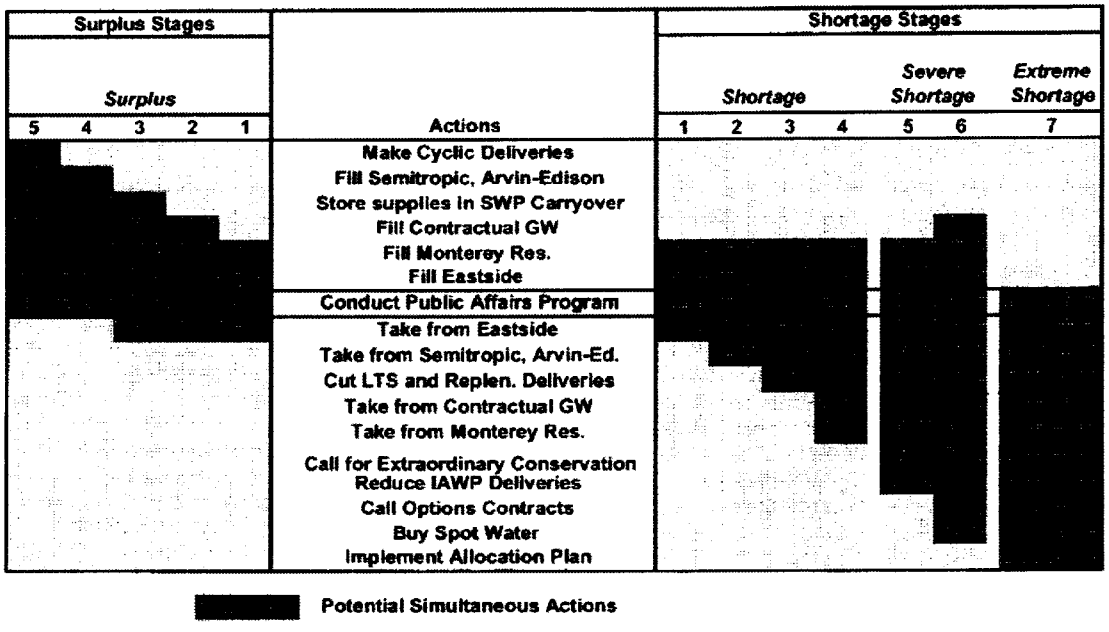
5.2 Metropolitan Water District of Southern California

RCWD receives MWD imported water deliveries from EMWD and WMWD. Both EMWD and WMWD are member agencies of MWD and therefore RCWD is subject to MWD policies during a water shortage. During fiscal year 2004 RCWD purchased 41,312 acre-feet of water from MWD, which represents 49.5 percent of total annual water production. Metropolitan Water District of Southern California's 1999 Water Surplus and Drought Management Plan (WSDM) provides a plan to provide 100 percent reliability of the agency's water service. Protocols are provided for times of water surplus and water shortage. MWD strategically manages water in times of surplus to ensure there is an adequate supply during a shortage. The WSDM plan defines surplus, shortage, severe shortage, and extreme shortage as follows:

> "**Surplus**: Supplies are sufficient to allow MWD to meet Full Service demands, make deliveries to all interruptible programs (replenishment, long-term seasonal storage, and agricultural deliveries), and deliver water to regional and local facilities for storage.
>
> **Shortage**: Supplies are sufficient to allow MWD to meet Full Service demands and make partial or full deliveries to interruptible programs, sometimes using stored water and voluntary water transfers.
>
> **Severe Shortage**: Supplies are insufficient and MWD is required to make withdrawals from storage, call on its water transfers, and possibly call for extraordinary drought conservation and reduce deliveries under the Interim Agriculture Water Program (IAWP).
>
> **Extreme Shortage**: Supplies are insufficient and MWD is required to allocate available imported supplies".

During shortages MWD will be able to meet municipal and industrial (M&I) demands with management of existing water supplies with no negative impact to the end user. Severe and extreme shortages will require MWDSC to implement the following shortage actions as stated in the WSDM:

- Draw on storage in the Diamond Valley Lake
- Draw on out-of-region storage in Semitropic and Arvin-Edison
- Reduce/suspend long-term seasonal and groundwater replenishment deliveries
- Draw on contractual groundwater storage programs in the region
- Draw on SWP terminal reservoir storage (per Monterey Agreement)
- Call for extraordinary drought conservation and public education
- Reduce IAWP (agricultural) deliveries
- Call on water transfer options contracts
- Purchase transfers on the spot market
- Allocation of MWD's firm imported supplies to its member agencies



Source: MWDSC WSDM Plan

Figure 5-1
MWD Stages and Action Matrix

CDM

Figure 5-1 illustrates MWD actions during times of surplus and shortage. If a severe shortage occurs IAWP deliveries will be reduced. In 2000, RCWD served approximately 1,300 Agriculture and Agriculture/Domestic accounts and delivered 33,857 AF of water to these customers; 49 percent of total deliveries. The action above calling for a reduction of IAWP will impact RCWD's agricultural customers in a severe shortage, as agricultural water deliveries are interruptible. The WSDM states:

> "**Reduce agricultural deliveries:** The IAWP offers interruptible water to southern California's agricultural industry at discounted rates. These supplies will be interrupted as part of MWD's shortage actions. MWD will work with IAWP participants to provide as much advance warning of interruption as possible. The IAWP reflects current policies toward agricultural water users. The policies underlying this program are due to be reviewed during the ten-year period of the WSDM Plan. The WSDM Plan will be changed accordingly".

According to MWD's IAWP Reduction Guidelines, MWD has the right to discontinue surplus water service in whole or in part with one year's written notice. After a purchaser is given a notice of discontinuation, MWD's CEO may reduce IAWP deliveries up to 30 percent prior to any urban water allocation action under the WSDM Plan.

The timing of potential IAWP reductions is important to note as Colorado River and State Water Project (SWP) supplies are determined annually. The initial supply allocation is estimated in December; however the SWP supply is uncertain and not final until May 1. Typically May 1 is when a notification would be made by MWDSC regarding a reduction in IAWP water deliveries, with actual reductions occurring 60 days later on July 1.

If MWD requires a utility to reduce IAWP water usage, water usage targets for the upcoming year are established based on water use during the previous year. Once this baseline water use target is established it will remain in place as long as the reduction is in effect, even if it goes beyond the fiscal year. Actual IAWP water consumption will be measured every six months. If an agency used less water than it was allotted it receives a credit that carries over into the next six month period. If the agency used more water than it was allotted via the established baseline then it is assigned a debit. If an agency uses more water than it is allotted they have to pay MWDSC's penalty rate for the amount of water over the established baseline.

5.3 Eastern Municipal Water District Water Shortage Contingency Plan

EMWD's Water Shortage Contingency Plan presents restrictions for residential, commercial, institutional, and industrial (CII), and agricultural sector customers during the four established water stages. Stage 1 is defined as having water deficiencies between 5 and 10 percent and restrictions are voluntary, Stage 2 is defined as water deficiencies from 10 to 25 percent, Stage 3 represents a deficiency of

25 to 50 percent, and in Stage 4 deficiencies are greater than 50 percent. During Stages 2-4 the restrictions set forth by EMWD are mandatory. During water shortages all of EMWD's customers are requested to adhere to restrictions. The Water Shortage Contingency Plan defines a customer as, "any person, company, agency, or organization using water supplied by EMWD." Therefore RCWD will be impacted by EMWD's water use restrictions in the event of a water shortage.

Restrictions pertaining for Stages 1-4 are below. The restrictions are voluntary for Stage 1 but are mandatory for Stages 2-4.

Residential water shortage contingency measures:

Stage 1:

1. "Do not hose down driveways or any other hard surfaces except for health or sanitary reasons.
2. Irrigate lawns and landscape only between midnight and 6:00 a.m. (unless hand watering). Adjust automatic timer clocks accordingly.
3. Adjust and operate all landscape irrigation systems in a manner that will maximize irrigation efficiency and avoid over watering or watering of hardscape and the resulting runoff.
4. Refrain from using decorative fountains unless they are equipped with a recycling system.
5. Where possible, install pool and spa covers to minimize water loss due to evaporation.
6. Do not allow hoses to run while washing vehicles. Use a bucket or a hose with an automatic shutoff valve".

Stage 2:

1. "No replacement water will be provided for ponds, lakes, etc".

Stage 3:

1. "Water used on a one-time basis for purposes such as construction and dust control shall be limited to that quantity identified in a plan submitted by the user describing water use requirements. The plan shall be submitted to the District for approval.
2. The use of water from fire hydrants shall be limited to activities necessary to maintain the public health safety and welfare.

3. Water for municipal purposes shall be limited to activities necessary to maintain the public, health, safety, and welfare.

4. Outdoor irrigation by sprinklers will only be allowed on even-numbered days of the month for those locations with a street address ending in an even last digit. Outdoor irrigation of locations not having a street address shall irrigate on even-numbered days of the month.

5. Outdoor irrigation by sprinklers will only be allowed on odd-numbered days of the month for those locations with a street address in an odd last digit.

6. Washing of autos, trucks, trailers, motor homes, boats, airplanes, or other types of mobile equipment is prohibited. However, such washings are exempted from these regulations for municipalities or commercial entities where the health, safety and welfare of the public is contingent upon frequent vehicle cleaning such as garbage trucks or vehicles used to transport food and perishables".

Stage 4:

1. "Irrigation of landscaping is only allowed twice per week with hand-held hose only.

2. No replacement water provided for pools and spas until such time as Stage 4 restrictions are deemed no longer in effect.

3. No one shall cause the emptying or refilling of existing pools or spas for cleaning purposes. Current water levels will be maintained.

4. All new landscaping shall be limited to drought-tolerant plantings as determined by the District.

5. No new lawn/turf, whether by seed or sod, shall be permitted.

6. No person or entity shall be required to implement any new landscaping requirements of any association, developer, or governing agency until the termination of Stage 4.

7. Use of water by all types of commercial car washes shall be reduced in volume by 50 percent".

CII water shortage contingency measures:

Stage 1:

1. "Reference evapotranspiration (ET) factors for individually metered landscape projects will be reduced from 1.0 (100 percent of ET) to 0.8 (80 percent of ET)".

Stage 2: No additional measure, however Stage 1 becomes mandatory.

Stage 3:

1. "Landscape meters to 75 percent of ET.

Stage 4:

1. Landscape meters to 60 percent of ET.

Agricultural water shortage measures:

Stage 4:

1. Based on interruptible agriculture (sic) water from MWDSC, field and row crops may be discontinued".

Note there are no agricultural water use restrictions for Stages 1-3.

5.4 Western Municipal Water District Water Shortage Contingency Plan

During a water shortage WMWD will adopt an Ordinance that restricts water usage and penalizes excess usage. Prohibitions of water use that may be imposed by WMWD include street/sidewalk cleaning, washing cars, lawn/landscape watering, non-permanent agriculture, uncorrected plumbing leaks, gutter flooding, and restrictions on construction use. According to the WMWD's Water Shortage Contingency Plan, the stages when these prohibitions become mandatory may vary. Unlike EMWD's plan which has specific measures to be taken during each of its four stages. The measures WMWD takes during a water shortage will apply to all retail and wholesale customers.

WMWD has prepared actions to be taken should a catastrophic event occur. Possible catastrophes it is prepared for include: regional power outage, earthquake, extreme weather, terrorism/sabotage, water borne diseases, and system failure.

In February 2005 WMWD was required to enact Ordinance 358 due to a five day shutdown of a MWDSC treatment plant. The Ordinance prohibited use of potable water for non-essential indoor and outdoor water use. More specifically irrigation;

hosing down sidewalks, driveways, patios, etc.; washing cars; and certain construction uses were prohibited.

WMWD's Water Shortage Contingency Plan states that it may stop wholesale water sales during a water shortage emergency period, which will have a direct impact on RCWD supplies.

5.5 RCWD Water Shortage Contingency Plan

As required by the Urban Water Management Plan Act, RCWD has developed a water shortage contingency plan so that it may provide a reliable supply of water to its customers in the event of a water shortage situation (see Appendix B). Below sections 10632 (a) through (i) are discussed.

5.5.1 Water Code Section 10632 (a)

The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

Currently RCWD has a resolution that establishes water conservation guidelines based on the availability of supply. There are four stages of action and each stage has a set of conservation measures. Water code section 10632 of the Urban Water Management Plan Act requires a shortage situation of 50 percent reduction in water supply to be addressed. Presented below are four water stages and the actions that are taken for each stage. Stage IV, water emergency, will provide adequate conservation during a water shortage of up to a 50 percent reduction in water supply and is discussed below.

Stage I - Normal Condition (The District is able to meet the water demands of its customers in the immediate future).

1. When the General Manager has declared that the District's water supply is in a "Normal Condition"customers are requested to use water wisely and to practice water conservation measures so that water is not wasted.

2. Customers are to avoid use of water in a manner that creates runoff or drainage onto adjacent properties or onto public or private roadways.

3. Water waste is a violation of California Law and District Regulations at any time.

Stage II - Water Alert (There is a probability that the District will not be able to meet all of the water demands of its customers).

1. Parks, school grounds, and golf courses are to be watered at night only.

2. Lawns and landscaping are to be watered after 6:00 p.m. and before 6 a.m.

3. Driveways, parking lots and other paved surfaces are not to be washed with water.

4. Private vehicles are to be washed with a bucket; hoses must have positive shut off nozzles.

5. Commercial car washes must recycle water.

6. Restaurant customers are to receive water only upon request.

7. A limited number of fire hydrant construction meters will be issued by the District. Applicant must present current, valid grading or building permit.

8. Livestock or animals may be watered at any time.

9. Decorative ponds, golf course water hazards which are not an integral part of the permanent irrigation or fire protection system, fountains and other waterscape features are not to be filled. Fountain pumps must remain off to minimize evaporation.

Stage III - Water Warning (The District is not able to meet all of the water demands of its customers).

1. Parks are to be watered at night no more than two times per week.

2. School grounds are to be watered at night no more than two times per week.

3. Golf courses, greens and tees only, are to be watered at night. Fairways may be watered on alternate days at night.

4. Lawns and landscaping are to be watered no more than two times per week after 6:00 p.m. and before 6:00 a.m.

5. Restaurant customers are to receive water only upon request using disposable cups.

6. Driveways, parking lots, or other paved surfaces are not to be washed with water.

7. Swimming pools are not to be filled.

8. Commercial car washes must recycle water.

9. New fire hydrant construction meters will not be issued by the District.

10. Water service through fire hydrant construction meters for grading or other constructions is to be used after 5:00 p.m. and before 10:00 a.m.

11. Agricultural customers are to use water on alternate days only.

12. Commercial nurseries are to use water only on alternate days between 6:00 p.m. and 6:00 a.m.

13. Livestock or animals may be watered at any time.

Stage IV – Water Emergency (A major deficiency of any supply or failure of a distribution facility is declared).

1. Lawns and landscaping are not to be watered.

2. Parks, school grounds and golf course fairways are to be watered with reclaimed water, if available, or not at all. Golf course greens and tees may be watered only on alternate nights.

3. Driveways, parking lots, or other paved surfaces are not to be washed.

4. Commercial car washes using recycled or reclaimed water are to be used for washing vehicles. Consumption of District water for this use must be reduced to 50 percent of average consumption for the year.

5. Restaurant customers are to receive water only upon request, using disposable cups.

6. Swimming pools are not to be filled.

7. New fire hydrant construction meters will not be issued by the District.

8. Water service through fire hydrant construction meters will not be available by the District.

9. Permanent orchard crop irrigation is to be limited to no more that two times per week. In the event of a temporary service outage, agricultural irrigation is to be discontinued.

10. Other agricultural and commercial nursery irrigation is to be discontinued.

11. Livestock or animals may be watered at any time.

The conservation actions listed under Stage IV- Water Emergency primarily target outdoor water use. The only indoor water use that is restricted is in regard to restaurant customers receiving water only upon request. The savings from this are likely insignificant, but help promote public awareness of the crisis. The other measures virtually eliminate outdoor water use with exception to watering livestock

and animals, minimal orchard crop irrigation, and golf course greens and tees on alternate nights. Other uses such as commercial car washes and parks, school, and golf course fairway watering are to use reclaimed water.

The sectors using the most water during fiscal year 2003-2004 were domestic (including Ag/Domestic) and the agricultural sector with 41 percent and 36 percent of total water use respectively, for a combined total of 77 percent. An analysis of RCWD billing data suggests that outdoor water use accounts for 51 percent of all total use in the domestic sector. In a severe water shortage, a complete restriction of outdoor domestic water use could potentially reduce total District water use by 22 percent.

Making the gross assumption that livestock and animal watering and the minimal orchard irrigation permitted make up 20 percent of total agricultural water use, the restrictions during a water emergency can reduce agricultural water use by 80 percent and total District water use by 29 percent.

The impacts of Stage IV would reduce total water use by an estimated 51 percent in the domestic and agricultural sectors alone. The Stage IV restrictions would create savings in the sectors that make up the remaining 33 percent of total water use as well. Golf, construction, commercial, landscape, multiple dwelling, and schools and government would all realize reductions in water use under restrictions of Stage IV water emergency. In the event of a 50 percent water shortage RCWD's Drought Ordinance Stage IV will provide the appropriate measures to save water.

5.5.2 Water Code Section 10632 (b)

An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

If conditions during the three years following 2005 are equal to the driest three-year historic sequence for RCWD's water supply, RCWD would have to take measures to meet water demand within its service area. Most likely RCWD will increasingly rely on MWDSC for imported water. The results of a simulation using the three driest historic years are presented below in Table 5-1.

Table 5-1
Driest Three-year Water Supply Sequence

Supply & Demand (Acre-Feet)	Current Conditions	Followed by Driest Three Consecutive Years (1988-1990)		
	2005	2006	2007	2008
Treated Imported Water	31,084	34,761	40,226	32,777
Groundwater	38,130	38,931	39,636	39,378
Reclaimed Water	6,044	6,093	6,161	6,068
Demand	75,258	79,786	86,023	83,634
M&I Deficit	0	0	0	0
Ag Deficit	0	0	0	5,411