

Moulton Niguel Water District

**Urban Water Management Plan
Revised Update 2005**

January 2007

Job No. 2005.002

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1.0 INTRODUCTION

1.1 Urban Water Management Planning Act

This report has been prepared in response to Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act), which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. This Act, which was adopted by the legislature through Assembly Bill (AB) Number 797, requires that "every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually prepare and adopt, in accordance with prescribed requirements, an urban water management plan." The Act requires urban water suppliers to prepare plans that describe and evaluate reasonable and practical efficient water uses, recycling, and conservation activities. These plans must be filed with the California Department of Water Resources (DWR) every five years. Urban water management plans are due to DWR by December 31, 2005.

Since its passage in 1983, several amendments have been added to the Act, the most recent coming in 2004. Some of the amendments provided for additional emphasis on metering, drought contingency planning, and water recycling. Also, new since 2000 is AB 901, which provides new requirements for addressing water quality. Specifically, Urban Water Management Plans must now include information relating to:

- The quality of existing sources over the 20-year planning horizon; and
- The manner in which water quality affects water management strategies and supply.

1.1.1 Senate Bills 610 and 221 of 2001

In 2001, the state legislature passed two bills that amended state law to require that counties and cities should consider information relating to the availability of water to supply certain new large proposed development. This information is required to be included in the administrative record of the approval process for such development projects. SB 610 requires the information to be provided to local governments for inclusion into environmental documents for projects that are subject to the California Environmental Quality Act (CEQA). SB 221 requires that city or county approval of certain residential subdivisions must include written verification that sufficient water supply is available to serve that subdivision. Both of these statutes identify the adopted local Urban Water Management Plan (UWMP) as an important source document to be used to fulfill these requirements. The UWMP is also identified as an important source to be considered when local agencies are updating their General Plans.

Under this legislation, the cities and counties that are considering a proposed development application must ask the local water agencies to present the required water supply information. The water agency must provide the information within 90 days of the request. The information required is outlined below.

1.1.2 Requirements of SB 610

This legislation requires that cities and counties address in environmental documentation for an applicable development project (refer to Section 1.1.3 SB 221 requirements) the sufficiency of the projected water supply. Specifically, SB 610 requires that applicable projects subject to CEQA and supplied with water from a public water system receive a “water supply assessment” from the water service provider on the adequacy of available supplies over a 20-year projection. SB 610 also makes changes to the Act to:

- Require additional information if groundwater is identified as a source, including a copy of any groundwater management plan, a copy of the adjudication order or decree for adjudicated basins, and if non-adjudicated, whether the basin has been identified as overdrafted; and
- Require a description of specific water supply projects and implementation schedules to meet projected demands over the 20-year planning horizon.
- The new requirements for water supply assessments (under Water Code §§ 10910-10915) allow compliance by incorporating by reference information from the most recent UWMP, provided the project’s water demand was included in that plan.

The water supply assessment must consider supplies under three hydrologic conditions: normal, single-dry and multiple dry years. The information considered must include water received in prior years from existing water supply entitlements or service contracts. In addition to the reporting of these data, supporting documentation should be provided, including written contracts, a water agency program to finance the planned deliveries, any permits required for delivery infrastructure and regulatory approval for diversion or conveyance of water. Where the water agency identifies a new source of water, other agencies that also have rights to the same

source of water should be identified. Where the sources of water include groundwater, additional information about the groundwater source must be included, as follows:

- A description of the groundwater basin, including:
 - for adjudicated basins a copy of the order or decree and a description of the amount of water that can be legally withdrawn from the basin.
 - for non-adjudicated basins, information must be provided as to whether the basin is overdrafted or projected to be overdrafted in the most current DWR bulletin and a detailed description of the responsible party's efforts to eliminate the long-term overdraft condition.
- A detailed description and analysis of the amount and location of groundwater pumped by water supplier for the past five years from any groundwater basin from which the proposed project will be supplied.
- A detailed description and analysis of the amount and location of groundwater that is projected to be withdrawn from the basin.
- An analysis of the sufficiency of the groundwater to meet the projected water demand associated with the proposed project.

Where current water sources are not sufficient, the water agency must provide its plans for acquiring additional water supplies. Suggested components that could be included in the plans are cost estimates, a description of permits required, and estimated time frames to supply acquisition.

1.1.3 Requirements of SB 221

This legislation prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project over a 20-year projection. This requirement also applies to increases of 10 percent or more of service connections for public water systems with less than 500 service connections. The written verification must include the following information:

- Historical record for at least 20 years;
- Urban Water Shortage Contingency Analysis;
- Supply reduction for "specific water use sector" during times of shortage; and
- Amount of water that can be reasonably relied upon from specified supply projects.

These requirements for written verifications (under Gov. Code § 66473.7) do not directly affect the requirements under the Act. However, the written verification must be based on substantial evidence, and SB 221 expressly provides that substantial evidence may include the most recent UWMP. Therefore, a water supplier may include the requirements under SB 221 in its UWMP as a means of satisfying the substantial evidence requirement.

1.1.4 Summary of Changes in the Act Since 2000

As a result of the above legislation and some additional legislative changes, the following are changes in the Act that have occurred from 2000 to the present:

- New legislative findings concerning water quality (Water Code § 10610.2, subs. (a)(4) – (a)(9), (b));
- A new requirement to describe water management tools that maximize local resources and minimize imported water supplies (§ 10620, subd. (f));
- A new requirement to notify all cities and counties within the service area that a plan or plan amendment is being prepared (§ 10620, subd. (b));
- A new requirement for additional information on groundwater where groundwater is identified as an existing or planned water source (§ 10631, subd. (b));
- Revised listing of water demand management measures to be described (CUWCC members may still elect to submit their conservation annual reports to meet this requirement) (§ 10631, subd. (f)(1));
- A new requirement to describe specific water supply projects and implementation schedules to meet projected demands over the 20-year planning horizon (§ 10631, subd. (h));
- A new requirement for data sharing between contracting water suppliers (i.e., wholesale, intermediate, and retail agencies) and a provision allowing suppliers to rely on information provided by a wholesale agency (§ 10631, subd. (j));
- A new provision allowing DWR to consider a water supplier's achievements and implementation plans for water conservation when evaluating applications for grants and loans (§ 10631.5);
- A new requirement to describe quantities of recycled water (§ 10633, subs. (b), (g));
- A new requirement to describe water quality over the 20-year planning horizon (§ 10634);
- A new requirement to notify all cities and counties within the service area of the time and place of the public hearing on plan adoption (§ 10642);
- A new requirement to file the plan or plan amendment with all cities and counties within the service area (§ 10644, subd. (a));
- For a water supplier that does not comply with the Act, a new requirement that DWR make that supplier ineligible to receive Prop 204 or Prop 13 funding (§ 10656); and
- A new provision allowing DWR to consider a water supplier's compliance with the plan requirements in determining the eligibility of receiving any funds from DWR-administered programs (§ 10657).

1.2 Coordination with Other Agencies

Recognizing that close coordination among other relevant public agencies is the key to the success of its UWMP, Moulton Niguel Water District (MNWD or the District) worked closely with other entities to develop and update this planning document. Table 1 documents the name of the agencies with which MNWD coordinated information for developing its UWMP.

Table 1 Coordination with Appropriate Agencies						
Agency	Participate developing plan	Comment on the draft	Attend public meetings	Contact for assist.	Sent a copy of the draft plan	Sent a notice of intention to adopt
City of Laguna Niguel	X	X		X	X	X
City of Laguna Hills	X	X		X	X	X
City of Mission Viejo				X	X	X
City of Dana Point	X	X		X	X	X
City of Aliso Viejo					X	X
County of Orange					X	X
MWDOC	X	X		X	X	X
SOCWA				X	X	X

General Plans of the Cities of Laguna Hills, Laguna Niguel, Mission Viejo, Aliso Viejo and Dana Point, within the MNWD service area is the source document for the District in its assessment of its water resource needs. UWMP also should serve as a source document for the cities as they prepare their General Plans. General Plan and UWMP may be linked, as their accuracy and usefulness are interdependent.

To meet the requirement set forth by Water Code section 10631 (k), the District notified MWDOC of the amount of water it wishes to purchase over the next 25 years.

Wastewater collection and treatment providers and other water agencies within South Orange County Wastewater Agency (SOCWA) service area were contacted for data on recycled water and associated projects.

1.2.1 Public Community Involvement

According to California Water Code Section 10642, “each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.” The two regional water agencies serving water to MNWD, Metropolitan Water Districts of Southern California (MWD) and Municipal Water Districts of Orange County (MWDOC), have conducted several public information meetings soliciting involvement of the local communities in the development of those plans.

MNWD has notified the cities in its service area about the update of the UWMP and requested information regarding any modifications in planning since the District’s 2000 Urban Water Management Plan. The MNWD Board of Directors adopted this Plan after a public hearing during the regularly scheduled public Board meeting held on December 15, 2005.

1.2.2 Department of Water Resource Role and Guidance

DWR staff reviews and determines the completeness of individual UWMPs pursuant to the Act. Agencies subject to the Act must have adopted a complete UWMP that meets the requirements of the law and submit it to DWR to be eligible for drought assistance or to receive funds through the Department. Results of the DWR review are provided to urban water suppliers through written correspondence. If necessary, water agencies with plans that do not meet DWR standards may wish to use the comments within the review letter to revise their UWMP for re-submittal. DWR provides a Legislative Report to the California Legislature one year after UWMPs are due, detailing the status and any outstanding elements of the UWMPs. DWR also prepares reports and provides data for any legislative hearings held to consider the effectiveness and/or completeness of the UWMPs in question.

DWR provides technical assistance to urban water suppliers to help them meet the requirements of the Act. DWR has provided guidance materials to aid water suppliers in developing year 2005 UWMPs. These materials are intended both to help water districts comply with the law and to help DWR staff review submitted plans for regulatory compliance. Guidance materials consist of a series of worksheets and check lists detailing acceptable responses to the requirements set forth in the Act. The District has used the guidance material in the development of this Plan.

1.2.3 Organization of this Plan

This document is divided into nine (9) sections.

1. Section 1 - The introduction, which explains the purpose of this Plan and the development of the Plan.

2. Section 2 - The District as an agency and its service area. This section addresses current and projected water supplies available to the District, and reliability of water supplies
3. Section 3 - Determination of Water Demand Management (DMM) implementation
4. Section 4 - Discusses the water shortage contingency plan.
5. Section 5 - Recycled Water Plan: Describes the wastewater management and water recycling in the District service area.
6. Section 6 - Describes the water quality issues that exist in the District service area and addresses their impact on the reliability of providing water service.
7. Section 7 - Water Service Reliability: Discusses reliability of water service to cities costumers and compares demand to supplies for normal, single-dry, and multiple-dry year scenarios.
8. Section 8 - Illustrates the adoption and implementation of the Plan.
9. Section 9 - Appendix

1.3 Resource Maximization/Import Minimization Plan

The District is committed to identifying ways of maximizing the area's existing water resources.

1.3.1 Integrated Regional Water Management Plan

In an effort to minimize its dependency on imported supplies, the District has taken a proactive stance and participated in the Integrated Regional Water Management Planning along with MWDOC and other Orange County water agencies.

Recognizing the sustainable future of the MWDOC service area depends upon the successful management of local and imported water supplies, MWDOC has been working with the County of Orange (lead) and the 24 cities and special districts serving the water and wastewater needs of south Orange County over the years to develop and integrate regional strategies that address, raise community awareness and coordinate numerous and varied projects that:

- Protect communities from drought
- Enhance local water supply and system reliability
- Ensure continued water security
- Optimize watershed and coastal resources
- Improve water quality throughout the watersheds

In addition, these projects, which are based on a watershed approach, include one or more of the following water management elements:

- Programs for water supply reliability, water conservation and water use efficiency
- Storm water capture, storage, treatment and management
- Removal of invasive non-native plants
- Creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands
- Groundwater recharge and management projects
- Water banking, water exchange, water reclamation, desalting, and other treatment technologies
- Planning and implementation of multipurpose flood control programs that protect property; improve water quality, storm water capture and percolation; and protect or improve wildlife habitat
- Watershed management planning and implementation
- Demonstration projects to develop new drinking water treatment and distribution methods.

In August 2004, this diverse group came together as a single unit to create stronger regional partnerships and connectivity, to maximize the efficiency of their efforts, and to identify funding opportunities and apply for competitive grants.

Specifically, the South Orange County Integrated Regional Water Management (**IRWM**) Group provides a framework for coordinating planning activities and projects related to water management and watershed protection that have been studied and funded, or are in need of funding, and integrating them into a water management plan with multiple regional benefits.

To date nearly 100 short- and long-term projects have been identified and prioritized based on the overall benefit they provide the south county region and their readiness for implementation.

The District has instituted various water conservation plans over the past decade in an effort to decrease present and future imported water demands. The District is a member of California Urban Water Conservation Council (**CUWCC**). As such the District has diligently pursued implementation of Best Management Practices (**BMPs**) and has filed BMP Activity Reports; copy of the 2003-2004 Report is included in the Appendix C.

2.0 SERVICE AREA INFORMATION

2.1 Background

MNWD is located within the southern portion of the County of Orange and provides water and sewer service to over 167,000 customers. The District is almost entirely developed and encompasses almost all of the Cities of Aliso Viejo, Laguna Niguel, Laguna Hills, Mission Viejo, and portions of the City of Dana Point.

MNWD was formed in November 1960 under provisions of California Water District Law, Division 13 of the Water Code of the State of California, commencing with Section 34000. The District is governed by a publicly elected Board of Directors.

The District adopted its most recent UWMP, in accordance with Section 10610 et seq. of the California Water Code, in December 2000.

2.1.1 History

To promote orderly development, and in accordance with Chapter 5, Section 36450 of the California Water Code, the Board of Directors of the District formed a total of nine (9) improvement districts (I.D.) for both water and sewer purposes. The improvement districts were formed to allow assessments for Plan of Works projects in those defined areas. General Obligation Bonds are sold that will benefit only the landowners within a specific improvement district. Bond funds are used to build local water storage and distribution facilities, and sewage collection and treatment plants which the District approved in its Plan of Works. Facilities that serve individual tract are paid for by developers and dedicated to the District for operation and maintenance.

2.1.2 Location

The District is situated in Orange County, approximately 60 miles south of Los Angeles and provides domestic and non-domestic water service to residential, commercial and industrial customers within the cities of Mission Viejo, Aliso Viejo, Laguna Niguel, Laguna Hills and Dana Point.

2.1.3 Location and Topography

MNWD ranges in elevation between 230 feet above sea level at its lowest point to 904 feet at its highest. In general, elevations increase from west to east, with the higher elevations located on the east side. The District is bordered by Irvine Ranch Water District (**IRWD**) and El Toro Water District (**ETWD**) to the north, South Coast Water District (**SCWD**) to the south, and Santa Margarita Water District (**SMWD**) to the south and east.

2.1.4 Land Use

There are four major land uses in the District: (1) residential (single-family and multiple-family); (2) commercial (retail and light industrial); (3) schools; and (4) parks. Table 16 shows the various types of land uses in the district at build-out. Residential development, primarily single family, is the predominant use throughout the District. The highest concentration of commercial use is in I.D. No. 3, which includes the Mission Viejo Mall. The highest concentration of schools (students) is also in I.D. No. 3, which includes Mission Viejo High School, Capistrano Valley High School, and Saddleback Community College. Table 16 also shows the totals for the various types of existing land uses in September 1999, currently, and in the projected future.

Since the District is essentially built-out, any anticipated changes in land use would be through redevelopment of existing land uses. In the process of updating the UWMP, each of the cities located within the MNWD boundary were contacted and provided information on future planned areas of redevelopment. The cities of Dana Point, Laguna Hills, and Laguna Niguel responded that they have not had significant land use planning changes since the last UWMP.

2.2 Current and Projected Population

The population of the District's water service area has increased from 160,832 in 2000 to 167,000 in 2005, a 3.8 % increase. The projected population increases are the assumed "in-filling" following development completion that was used in the water demand projections modeled by the Municipal Water Districts of Orange County (MWDOC).

Table 2						
Population - Current and Projected						
	2005	2010	2015	2020	2025	2030
Service Area Population	165,700	167,600	169,300	170,900	172,600	174,400

2.3 Climate and Rainfall

The District service area enjoys a Mediterranean climate with an average annual rainfall of about 13 inches. Temperatures vary from a mean of 54°F in the winter to a mean of 67°F in the summer. **National Oceanographic and Atmospheric Administration (NOAA)** does not provide historical climate data for the service area of MNWD but it does provide it for Tustin-Irvine Ranch, California (049087) which is in close proximity and very similar to MNWD Service Area as far as climate and rainfall is concerned. Therefore, the data for Tustin- Irvine Ranch, California (049087) is utilized. **Table 3** below shows climate data for MNWD service area.

Table 3						
Climate						
	January	February	March	April	May	June
Average Eto (in.)	2.18	2.49	3.67	4.71	5.18	5.87
Average Rainfall (in.)	2.53	2.73	2.21	1.01	0.26	0.07
Average Max. Temp.	67.0	68.1	69.4	72.9	75.2	79.0
Average Min. Temp.	40.5	42.4	44.3	47.7	52.2	55.8

Table 3 (continued)							
Climate							
	July	August	Sept.	October	Nov.	Dec.	Annual
Average Eto (in.)	6.29	6.17	4.57	3.66	2.59	2.25	49.63
Average Rainfall (in.)	0.01	0.08	0.27	0.36	1.32	2.25	12.82
Average Max. Temp.	84.0	85.5	84.7	79.7	73.9	68.2	75.6
Average Min. Temp.	59.2	59.5	57.0	51.9	44.4	40.7	49.6

** Period of Record: 12/1/1927 to 6/30/2003*

2.4 Water Supplies

This section addresses current and projected water supplies available to MNWD. The District has a modern water system, which dates back to 1960. Imported water from MWD through MWDOC is the major source of water supply to the District. The water system provides reliable water service to over 165,000 residents within its service area. The system currently has 10 connections to the Joint Regional Water Supply System (**JRWSS**) and three connections to the Allen-McCulloch (**AMP**) pipeline that are the sources of the District’s imported water supply, 31 water storage reservoirs, 29 pumping stations, and 700 miles of domestic water pipelines.

2.4.1 Imported Water

The District is a member agency of the MWDOC. MWDOC is a member agency of the MWD and as such is entitled to receive water from available MWD sources. This, in turn, entitles the District to receive water from available MWD sources.

On September 11, 1961, the District entered into number of agreements with IRWD, MWDOC and other parties for acquisition of 45 cfs capacity rights in the East Orange County Feeder No. 2 (EOCF No. 2) owned and operated by MWD. EOCF No. 2 delivers water to the JRWSS, and is jointly owned by MNWD, IRWD, the City of San Juan Capistrano, and the City of San Clemente.

In 1985, the District de-annexed Improvement District No. 10 (located on the northwest side of El Toro Road) to ETWD. The District transferred 2 cfs of its JRWSS capacity to ETWD with the de-annexation, leaving the District with 43 cfs of capacity.

On March 30, 1978, the District acquired 30 cubic feet per second (cfs) of water capacity in the AMP, a major water supply line constructed by the MWDOC from the Robert B. Diemer Filtration Plant located in Yorba Linda to a terminus in the northern section of Mission Viejo. Originally, the capacity as well as the ownership of the AMP was based on theoretical calculations. In 1988, the actual capacity of the AMP was measured to be significantly higher than the theoretical capacity. This surplus capacity became known as the “splatter capacity” and was allocated to the AMP participants based on capacity ownership. The District received an additional 5.1 cfs, giving it a total of 35.1 cfs of capacity in the AMP. In 1994, MWD purchased the AMP from MWDOC and now operates the AMP. The AMP terminates in the northeast section of Mission Viejo and conveys water primarily to Mission Viejo and Laguna Hills.

The District also has entitlements and/or written contracts with MWDOC to receive imported (potable) water from MWD via the regional distribution system located in Orange County, components of which are described below. Although pipeline capacity rights do not guarantee the availability of water, per se, they do guarantee the ability to convey water when it is available to the District’s distribution system and, therefore, operate in tandem with water entitlements and/or contracts to receive supplemental water for purposes of demonstrating not only water supply reliability, but also physical delivery system reliability. All imported water supplies assumed in this document are available to the District from existing infrastructure facilities.

Allen-McColloch Pipeline

The AMP is the supplemental source of domestic water in which the District owns specified capacity rights for the delivery of water. MWD owns and operates the AMP. The District’s AMP capacity ownership, expressed as rate of flow, is **35.1 cubic feet per second (cfs) or 25,412 acre-feet per year.**

Table 4 below shows imported and recycled water supply sources of the District.

Table 4				
Imported and Recycled Water Supply Sources				
Source	Connection Designation	Total Feeder Capacity	Allocated Capacity	Capacity of Connection
<i>MWD-MWDOC</i>		CFS		CFS
East Orange County Feeder No. 2	Northerly	43.0¹		20.0
	Southerly			20.0
	NAR			10.0
	Paseo de Valle			10.0
	Del Avion			5.0
	Aliso Hills			2.0
	Paseo de Valencia			4.6
	LaPaz Underground			10.0
	Oso			6.2
	CC-3			6.0
Allen-McColloch Pipeline	ST-10	35.1¹		10.0
	ST-11			10.0
	ST-13			10.0
Total Imported Capacity	*78.1 (56,544 AF/Yr)			
<i>Recycled Water Supplies(Local)</i>				CFS
Plant 3A				3.70
SCWD-CTP				2.20
SOCWA-JRTP				17.70
Total Recycled Water Capacity				23.60

¹ For determining the total capacity, either the total feeder capacity or the connection capacity, whichever is less, were utilized.

CFS = Cubic-Feet per Second

GPM = Gallons per Minute

AF/Yr = Acre-feet per year

The Agreement for Sale and Purchase of Allen-McColloch Pipeline (Metropolitan Agreement No. 4623) among MWD, MWDOC, MWDOC Water Facilities Corporation and certain other identified participants, including the District, dated July 1, 1994 (**AMP Sale Agreement**) requires MWD, among other things, to meet the District’s requests for water deliveries (subject to the availability of water from MWD). The AMP Sale Agreement further requires MWD to augment/increase capacity necessary to meet the District’s projected ultimate service area water demands, which includes the Project and other undeveloped lands within the District.

Furthermore the enumerated capacity is the nominal peaking capacity that can be exceeded subject to certain peaking penalties.

East Orange County Feeder No. 2

The EOCF No. 2 is a pipeline jointly owned by several local agencies and MWD. The District has **43.0 cfs, or 31,132 acre-feet per year**, of capacity rights in the EOCF No. 2 pursuant to an agreement between MWDOC and the District, dated September 11, 1961.

The District has a number of service connection agreements with MWDOC whereby MWDOC will deliver water to the District as it receives water from MWD in the amount requested by the District, subject to MWD water availability.

2.4.2 Recycled Water

MNWD has produced recycled water for onsite treatment plant and landscape irrigation use for many years from its water recycling plants. **Table 5** shows historical recycled water production records below:

Table 5 Historical Recycled Water Production – AF			
Calendar Year	Treatment Plant Use	Landscape Use	Total Usage
1996	Not measured	1,287	1,287
1997		2,860	2,860
1998		3,200	3,200
1999		5,378	5,378
2000		5,826	5,826
2001		5,230	5,230
2002		7,255	7,255
2003		6,420	6,420
2004		7,417	7,417

2.4.3 Groundwater

Groundwater sources are currently unavailable to the MNWD due to underlying geology. However, the District has some water rights in the San Juan Groundwater Basin (the Basin).

Water Bearing Formations

The primary water-bearing unit within the Basin is quaternary alluvium. This alluvium ranges from a heterogeneous mixture of sand, silt, and gravel in the eastern portion of the basin, to coarse sand near the center, to fine-grained lagoonal sediments in the western portion of the basin. Thickness of the alluvium average about 65 feet and may reach more than 125 feet. Specific yield of the alluvium is estimated to average about 13 percent and range from 3 to 22

percent. Wells typically yield from 450 to 1,000 GPM. Sand layers of the Tertiary Santiago Formation may be water bearing within the region and beneath the Basin, and minor amounts of water are extracted from fractured basement rock beneath the Basin.

Restrictive Structures

At the confluence of San Juan Creek and Canada Chiquita, near the middle portion of the Basin, the Cristianitos fault forms a barrier to subsurface outflow. Forester, Mission Viejo and Aliso faults are not known to form barriers to groundwater flow, but they are mapped as crossing the Basin.

Recharge Areas

Recharge of the Basin is from flow in San Juan Creek, Oso Creek, and Arroyo Trabuco and precipitation to the valley floor. Water from springs flows directly from Hot Spring Canyon into San Juan Creek, adding to recharge.

Groundwater Level Trends

Groundwater levels in 1987 were similar to water levels in 1952. Hydrographs show seasonal cycles with average declines related to drought cycles that recover during more plentiful seasons. Groundwater flows southwest toward the Pacific Ocean.

Groundwater Storage Capacity

The total storage capacity has been estimated to be 90,000 AF.

Groundwater Budget

A study by NBS Lowry (1994) investigated and modeled the Basin for 1979 through 1990. They determined a mean pump extraction capacity of 5,621 AF/Yr and a mean subsurface inflow of 2,246 AF/Yr. Average subsurface outflow to the ocean is estimated to be about 450 AF/Yr.

San Juan Basin Authority (**SJBA**) approved the San Juan Basin Groundwater Management and Facility Plan (**GMFP**) in 1995. (A copy of which is available at the District offices). GMFP represents the first step in the implementation of the SJBA mission to develop and maintain a reliable, good quality and economical local water supply for the residents in the Basin by maximizing use of local ground and surface water, the San Juan Creek and its tributaries, with due consideration for the preservation and enhancement of the environment, including, but not limited to, natural resources, fish and wildlife, infrastructure improvements and the cultural heritage of the area. Additional studies, such as the Preliminary Well Design and Site Selection Report, prepared in June 2001 by Geotechnical Consultants, Inc., confirm the findings in the SJBA Groundwater Management and Facility Plan.

Groundwater Historical and Projected Extraction

Up until 2004, there has been limited amount of extraction of supply from this Basin. **Table 6** shows groundwater produced of the Basin from 2000 to 2004.

Table 6						
Historical Groundwater Production in San Juan Basin						
	2000	2001	2002	2003	2004	2005
AF/Year	1,396	1,120	568	924	1,340	2,304

In 2000, the California State Water Resources Control Board granted water rights permit of 8,026 AF/Yr to SJBA for diversion and use from the Basin. Of this, 1,353 AF/Yr is allocated to MNWD. The permit also allows additional 2,676 AF/Yr in the future depending on certain conditions enumerated in the permit. 1,804 AF/Yr of this future right is also allocated to MNWD. SJBA completed the Phase I of San Juan Basin Desalter Project, also referred as San Juan Groundwater Recovery Project (**GWRP**), a reverse osmosis filtration/treatment facility, on December 2004. This facility is leased to the City of San Juan Capistrano for a 50-year term. According to the agreement between the SJBA and the City, the City can pump 5,800 AF/Yr to produce up to 4,800 acre-feet of groundwater annually from the Basin. Of this, 978 AF and 809 AF is MNWD allocated water. MNWD is currently not planning to produce or treat brackish water from the Basin due to cost of pumping and treatment and other considerations.

Table 7 also shows current and future imported and recycled water supplies

Table 7						
Current and Planned Water Supplies – AF/Yr						
Water Supply Sources	2005	2010	2015	2020	2025	2030
Water delivery capacity from:						
MWD/MWDOC	56,544	56,544	56,544	56,544	56,544	56,544
Recycled Water (projected capacity)	8,000	9,800	9,800	9,800	9,800	9,800
Total	64,544	66,344	66,344	66,344	66,344	66,344

Table 8 shown below shows the projected water demands including the imported and locally produced recycled on the MNWD system,

Table 8 Future Water Demands - AFY						
Water Supply Sources	2005	2010	2015	2020	2025	2030
Water purchased from:						
MWD/MWDOC	34,884	35,114	35,435	35,935	36,435	36,881
Groundwater* (San Juan Basin)	0	0	0	0	0	0
Recycled Water (projected use)	7,868	9,800	9,800	9,800	9,800	9,800
Desalination*	0	0	0	0	0	0
Total	42,752	44,914	45,235	45,735	46,235	46,681

Table 9 shows the water rights allocated to MNWD by the Permit No.21074 issued by the State Water Resources Control Board. MNWD is not presently anticipating use of groundwater from the SJBA due to water quality issues. The water rights have been assigned to the City of San Juan Capistrano by the SJBA.

Table 9 Groundwater Pumping Rights - AF Year	
Basin Name	Pumping Right - AFY
San Juan Groundwater Basin	1,353
Total	1,353

2.5 Reliability of Supply

The District is totally dependent on MWD to meet its water demands. The MWD has prepared its Regional Urban Water Management Plan (**MWD UWMP**), dated December 2005, for its service area. MWDOC also has prepared MWDOC Regional Urban Water Management Plan (**MWDOC UMWP**), dated December 2005, for its service area, which is inclusive of and consistent with the District's base supply and demand projections addressed herein. **Pursuant to Water Code Section 10631(k), the District is relying upon water supply information provided by the wholesale agencies, MWD and MWDOC, in fulfilling informational requirements addressed in this UWMP Update.**

To evaluate supply reliability, MWD developed a computer model named IRPSIM. This model uses 70 years of historical hydrology (from 1922 to 1991) to develop estimates of water surplus and shortage over the 20-year planning horizon. The output from these model runs enables staff to analyze the extent to which a particular supply option can add to the region's supply reliability and determine the need for additional supplies. It also helps to determine the appropriate targets for core and flexible supplies.

Core water supplies provide a certain amount of water in every year, regardless of whether surplus supplies already exist. Examples of core supplies include recycled water projects, safe yield groundwater production, and Colorado River Aqueduct (CRA) base supplies. They provide the advantage of greater certainty with respect to the supply yield and cost. The disadvantage of core supplies is that if they are developed solely to meet infrequent dry-year supply needs, they can be redundant in surplus years, thus resulting in higher costs. Flexible water supplies provide supply only when needed (such as a dry year) and do not result in increased amounts of surplus water during years of plentiful supply. Examples of flexible supplies include voluntary water transfers and storage. Flexible supplies tend to be more cost-effective than core supplies, especially in light of the high degree of variability of Metropolitan's existing supplies, but their supply yield may be less certain. Developing a resource strategy that balances both cost and risk requires a combination of core and flexible supplies.

Table 10 summarizes results from IRPSIM model studies performed to test the supply reliability of the adopted resource mix. The IRPSIM results show the region's ability to respond in future years under a repeat of the 1990-92 hydrology, that is, in the case of multiple-dry years. This shows that the region can provide reliable water supplies under a series of multiple dry years. **Table 11** shows a similar analysis using the historic hydrology of 1977, the single driest hydrologic year to date, and **Table 12** reports the expected situation on average over all of the historic hydrologies.

The IRPSIM analyses of the IRP Update report show that Metropolitan can maintain reliable supplies under the conditions that have existed in past dry periods throughout the period 2005 through 2030.

Table 10					
MWD Multiple Dry-year Supply Capability¹ & Projected Demands					
AF/Yr					
	2010	2015	2020	2025	2030
Current Supplies					
Colorado River ²	722,000	699,000	699,000	699,000	699,000
California Aqueduct ³	912,000	912,000	912,000	912,000	912,000
In-Basin Storage	482,000	480,000	463,000	449,000	449,000
Supplies Under Development					
Colorado River Aqueduct	95,000	460,000	400,000	400,000	400,000
California Aqueduct	330,000	215,000	299,000	299,000	299,000
In-Basin Storage	78,000	103,000	103,000	103,000	103,000
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
MWD Supply Capability	2,619,000	2,834,000	2,841,000	2,827,000	2,827,000
MWD Supply Capability w/ CRA Maximum of 1.25 MAF⁴	2,619,000	2,776,000	2,741,000	2,719,000	2,719,000
Firm Demands on MWD^{5,6}	2,376,000	2,389,000	2,317,000	2,454,000	2,587,000
Potential Reserve & Replenishment Supplies	243,000	377,000	424,000	265,000	132,000

1 Represents supply capability for resource programs under listed year type.

2 Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct

3 California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct

4 Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

5 Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation and local supplies, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

6 Includes projected firm sales plus 70% of projected IAWP agricultural sales

Table 11 summarizes results from IRPSIM model studies performed to test the supply reliability of the adopted resource mix in a similar analysis using the historic hydrology of 1977, the **single driest** hydrologic year to date.

Table 11					
MWD Single Dry-year Supply Capability¹ & Projected Demands					
AF/Yr					
	2010	2015	2020	2025	2030
Current Supplies					
Colorado River ²	722,000	699,000	699,000	699,000	699,000
California Aqueduct ³	777,000	777,000	777,000	777,000	777,000
In-Basin Storage	840,000	838,000	808,000	784,000	784,000
Supplies Under Development					
Colorado River Aqueduct	95,000	460,000	400,000	400,000	400,000
California Aqueduct	330,000	215,000	299,000	299,000	299,000
In-Basin Storage	78,000	103,000	103,000	103,000	103,000
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
MWD Supply Capability	2,842,000	3,101,000	3,102,000	3,078,000	3,078,000
MWD Supply Capability w/ CRA Maximum of 1.25 MAF⁴	2,842,000	3,033,000	3,002,000	2,970,000	2,970,000
Firm Demands on MWD^{5,6}	2,293,000	2,301,000	2,234,000	2,363,000	2,489,000
Potential Reserve & Replenishment Supplies	549,000	732,000	768,000	607,000	481,000

1 Represents supply capability for resource programs under listed year type.

2 Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct

3 California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct

4 Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

5 Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation and local supplies, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

6 Includes projected firm sales plus 70% of projected IAWP agricultural sales

Table 12 summarizes results from IRPSIM model studies performed to test the supply reliability of the adopted resource mix in a similar analysis of expected situation on **average** over all of the historic hydrologies.

Table 12					
MWD Average Year Supply Capability¹ & Projected Demands					
AF/Yr					
	2010	2015	2020	2025	2030
Current Supplies					
Colorado River ²	711,000	678,000	677,000	677,000	677,000
California Aqueduct ³	1,772,000	1,772,000	1,772,000	1,772,000	1,772,000
In-Basin Storage	0	0	0	0	0
Supplies Under Development					
Colorado River Aqueduct	0	0	0	0	0
California Aqueduct	185,000	185,000	185,000	185,000	185,000
In-Basin Storage	0	0	0	0	0
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
MWD Supply Capability	2,668,000	2,600,000	2,654,000	2,654,000	2,654,000
MWD Supply Capability w/ CRA Maximum of 1.25 MAF⁴	2,668,000	2,600,000	2,654,000	2,654,000	2,654,000
Firm Demands on MWD^{5,6}	2,040,000	2,053,000	1,989,000	2,115,000	2,249,000
Potential Reserve & Replenishment Supplies	628,000	547,000	665,000	539,000	405,000

1 Represents supply capability for resource programs under listed year type.

2 Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct

3 California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct

4 Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

5 Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation and local supplies, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.

6 Includes projected firm sales plus 70% of projected IAWP agricultural sales

The following **Table 14** illustrates the reliability of the District water supplies based on existing infrastructure currently in place for the system. The supply information presented relies on the availability of imported supplies as documented above in MWD reliability assessment and is based on the District’s connected capacity to MWD/MWDOC importation system. **Therefore, the imported water supplies are equal to the physical ability of the District’s importation system.** This does not necessarily mean that the amount of imported supply shown on the Tables will be available from MWD at a given time. However, MWD as the imported supplier has the

capability to provide more than the aggregate of all import demands on its system as demonstrated in **Tables 10** through **12** above. Therefore, as long as MWD has enough supplies the District has the capability to purchase up to the imported supply figures shown.

For imported water supply reliability MWD defines its water years with different historical hydrologies. According to its draft Regional UWMP (May 2005), MWD defines its multiple-dry years as 1990-1992 and the single-dry year as 1977.

This analysis assumes MWD will be able to supply the imported demand under all hydrologic conditions as shown on **Tables 9, 10** and **11**. As a result, the water year is defined by the net difference of total retail demand less local supplies. In a dry year, the retail demand usually increases due to dry and hot weather.

In **Table 14**, all water **demands** are based on the hydrological data. Normal year is average of historical hydrology from 1922 to 2004; Year 1961 is the single-dry year and years 1959 through 1961 are the multiple-dry water years. The imported **supplies** on the other hand are based upon for the average year a repeat of 1977 hydrology; for the single-dry year repeat of 1977 hydrology; and for multiple-dry years repeat of 1990-92 hydrologies.

MWDOC has developed a water balance computer model. Employing the model all three variables that is retail demand, local supplies, and imported supplies were simulated using 83 historical hydrologies from 1922 to 2004. The average of the 83 simulated trials was used to represent a normal condition. Of the 83 years, the hydrologic condition of 1961 yields the highest demand for imported supply, and therefore 1961 is defined as the single-dry year in MWDOC service area. Similarly, the historical sequence of 1959 to 1961 yields the highest demand in a three-year sequence for imported supply, and is then defined as the multiple-dry years in MWDOC service area. Since MNWD is typical of MWDOC service area, the findings are considered applicable to the District’s service area for determining critical demand.

Table 13 shows the basis of water year utilized for **demand** purposes in the **Table 14**:

Table 13			
Basis of Water Year Data			
Water Year Type			
Average Water Year	Average of Historical Hydrology from 1922 to 2004		
Single-Dry Water Year	1961		
Multiple-Dry Water Years	1959	1960	1961

Local supplies consist of recycled water. The imported water supplies are equal to the physical ability of the District’s importation system.

Table 14 illustrates the supply reliability of MNWD and compares demands and supplies.

Table 14					
Supply Reliability – AF/Yr					
2010	Normal	Single	Multiple-Dry Water Years		
	Water Year	Dry Year	Year 1	Year 2	Year 3
Local Supply Capacity	9,800	9,800	9,800	9,800	9,800
Imported Water Capacity	56,544	56,544	56,544	56,544	56,544
Total Supply Capacity	66,344	66,344	66,344	66,344	66,344
Total Water Demand	46,926	49,507	49,507	49,507	49,507
Demand as % of Normal		105.5%	105.5%	105.5%	105.5%
2015	Normal	Single	Multiple-Dry Water Years		
	Water Year	Dry Year	Year 1	Year 2	Year 3)
Local Supply Capacity	9,800	9,800	9,800	9,800	9,800
Imported Water Capacity	56,544	56,544	56,544	56,544	56,544
Total Supply Capacity	66,344	66,344	66,344	66,344	66,344
Total Water Demand	47,251	49,850	49,850	49,850	49,850
Demand as % of Normal		105.5%	105.5%	105.5%	105.5%
2020	Normal	Single	Multiple-Dry Water Years		
	Water Year	Dry Year)	Year 1	Year 2	Year 3)
Local Supply Capacity	9,800	9,800	9,800	9,800	9,800
Imported Water Capacity	56,544	56,544	56,544	56,544	56,544
Total Supply Capacity	66,344	66,344	66,344	66,344	66,344
Total Water Demand	47,763	50,390	50,390	50,390	50,390
Demand as % of Normal		105.5%	105.5%	105.5%	105.5%
2025	Normal	Single	Multiple-Dry Water Years		
	Water Year	Dry Year	Year 1	Year 2	Year 3)
Local Supply Capacity	9,800	9,800	9,800	9,800	9,800
Imported Water Capacity	56,544	56,544	56,544	56,544	56,544
Total Supply Capacity	66,344	66,344	66,344	66,344	66,344
Total Water Demand	48,260	50,914	50,914	50,914	50,914
Demand as % of Normal		105.5%	105.5%	105.5%	105.5%
2030	Normal	Single	Multiple-Dry Water Years		
	Water Year	Dry Year	Year 1	Year 2	Year 3
Local Supply Capacity	9,800	9,800	9,800	9,800	9,800
Imported Water Capacity	56,544	56,544	56,544	56,544	56,544
Total Supply Capacity	66,344	66,344	66,344	66,344	66,344
Total Water Demand	50,897	53,696	53,696	53,696	53,696
Demand as % of Normal		105.5%	105.5%	105.5%	105.5%

Reliability of a supply will often be impacted by climatic variation. To analyze the changes of reliability due to climate, this Plan relies, for critical demand determination, on the established hydrologic conditions defined by climatic variation of the MWDOC region. Therefore, the average water year, the single-dry water year, and the multiple-dry water years in MWDOC are on based the MWDOC analysis described above and as shown on **Table 13**.

The MNWD relies on import supplies provided by MWD through MWDOC. Various factors that may have impact on the reliability of MWD supplies are addressed by MWD in its Regional UWMP. Through prudent planning and integrated resource implementation MWD has reduced the inconsistencies associated with supply reliability. However remote, legal and environmental water quality issues may have impacts on MWD supplies. It is felt, however, climatic factors would probably have more impact than the others mentioned.

Name of supply	Legal	Environmental	Water Quality	Climatic
MWD (MWDOC)	x	x	x	x

2.6 Transfer and Exchange Opportunities

The MWD currently has a tiered unbundled rate structure. Tier 2 of this rate structure increases the cost of supply to a member agency in order to provide a price signal that encourages development of alternative supply sources. One alternative source of supply may be a transfer or exchange of water with a different agency.

The CALFED program has helped to develop an effective market for water transactions in the Bay-Delta region. This market is demonstrated by the water purchases made by the Environmental Water Account and MWD in recent years. MWDOC and its member agencies plan to take advantage of selected transfer or exchange opportunities in the future. These opportunities can help ensure supply reliability in dry years and avoid the higher Tier 2 cost of supply from MWD. The continued development of a market for water transactions under CALFED will only increase the likelihood of MWDOC participation in this market when appropriate opportunities arise.

MWDOC is in the process of developing long-term relationships with water suppliers in Northern California. These relationships may lead to transfer agreements in the near future. One example of this is the South Feather Water and Power Agency (SFWPA). MWDOC has discussed a potential transfer of water from SFWPA through the State Water Project and MWD distribution system into the MWDOC service area. This transfer would solidify MWDOC dry-year supplies while also helping to reduce dry-year costs. Initial discussions indicate this transfer could be in the range of 10,000 acre-feet per year.

MWDOC will continue to help its member agencies in developing these opportunities and ensure their successes. In fulfilling this role, MWDOC will look to help its member agencies navigate the operational and administrative issues of wheeling water through MWD water distribution system.

The District relies on the efforts of MWD as well as MWDOC to pursue transfer or exchange opportunities. As such there are no current efforts by the District.

2.7 Water Use by Customer Type

The District currently has approximately 66,688 customer connections to its potable and non-domestic water distribution system. **All connections are metered.** The following table shows the amount of actual and projected water usage by sectors on a calendar year basis from 2000 to 2030.

Table 16 Water Use by Customer Type						
Water Use Sectors	1999 - 2000		2005		2010	
	metered		metered		metered	
	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family residential	45,143	20,883	33,528	23,600	34,280	24,800
Multi-family residential	Included above	Included above	29,934	Included above	30,725	Included above
Commercial	1,652	5,903	1,848	3,000	1,900	3,200
Industrial						
Institutional & governmental	448	Included below	821	Included below	900	Included below
Landscape	2,473	13,251	2,557	13,355	2,600	13,976
Total	49,716	40,036	66,688	39,955	70,405	41,976

Table 16 Water Use by Customer Type (continued)						
Water Use Sectors	2015		2020		2025	
	metered		metered		metered	
	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family residential	34,280	24,976	34,280	25,253	34,280	25,528
Multi-family residential	30,725	Included above	30,725	Included above	30,725	Included above
Commercial	1,900	3,232	1,900	3,264	1,900	3,297
Industrial						
Institutional & governmental	900	Included below	900	Included below	900	Included below
Landscape	2,600	14,068	2,600	14,226	2,600	14,385
Total	70,405	42,276	70,405	42,743	70,405	43,210

Table 16		
Water Use by Customer Type (continued)		
	2030	
	metered	
Water Use Sectors	# of accounts	Deliveries AFY
Single family residential	34,280	25,773
Multi-family residential	30,725	Included above
Commercial	1,900	3,330
Industrial		
Institutional & governmental	900	Included below
Landscape	2,600	14,524
Total	70,405	43,627

2.7.1 System Losses

System losses occur due to leaks, hydrant flushing, un-accounted for usage and miscellaneous other losses. The District system losses amount to about 7 % of the total demand.

Table 17							
Additional Water Uses and Losses – AF/Yr							
Unaccounted Losses	1999-2000	2005	2010	2015	2020	2025	2030
Total	2,800	2,800	2,940	2,960	3,000	3,025	3,025

2.7.2 Sales to Other Agencies

The District does not sell water to other agencies.

Table 18							
Total Water Use – AF/Yr							
Water Use	1999-2000	2005	2010	2015	2020	2025	2030
Total	41,716	42,752	44,914	45,235	45,735	46,235	46,681

2.8 Demand Management Measures

The Act describes two distinct methods for providing information related to Demand Management Measures (**DMMs**) and meeting the requirements of Water Code Section 10631 (f) and (g): (i) Members of the CUWCC may submit annual BMP Activity Reports; or (ii) water suppliers who are not members or choose not to submit annual BMP Activity Reports must submit information about their programs, including current activities, scheduled activities, methods of evaluation, savings, and costs.

As an active reporting member of the CUWCC, the District has included its BMP Activity Reports as Section 2.8.1 and BMP Coverage Reports as Section 2.8.2 of this Plan. The five most recent annual BMP Activity Reports are included in this Plan (2000 through 2004), along with BMP Coverage Reports as a measure of implementation over time.

2.8.1 BMP Activity Reports

The CUWCC Annual BMP Implementation Reports for 2003 - 2004 are provided as Appendix C in this report.

2.8.2 BMP Coverage Report

The CUWCC BMP Coverage Report for 2003- 2004 are provided as Appendix C in this report

2.9 Planned Water Supply Projects and Programs

Table 19 Future Water Supply Projects AF/Yr							
			2010				
Project Name	Start Date	Complete Date	Normal	Single-dry year	Multiple-Dry-years		
					Yr 1	Yr 2	Yr 3
LRP 98 ¹		2006-07	1,276	1,276	1,276	1,276	1,276

Table 19 Future Water Supply Projects AF/Yr (continued)					
2010 through 2030					
	Normal	Single-dry year	Multiple-Dry-Year		
			Year 1	Year 2	Year 3
LRP 98 ¹	1,276	1,276	1,276	1,276	1,276

1Moulton Niguel Reclamation Expansion Phase IV

The District is planning the expand its recycled water supply through two multi-agency projects seeking State grant funding; 1.5 MGD with El Toro Water District at their wastewater treatment plant site and 1.5 MGD with the City of San Juan Capistrano at the SOCWA J.B.Latham Wastewater Treatment Plant. These two projects are not included in the District’s local supply due to the lack of certainty regarding the funding sources for these projects at this time.

2.10 Development of Desalinated Water

2.10.1 Desalination of Brackish Groundwater

MNWD does not plan to desalinate brackish groundwater at this time.

2.10.2 Desalination of Ocean Water

Until recently, seawater desalination has been considered uneconomical to be included in the water supply mix. However, recent breakthroughs in membrane technology and plant siting strategies have helped reduce desalination costs, warranting consideration among alternative resource options. However, the implementation of large-scale seawater desalination plants faces considerable challenges. These challenges include high capital and operation costs for power and membrane replacement, availability of funding measures and grants, addressing environmental issues and addressing the requirements of permitting organizations, such as the Coastal Commission. These issues require additional research and investigation.

MWDOC has been in the process of studying the feasibility of ocean desalination on behalf of its member agencies. MWDOC is reviewing and assessing treatment technologies, pretreatment alternatives, and brine disposal issues, and identifying and evaluating resource issues such as permitting, and the regulatory approvals (including CEQA) associated with the delivery of desalinated seawater to regional and local distribution system.

MWDOC is also assisting its member agencies in joint development of legislative strategies to seek funding in the form of grant and/or loans, and to inform decision-makers of the role of seawater desalination in the region's future water supplies. Observing the strategies and outcomes of other agency programs (such as that in Tampa Bay, Florida) to gain insights into seawater desalination implementation and cost issues is also being undertaken.

In Orange County, there are three proposed ocean desalination projects that could serve MWDOC and its member agencies with additional water supply. These projects are the Poseidon Resources proposed Huntington Beach Seawater Desalination Project, the joint SDCWA and MWDOC proposed Regional San Onofre Seawater Desalination Project, and the MWDOC proposed Dana Point Ocean Desalination Project.

Poseidon Resources Corporation Proposed Project. The Poseidon Resources proposed Seawater Desalination Project would be co-located within the AES Generation Power Plant in Huntington Beach. It is being planned to provide 50 MGD of desalinated supply for distribution into coastal and south Orange County. Currently, the project remains in the environmental review and permitting phase. At this time, there are no current agreements with water agencies in Orange County for purchase of the product water.

Joint San Diego/Orange County Proposed Regional San Onofre Project. The joint San Diego County Water Authority (SDCWA) and MWDOC proposed Regional San Onofre Seawater Desalination Project is currently being investigated to determine project feasibility. The project size is yet to be determined, but a large facility is being investigated (50 to 150 MGD). This project’s time frame has been estimated by SDCWA for implementation in 2020.

MWDOC Proposed Dana Point Ocean Desalination Project. MWDOC is currently investigating the feasibility of an ocean desalination plant in Dana Point, in the vicinity of San Juan Creek. This project would provide both system reliability as well as providing supply reliability to the area and MWDOC service area. MWDOC commissioned a preliminary feasibility study of the project in 2000. That study suggested that the site appeared feasible for a desalination project and a 25 MGD project was recommended for this location.

Therefore, **Table 20** shows opportunities for desalinated water on a regional basis (MWDOC service area) and not for MNWD specifically. MNWD has not, on its own, attempted to investigate seawater desalination due to economic and physical impediments.

Table 20 Opportunities for desalinated water	
Sources of Water	Check if yes
Ocean Water	x
Brackish ocean water	x
Brackish groundwater	

2.11 Current and Projected Supply Includes Wholesale Water

Water Code section 10631 (k) requires urban water suppliers that rely upon a wholesale agency for a source of water, to provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. MNWD therefore has provided MWDOC, its wholesale provider, projections of future water demands. The wholesale agency, MWDOC has provided information to MWD for inclusion in the MWD plan. MWD has identified and quantified the existing and planned sources of water for its total service area. MWD has declared that it is more than capable of supplying normal, single-dry year and multi-dry year demands of all its member agencies for the next 25 years. However, due to its unique circumstances, neither MWD, nor MWDOC will identify water available to each urban water supplier in case of a shortage situation. According Government Code Section 350, in case of a shortage, MWD and MWDOC will deliver water based on the need. (Please see Section 4.1 for more detailed discussion.)

The MNWD regularly provides projection of future water demand to MWDOC. The demand figures in the following **Table 21** were provided to MWDOC in preparation of the District's as well as the MWDOC UWMP.

Table 21					
MNWD Demand Projections Provided to Wholesale Suppliers – AF/Yr					
Wholesaler	2010	2015	2020	2025	2030 - opt
MWDOC	34,746	33,735	34,235	34,735	35,181

MWDOC in preparing its UWMP has identified the water demands associated with ETWD and communicated those demands to MWD as shown on **Table 22** below.

Table 22					
Wholesaler Identified & Quantified Existing and Planned Sources of Water- AF/Yr					
Wholesaler sources	2010	2015	2020	2025	2030 - opt
MWDOC	34,746	33,735	34,235	34,735	35,181

In the situation where the reliability of imported supply is not specifically quantified, MWDOC uses the inferred approach and assumes MWD will be able to supply the imported demand under all hydrologic conditions. As a result, the water year is defined by the net difference of total retail demand less local supplies. In a dry year, the retail demand usually increases due to dry and hot weather. At the same time, local supply usually is low due to less precipitation. The greater the net difference means the more critical it is for MWDOC to depend on imported supply to meet its demand.

As described in Section 2.5, the water balance computer model developed by MWDOC indicates the hydrologic condition of 1961 yields the highest demand for imported supply, and therefore is defined as the single-dry year in MWDOC service area. Similarly, the historical sequence of 1959 to 1961 yields the highest demand in a three-year sequence for imported supply, and is then defined as the multiple-dry year in MWDOC service area.

MWD defines its water years with different historical hydrologies. According to its draft UWMP (May 2005), MWD defines its multiple-dry years as 1990-1992 and the single-dry year as 1977. MWDOC reviewed regional imported demand based on MWD defined water years. The result indicated that the single year of 1961 and the sequence of 1959 to 1961 were more conservatives because they yielded higher imported demands than any other years in the historical pool. **Table 23** below illustrates imported water supply reliability based on MWDOC application of demand projections.

Table 23					
Wholesale Supply Reliability - % of normal AFY					
		Single Dry	Multiple Dry Water Years		
Wholesaler sources		1961	Year 1 (1959)	Year 2 (1960)	Year 3 (1961)
MWDOC - MWD	2010	107%	109%	105%	107%
MWDOC - MWD	2015	107%	109%	105%	107%
MWDOC - MWD	2020	107%	109%	105%	107%
MWDOC - MWD	2025	107%	109%	105%	107%
MWDOC - MWD	2030	107%	109%	105%	107%

3.0 DETERMINATION OF DMM IMPLEMENTATION

Water Code section 10631.5 states that the DWR shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The Act allows an urban water supplier who is signatory to the MOU by the CUWCC to submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

The District is a Member Agency of CUWCC and signatory to its BMPs since 1990. MNWD recognizes the importance of water conservation and has made water use efficiency an integral part of water use planning. The District also has implemented and actively participating in many water conservation activities. The District actively participates in most of BMPs as outlined in the Memorandum of Understanding in cooperation with the MWDOC and other retail agencies. The most recent BMP Activity Report submitted to CUWCC for years 2003-2004 are included in Appendix C.

4.0 WATER SHORTAGE CONTINGENCY PLAN

4.1 Imported Water Shortages

As a wholesaler of imported water to the District, MWDOC is responsible to manage its supplies during times of shortage and to ensure it meets the demands of its member (retail) water agencies. In turn, retail water agencies must manage their local supplies and supplies they receive from MWDOC utilizing various mechanisms to ensure the reliability of their supply.

4.1.1 Stages of Drought Action

While MWDOC has broad powers to allocate or prohibit uses of water upon the declaration of a Water Shortage Emergency by its Board, MWDOC has not acted to directly mandate how water is used by its member (retail) water agencies in the past. However, subject to possible legal limitations as to the basis for allocation, MWDOC is responsible for how imported water will be allocated to each member agency, which will then determine specific stages of shortage actions in accordance with situation at hand. During past shortages, MWDOC has adopted Board Resolutions urging its retail agencies to develop and implement water shortage plans; calling upon each agency to adopt and enforce regulations prohibiting the waste of water; and implementing an allocation plan for available imported water consistent with reductions, incentives and penalties imposed on MWDOC by the MWD.

MWD has a Water Surplus and Drought Management (WSDM) Plan for the management of its imported water. The WSDM Plan has identified seven stages of water shortages caused by dry years and drought, with each one getting significantly more severe (see Table 24).

It is anticipated that water shortages would have to be extremely severe for MWD to implement the action listed for Stage 7, which is to allocate its imported water supplies to its member agencies. For example, even with significant reductions in Colorado River water supplies and a repeat of the 1987-1992 drought on the State Water Project, MWD could meet all retail water needs of its member agencies by implementing the stages one through six of the WSDM Plan until 2025 (MWD Integrated Resources Plan Update, 2004).

4.1.2 MWD Water Shortage and Drought Management Plan (WSDM Plan)

In April of 1999, MWD Board of Directors adopted the Water Surplus and Drought Management Plan (WSDM Plan). This plan will provide policy guidance for management of regional water supplies to achieve the reliability goals of Southern California's Integrated Resources Plan (IRP). Through effective management of its water supply, MWD fully expects to be 100 percent reliable in meeting all non-discounted non-interruptible demands throughout the next ten years.

Unlike previous shortage management plans, the WSDM Plan recognizes the link between surpluses and shortages, and it integrates planned operational actions with respect to both conditions. The WSDM Plan continues Metropolitan's commitment to the regional planning approaches initiated in the IRP.

WSDM Plan Development

MWD and its member agencies jointly developed the WSDM Plan during 1998 and 1999. This planning effort included more than a dozen half-day and full-day workshops and more than three dozen meetings of MWD and member agency staff. The result of the planning effort is a consensus plan addressing a broad range of regional water management actions and strategies.

WSDM Plan Principles and Goals

The guiding principle of the WSDM plan is to manage MWD water resources and management programs to maximize management of wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle come the following supporting principles:

- Encourage efficient water use and economical local resource programs.
- Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years.
- Pursue innovative transfer and banking programs to secure more imported water for use in dry years.
- Increase public awareness about water supply issues.

The WSDM plan also declared that, should mandatory import water allocations be necessary, those allocations would be calculated on the basis of need, as opposed to any type of historical purchases. The WSDM plan contains the following considerations that would go into an equitable allocation of imported water:

- Impact on retail consumers and regional economy;
- Investments in local resources, including recycling and conservation;
- Population growth;
- Changes and/or losses in local supplies;
- Participation in Metropolitan's Non-firm (interruptible) programs;
- Investment in Metropolitan's facilities.

Ensuring Regional Reliability

As a result of the investments made in conservation, water recycling, storage, and supply, Metropolitan has identified a resource management plan that should result in 100 percent reliability for non-discounted non-interruptible demands through 2025. A key element of MWD strategy is to store surplus supplies during wet periods for use during drought periods.

The WSDM Plan guides the operations of these resources to ensure short- and long-term regional reliability. It identifies the expected sequence of resource management actions Metropolitan will execute during surpluses and shortages to minimize the probability of severe shortages and eliminate the possibility of extreme shortages and shortage allocations.

Surplus and Shortage Stages

The WSDM Plan distinguishes between *Surpluses*, *Shortages*, *Severe Shortages*, and *Extreme Shortages*. Within the WSDM Plan, these terms have specific meanings relating to MWD capability to deliver water to its customers.

Surplus: MWD can meet full-service and interruptible program demands, and it can deliver water to local, regional and out-of-region storage.

Shortage: MWD can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.

Severe Shortage: MWD can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program deliveries.

Extreme Shortage: MWD must allocate available supply to full-service customers.

The WSDM Plan also defines five surplus management stages and seven shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in MWD storage programs. Thus, a ten percent shortfall in imported supplies could be a stage one shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more severe shortage. Each year, MWD evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage for that year. Each stage is associated with specific resource management actions designed to (1) avoid an Extreme Shortage to the maximum extent possible and (2) minimize adverse impacts to retail customers should an Extreme Shortage occur. The current sequencing outlined in the WSDM Plan reflects anticipated responses based on detailed modeling of MWD existing and expected resource mix.

Storage Actions by Surplus Stage

MWD supply situation is considered to be in surplus as long as net annual deliveries can be made to water storage programs. Deliveries for storage in the Diamond Valley Lake and in the SWP terminal reservoirs continue through each surplus stage, provided that there is available storage capacity. Withdrawals from Diamond Valley Lake for regulatory purposes or to meet seasonal demands may occur in any stage. Deliveries to other storage facilities may be interrupted, depending on the amount of the surplus. The following section discusses the management actions to be taken under various levels of surplus, ranked from the smallest to the largest amount of surplus.

Surplus Stage 1. MWD may curtail or temporarily suspend (1) deliveries to regional groundwater basins under the Conjunctive Use and Cyclic Storage programs; (2) deliveries to Semitropic and Arvin-Edison groundwater storage programs; (3) deliveries of SWP carryover water to SWP reservoirs; and (4) contractual groundwater storage deliveries.

Surplus Stage 2. MWD may curtail or temporarily suspend (1) deliveries to regional groundwater basins under the Conjunctive Use and Cyclic Storage programs; (2) deliveries to Semitropic and Arvin-Edison groundwater storage programs; and (3) deliveries of SWP carryover water to SWP reservoirs.

Surplus Stage 3. MWD may curtail or temporarily suspend (1) deliveries to regional groundwater basins under the Conjunctive Use and Cyclic Storage programs; and (2) deliveries to Semitropic and Arvin-Edison groundwater storage programs.

Surplus Stage 4. MWD may curtail or temporarily suspend deliveries under the Conjunctive Use and Cyclic Storage programs.

Surplus Stage 5. MWD will make deliveries to all available in-region and out-of-region storage resources, including deliveries under the Conjunctive Use and Cyclic Storage programs.

Shortage Actions by Shortage Stage

When MWD must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, it is still able to meet all end-use demands for water. The following summaries describe water management actions to be taken under each of the seven shortage stages.

Shortage Stage 1. MWD may make withdrawals from Diamond Valley Lake.

Shortage Stage 2. MWD will continue Shortage Stage 1 actions and may draw from out-of-region groundwater storage.

Shortage Stage 3. MWD will continue Shortage Stage 2 actions and may curtail or temporarily suspend deliveries to Long Term Seasonal and Replenishment Programs in accordance with their discounted rates.

Shortage Stage 4. MWD will continue Shortage Stage 3 actions and may draw from conjunctive use groundwater storage (such as the North Las Posas program) and the SWP terminal reservoirs.

Shortage Stage 5. MWD will continue Shortage Stage 4 actions. MWD Board of Directors may call for extraordinary conservation through a coordinated outreach effort and may curtail Interim Agricultural Water Program deliveries in accordance with their discounted rates. In the event of a call for extraordinary conservation, MWD Drought Program Officer will coordinate public information activities with member agencies and monitor the effectiveness of ongoing conservation programs. The Drought Program Officer will implement monthly reporting on conservation program activities and progress and will provide quarterly estimates of conservation water savings.

Shortage Stage 6. MWD will continue Shortage Stage 5 actions and may exercise any and all water supply option contracts and/or buy water on the open market either for consumptive use or for delivery to regional storage facilities for use during the shortage.

Shortage Stage 7. MWD will discontinue deliveries to regional storage facilities, except on a regulatory or seasonal basis, continue extraordinary conservation efforts, and develop a plan to allocate available supply fairly and efficiently to full-service customers. The allocation plan will be based on the Board-adopted principles for allocation listed previously. MWD intends to enforce these allocations using rate surcharges. Under the current WSDM Plan, the surcharges will be set at a minimum of \$175

per AF for any deliveries exceeding a member agency's allotment. Any deliveries exceeding 102% of the allotment will be assessed a surcharge equal to three times MWD full-service rate.

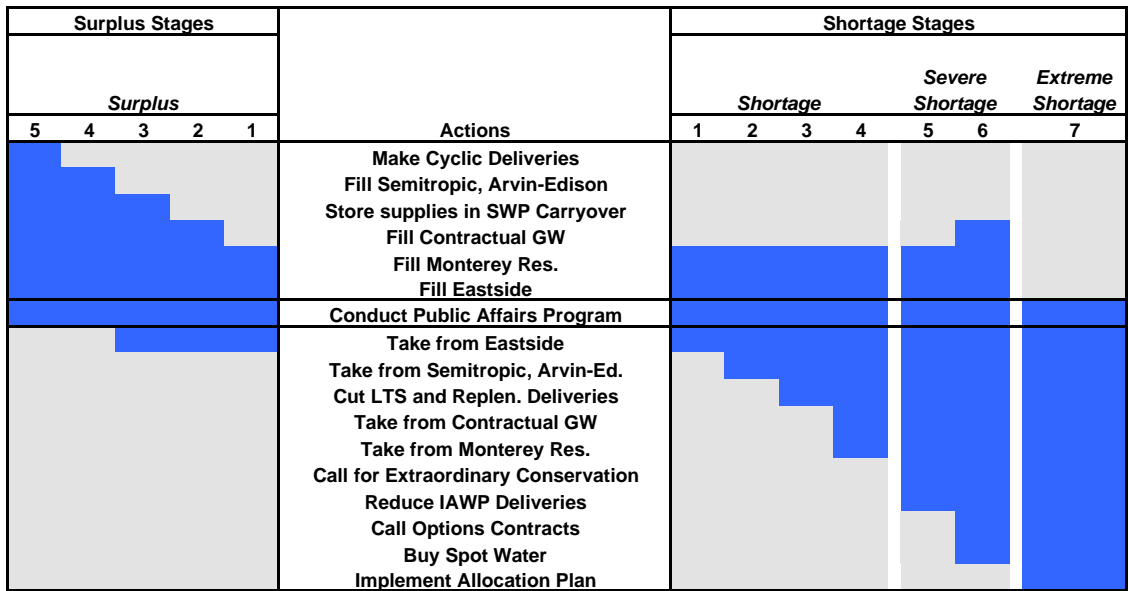
Although WSDM Plan did not specify the exact formula for how imported water would be allocated in Stage 7, it did include some principles for allocation. MWD Board adopted the WSDM Plan and principles for imported water allocation in 1999.

Should the severity of drought warrant the need to allocate imported water, MWD would do so following an overall principle of equity, and on the basis of meeting agencies' retail needs. MWD will consider the following in the equitable allocation of imported water:

1. Impact on retail water customers and economy
2. Investments in recycling and conservation
3. Population change
4. Overall investment in local resources
5. Changes and/or loss of local supply
6. Participation in MWD's non-firm (interruptible) programs
7. Investment in MWD's facilities

Table 24 Water Supply Shortage Stages and Conditions (MWD Water Surplus & Drought Management Plan)	
Stage No.	Actions
1	Withdraw stored water from Diamond Valley Lake
2	Stage 1 plus draw from out of region groundwater storage
3	Stage 2 plus curtail/temporary suspend deliveries to local groundwater and surface storage replenishment in accordance with their discounted rates
4	Stage 3 plus draw from local Conjunctive Use Groundwater Programs & SWP terminus reservoirs
5	Stage 4 plus extraordinary conservation through coordinated outreach and curtail Interim Agricultural Water Program deliveries in accordance with discounted rates
6	Stage 5 plus exercise water transfer option contracts and/or buy water on open market for consumptive use or for delivery to regional storage facilities
7	Stage 6 plus allocation of imported water to member agencies based adopted principles of fairness and need

During a severe water shortage (50% or greater loss in imported supply), MWDOC would be responsible for allocating its allocation of imported water from MWD. MWDOC would use the same principles as identified in MWD WSDM Plan for the allocation of imported water to its member (retail) water agencies, subject to any locally developed principles or adjustments found to be relevant and adopted by the MWDOC Board, and further subject to any other legal restrictions on the basis for allocation that may apply. The stages of imported water management during a drought would give MWDOC sufficient time to work with its retail water agencies to develop an equitable formula for the allocation of imported water.



Potential Simultaneous Actions

Figure 2
Resource Stages, Anticipated Actions, and Supply Declarations

4.2 MNWD Water Shortage Plan

4.2.1 Water Conservation Program

California Water Code Section 375 et seq. permits retail water agencies to adopt and enforce water conservation programs for the purpose of reducing water consumption and conserving water supplies. MNWD water conservation program was initially established in response to the '76-'77 drought. In 1976, the District's Board of Directors adopted a formal water conservation program (Resolution No. 76-30) within the guidelines established by MWD, California State Water Resources Control Board, and Assembly Bill No. 797 (the Urban Water Management Planning Act). In response to the drought of the 1980s, the District's Board of Directors adopted Resolution 92-2, which set forth the guidelines to address mandatory water conservation. A copy of this resolution is in the Appendix E.

4.2.2 Voluntary and Mandatory Water Conservation Contingency Plans

As in the past, the District prefers to use voluntary means to achieve its water conservation goals. Any media means available, direct mailings, newsletters, bill stuffers, direct contact with community groups, and information presented to local schools is used to inform the District's constituents of the need to conserve water beyond that which is normally practiced. In the past, these measures have been sufficient. Notwithstanding, critical events in the future could require much more stringent means. To this end, the District has developed a Water Shortage Contingency Plan designed to enforce mandatory water conservation.

During a water shortage, MWDOC will establish the amount of water available to the District. Based upon this allotment, the District will determine what level of water conservation is required to meet the MWDOC guidelines. If voluntary measures are ineffective or insufficient, mandatory measures will be invoked. These measures include:

- Establishment of mandatory conservation goals.
- Surcharges to those customers who do not comply.
- Discontinuance of service for severe violators.
- Rationing in times of critical need.

District conservation personnel monitor the water use throughout the District to insure the "No Waste" policy of the District is enforced.

4.2.3 No Waste Policy

During periods of extreme water shortage, District residents are prohibited from washing down driveways, sidewalks, parking lots, etc., or washing vehicles, boats, or trailers on hard areas. Restaurants are allowed to serve water only upon request. Runoff from a property, that can be reasonably prevented, is prohibited. Water leaking from any facility on the premises is prohibited. Fountains, pools, or other devices with a capacity of fifty or more gallons may not be filled or refilled. Any person suspected of a violation will be given a preliminary notice describing the infraction. If the

infraction is not corrected within twenty-four hours, the General Manager may (1) issue a warning notice; (2) install a flow-restricting device; or (3) discontinue service to the property.

4.2.4 Water Shortage Contingency Plan

In 1988, the District reaffirmed its water conservation plan by adopting Resolution 88-15; see Appendix E. The Water Conservation Rules and Regulations contain prohibitions and rules of water use to be enforced during a water shortage.

Water Allotment Methods

In previous years it has not been necessary for Moulton Niguel Water District to initiate a water-rationing program. However, for the purposes of drought contingency planning, the District has the elements of a rationing program in place.

Consumer response to rationing programs is more predictable than to other measures, and these are generally the most effective programs to achieve significant demand reduction. A strict rationing program combined with a prohibition of landscape irrigation with potable water can bring per capita water use down to very low levels.

Key elements of a successful rationing program include sharing available water as equitably as possible, and keeping customers informed about the status of the shortage. A good public information program facilitates administration and enforcement of a rationing plan. Pertinent information regarding water use and supply must be published and disseminated at least weekly to continually maintain customer commitment. Also, providing fixture replacement rebates, free showerheads and useful information to help customers reduce water consumption stimulates relatively painless short-term and long-term water demand reductions.

Rationing programs are generally patterned after one of four basic allocation schemes:

- Percentage reduction
- Percentage reduction varied by season
- Fixed allotment
- Specific use bans

The type of rationing method selected depends on the following factors:

- Amount of water available for health, safety and sanitary purposes, commercial/industrial uses, agriculture and landscape irrigation
- The seasonal variation in water consumption (usually a function of irrigation demand)
- Degree of homogeneity among consumer types

4.3 Estimate of Minimum Water Supply for Next Three Years

MWD has declared 100 % reliability for full service through the year 2010. The MWD Regional UWMP documents MWD demand supply balance in multiple-dry years, single-dry year and average year as shown in Section 2.5 herein. Therefore, the District anticipates the ability to meet its water demand through the next three years.

The District has determined maximum water demands for each of the next three years, 2006-2008. Table 25 compares demands under normal conditions and under a hypothetical repeat of the historical driest three-year period for District service area, 1959-1961. During multiple dry years, retail demands increase, resulting in the use of increased imported supplies from Metropolitan. MWDOC is expected to meet all retail consumption during a three-year dry period of 2006-2008 based on the three driest years on record. MWD is expected to be able to supply all of MWDOC imported water demand during the same period. MWD 2005 Regional UWMP indicates that MWD can provide 100% of the supply demanded by its member agencies until 2030.

Table 25						
Three-Year Estimated Minimum Water Supply (Based on Multiple-Dry Years)- AF/Yr						
Source	Normal			Multiple Dry Year		
	2006	2007	2008	2006	2007	2008
Local Supplies	8,560	9,280	9,694	8,560	9,280	9,694
Imported Supply	56,544	56,544	56,544	56,544	56,544	56,544
Total Supply	65,104	65,824	66,238	65,104	65,824	66,238

4.4 Catastrophic Supply Interruption Plan

From a regional perspective, Orange County and all of southern California is heavily dependent upon imported water supplies from MWD. Imported water is conveyed through the State Water Project (SWP) and Colorado River Aqueduct (CRA), which travel hundreds of miles to reach urban southern California, and specifically to Orange County. Additionally, this water is distributed to customers through an intricate network of pipes and water mains that are susceptible to damage from earthquakes and other disasters. Regional storage for southern California and Orange County is provided by MWD to mitigate an outage of either the SWP or CRA. The recently completed Diamond Valley Lake is an 800,000 acre-foot reservoir, of which about 400,000 acre-feet of water is reserved for catastrophic emergencies. In fact, protection from catastrophic events such as earthquakes was a major reason for the construction of Diamond Valley Lake.

In 1983, the Orange County water community developed a *Water Supply Emergency Preparedness Plan* to respond effectively to disasters impacting the regional water distribution system. The collective efforts of these agencies resulted in the formation of the Water Emergency Response Organization of Orange County (WEROC) to coordinate emergency response on behalf of all Orange County water agencies, develop an emergency plan to respond to disasters, and conduct disaster training exercises for the Orange County water community. WEROC is unique in its ability to provide a single point of contact for representation of all water utilities in Orange County during a disaster. This representation is to the county, state, and federal disaster coordination agencies. Within the Orange County Operational Area, WEROC is the recognized contact for emergency disaster response for the water community. For more details on WEROC, please refer to MWDOC Regional UWMP.

The District relies on imported water for almost all of its supply. In the event of a supply interruption in the importation facilities, the District, as well as most of South Orange County's customers, would be impacted. In December of 1999, the AMP unexpectedly ruptured, immediately eliminating a major source of supply to South Orange County. MWD was able to repair the pipeline and restore regular operations within (seven) days. It was fortunate that this pipeline failure occurred during the winter in a relatively accessible location. A more difficult pipeline repair or a major failure at the Diemer Filtration Plant could result in an interruption in import supply of far greater than seven days. MWD Administrative Policy requires its member agencies be able to withstand planned supply shutdowns of at least seven days between the months of October and April. This policy is designed to facilitate MWD to conduct scheduled maintenance of the supply and treatment systems. The 1999 AMP failure made it quite apparent that the agencies in South Orange County that depend on the import supply must plan for unexpected supply interruptions during potential peak demand conditions.

Of all these risks, earthquakes represent the major area of risk to water system reliability. Imported water is treated locally at the Diemer Filtration Plant in Yorba Linda and delivered via two pipelines, the East Orange County Feeder No. 2 and AMP. To ensure continued water reliability for south Orange County, 11 Orange County agencies, the MWD and the U.S. Bureau of Reclamation joined together to fund the South Orange County Water Reliability Study (SOCWRS) - Phase 2 System Reliability Plan. Heading these efforts was MWDOC.

The purpose of this planning effort, conducted over the past 12 months, was to:

- Identify risks, including earthquakes, that pose the greatest threat to the regional water treatment and distribution infrastructure
- Identify ways to bolster source-of-supply and regional distribution systems, building on earlier engineering investigations and studies
- Develop a list of projects that accomplish the above objectives, and identify appropriate investments
- Allow for flexibility in phasing. Most notably project operational dates and sizing should be flexible to account for changes in local resource development (LRPs)
- The plan builds on a number of prior studies, including: SOCWRS Phase 1, which served as the foundation for this effort; MWD Central Pool Augmentation Project, currently in project and right-of-way refinement; Santa Margarita Water District's Lined and Covered Reservoir investigations to increase local storage for emergency needs; Irvine Ranch Water District's Water Resources Master Plan Update and Planning Area-6 Sub-Area Master Plan; and various Orange County Water District plans and groundwater basin operations studies.

An emergency outage of the Diemer Filtration Plant, which is situated adjacent to the Whittier Fault, is judged to be the most severe supply risk to south Orange County. In addition, there are scheduled and sometimes urgent shutdowns of critical facilities that are necessary to make repairs and improvements.

One of these critical facilities, the AMP, has experienced one major failure and two minor leaks since its construction in 1980 as well as having been shutdown at various times for inspection and repairs. The major failure occurred in December 1999 due to a pressure surge, and was repaired and restored to service in nine days by MWD maintenance crews.

Finally, the East Orange County Feeder No. 2, a MWD-operated pipeline, is considered to be in good condition, but it is aging, having been constructed in 1961. An outage of this pipeline has a smaller impact in south Orange County since the AMP and South County Pipeline, the major extension of the AMP into south Orange County, provides about 50% greater capacity than the East Orange County Feeder No. 2.

There are several faults in the area that could cause earthquake-induced failures. Of most significance is the Whittier-Elsinore Fault Zone and, to a lesser extent, the Peralta Hills Fault, San Joaquin Hills Thrust Fault, and the Newport-Inglewood Fault Zone. Knowledge of seismic forces has advanced significantly since the design and construction of the Orange County regional water treatment and distribution system, as well as design standards for protection of structures from major earthquakes.

The scenarios evaluated included planned shutdowns of the Diemer Filtration Plant, either a lower or upper AMP emergency outage, and a Diemer Filtration Plant emergency outage. For the latter, the evaluation included sub-cases with and without implementation of the Central Pool Augmentation

(CPA) Project by MWD. The CPA Project has the greatest positive impact on the ability of south Orange County to withstand outages; however, its implementation is years away.

The scenarios were also evaluated with and without planned Local Resource Projects (LRPs). These projects, such as water recycling and groundwater desalters, reduce the extent of shortages, and therefore, the number and size of reliability improvements.

Implementation of the recommended plan will commence upon reaching agreement with the south Orange County agencies on the priority projects, gaining plan acceptance, and developing a business plan and organizational structure for implementation of the plan.

The District is prepared for a catastrophic event that threatens to interrupt water supplies. The District should be able to sustain itself for approximately seven days should there be an interruption in its source of supply. This is an estimate based upon the District's normal usage and storage levels. Several factors have a direct bearing upon how long the District can survive without additional supplies. These include the weather, time of day, time of year, amount of water actually in storage at the time of the interruption, coincidental firefighting, conservation measures, and the integrity of the District's internal distribution system.

Should the District incur an internal catastrophe disrupting service within the District boundaries, the District has made modifications to its internal distribution system allowing it to flow water in reverse of normal operation to restore service to affected areas. The District has constructed numerous interconnections with its neighboring water agencies to allow for emergency water exchanges.

The District has prepared for a regional power outage by installing auxiliary generators at pump stations that serve systems without reservoirs and at critical pump stations that serve systems with reservoirs. It also has 29 reservoirs (operating tanks) containing a total of 83.4 million gallons of potable water and 5 emergency interties with neighboring water districts that can be used to serve the District demands for seven days. District maintains an Emergency Response and Recovery Plan and performs disaster drills at least once a year.

Table 26 Preparation Actions for a Catastrophe	
Possible Catastrophe	Check if Discussed
Earthquake	x
Pipeline breaks	x
Treatment Plant Outage	x

4.5 Penalties for Excessive Use

Depending upon the circumstances, several types of penalties can be utilized by the District to attain reduction goals or force mandatory conservation. These include invoking a blocked rate structure that includes surcharges for excessive use. The District may also invoke surcharges to those customers who do not comply, discontinue service for severe violators, and ration water in times of critical need. See Appendix E for penalty provisions.

4.6 Impacts on Revenues and Expenditures

A reduction in water use could mean a revenue shortfall for the District. In this case, the District will be required to either raise water rates or impose a drought surcharge. Because anticipating generated revenue is more complicated by raising water rates, the District may elect to impose a drought surcharge. Imposing a drought surcharge will allow the District to recover all of its extraordinary drought-related expenses and lost revenues to meet fixed costs. This method of cost recovery is easy to administer and will allow for more accurate prediction of the additional revenue that will be generated. The District has a Rate Stabilization Fund to assist the District in managing its revenue shortfall.

4.7 Mechanism to Determine Reductions in Water Use

Should it become necessary for the District to initiate the actions mandated by the Water Shortage Contingency Plan, the District will constantly be comparing actual demand and supply with projected demand in order, to determine if phase adjustments are required. The District utilizes a sophisticated Telemetry and Control System that monitors District consumption in real time. This along with increasing the frequency of its meter reading will allow the District to monitor the effectiveness of its reduction program. Prior to altering the demand reduction, the District will first consider program adjustments such as raising the level of expenditure on public information and/or increasing enforcements efforts. Only if these efforts fail to stabilize the water supply would a phase adjustment be instituted.

5.0 RECYCLED WATER PLAN

5.1 Wastewater System

The District collects wastewater via a network of gravity lines, lift stations, and force mains throughout the service area. Wastewater is primarily residential in nature. There is very little contribution from commercial and industrial activities as the District is primarily residential. Wastewater collected by the District is sent to the South Orange County Wastewater Authority (SOCWA) plants for treatment and disposal. SOCWA is a Joint Powers Authority (JPA) that collects, treats, and disposes of wastewater and sludge in south Orange County. The District is a member agency of SOCWA. Other SOCWA member agencies include City of Laguna Beach, Trabuco Canyon Water District, Emerald bay Services District, South Coast Water District, Irvine Ranch Water District, the City of San Clemente, City of San Juan Capistrano and Santa Margarita Water District. Costs for the operation and maintenance of treatment facilities are proportioned to each member agency primarily based on ownership capacity in the plants. The current total average daily flow tributary to the SOCWA J.B.Latham Treatment Plant is 8.5 million gallons per day (MGD). The plant has a design capacity of 13 MGD. The SOCWA Joint Regional Treatment Plant has a capacity of 12 MGD and is currently processing slightly over 10 MGD. Plant 3A has a secondary treatment capacity of 8 MGD and is currently processing 4 MGD. The District owns 22.7 MGD of secondary treatment capacity in the SOCWA treatment plants.

The SOCWA plants use a conventional activated sludge process that treats wastewater to secondary treatment standards. The SOCWA plant effluent is disposed by means of ocean outfalls that discharge off the coasts of Dana Point and Laguna Beach.

Table 27	
Participating agencies	
	participated
Water agencies	MWDOC
Wastewater agencies	SOCWA, MNWD, SCWD
Groundwater agencies	SJBA
Planning Agencies	

Table 28 shows the amount of wastewater collected and projected to be collected for treatment within the service area of the District. As mentioned above, wastewater is primarily residential in nature with very little contribution from commercial and industrial activities. As such all collected wastewater meets eligibility standards for recycled water. The exception is if the imported water were to exceed 650 to 700 ppm in salinity then recycled water would be on the borderline to meet the Basin Discharge Standards.

Table 28							
Wastewater Collection and Treatment – AF/Yr							
Type of Wastewater	2000	2005	2010	2015	2020	2025	2030
Wastewater collected & treated in service area	18,480	18,715	19,040	19,040	19,040	19,040	19,040
Volume that meets recycled water standard	18,480	18,715	19,040	19,040	19,040	19,040	19,040

Table 29								
Disposal of wastewater (non-recycled) AF/Yr								
Method of disposal	Treatment Level	2000	2005	2010	2015	2020	2025	2030
Ocean Outfall	Secondary	10,980	10,715	9,240	9,240	9,240	9,240	9,240
Total								

5.2 Recycled Water System

In 1984, the MNWD constructed a 0.6 MGD Advanced Wastewater Treatment Plant (AWT) at the AWMA plant in Laguna Niguel, currently known as SOCWA Joint Regional Wastewater Treatment Plant (JRTP). This tertiary treatment facility produced water for irrigating the El Niguel Country Club in Laguna Niguel and produced approximately 350 acre-feet of water per year for the Country Club.

In 1988, the AWT facility was expanded from 0.6 to 2.4 MGD of tertiary treatment capacity. The District now services the El Niguel Country Club, Crown Valley Community Park, Laguna Niguel Regional Park, and several greenbelt areas within the City of Laguna Niguel.

MNWD constructed a 2.4 MGD AWT facility at Plant 3A. The treatment plant and the AWT were placed on line in 1990.

The District has expanded its reclaimed water supply capacity to provide maximum-month demands for its reclaimed water distribution system. This system serves two separate hydrologic areas: Laguna HA 1.1 (including the Laguna Niguel, Aliso Viejo, and Dana Point hydrologic sub-areas), and Mission Viejo HA 1.2. The system serves reclaimed water from three water reclamation treatment plants: (1) MNWD Plant 3A AWT, (2) SOCWA JRTP AWT, and (3) South Coast Water District WRP, which is interconnected to the MNWD distribution system. The MNWD currently has 15.2 MGD of tertiary treatment capacity in compliance with Title 22 Recycled Water requirements. MNWD also has 1,000 AF of seasonal storage for its recycled water distribution system.

MNWD has 2.4 MGD capacity in Plant 3A; 11.4 MGD capacity in the SOCWA Joint Regional Treatment Plant; and 1.4 MGD of capacity in the SOCWA Coastal Treatment Plant.

Table 30							
Recycled Water Uses - Actual and Potential – AF/Yr							
User type	Treatment Level	2005	2010	2015	2020	2025	2030
Agriculture							
Landscape	Tertiary Title 22 compliant	7,868	9,800	9,800	9,800	9,800	9,800
Wildlife Habitat							
Wetlands							
Industrial							
Groundwater Recharge							
Total		7,868	9,800	9,800	9,800	9,800	9,800

Table 31						
Projected Future Use of Recycled Water in Service Area - AF/Yr						
	2005	2010	2015	2020	2025	2030
Projected use of Recycled Water	7,868	9,800	9,800	9,800	9,800	9,800

Table 32		
Recycled Water Uses - 2000 Projection compared with 2005 actual – AF/Yr		
User type	2000 Projection for 2005	2005 actual use
Landscape	9,796	7,868
Total	9,796	7,868

6.0 WATER QUALITY IMPACTS ON RELIABILITY

MNWD is a member agency of MWDOC, which is a member agency of the MWD. The District obtains almost all of its water supply through MWDOC, from MWD. MWD has two primary sources of water, the State Water Project (SWP) and the Colorado River Aqueduct (CRA). For most of Orange County, imported water is served as a blend of both sources with the proportions of the blend dependent upon the year-to-year availability of CRA and SWP water. CRA water tends to be higher in total dissolved solids and lower in dissolved organics. SWP water usually has a lower TDS but higher organic material, which can lead to formation of disinfection byproducts (DBPs). MWD recognizes the impacts of water quality on its member agencies and has embraced water quality planning in its IRP and monitoring efforts to address water quality issues. Planning efforts have identified management strategies that allow flexibility in operations to improve water quality and source protection while maintaining reliability. MWD water quality staff conduct both required monitoring and monitoring for constituents of concern that are currently unregulated. Over 300,000 water quality tests are performed each year.

6.1 Metropolitan Water Quality Issues

6.1.1 Total Dissolved Solids Management

High TDS levels in imported water delivered by MWD water leads to increased recycled water treatment costs, results in increased water losses during the recycled water treatment processes, reductions in recycled water use as demand decreases for recycled water with high TDS levels, recycled water does not meet RWQCB standards, brine volumes increase, and ultimately the ability to use the underlying groundwater basins for water storage could be diminished. MWD has established an operational policy objective to deliver water to each of its member agencies at a TDS of 500 mg/l when feasible. This requires careful operational planning and management to achieve.

Colorado River Aqueduct

CRA water has high TDS levels, averaging 650 mg/L during normal water years. Salinity levels are dependent upon precipitation in the Colorado River Basin. During drought years salinity levels increase and during years with above normal precipitation salinity levels decline as naturally occurring salt concentrations decline. In times of extreme droughts, salinity levels could exceed 900 mg/L. A long-term salinity management strategy is in place at the state and federal level for the Colorado River Basin. Funds are appropriated annually to help fund salinity mitigation and reduction projects throughout the watershed.

State Water Project

SWP TDS levels are significantly lower than CRA water, averaging 250 mg/L for water delivered via the East Branch of the SWP and 325 mg/L for the West Branch deliveries. West Branch deliveries have higher TDS levels as a result of salt loading in local streams, operational issues, and evaporation losses at Pyramid and Castaic Lakes. TDS levels and available supply vary based on hydrologic conditions in the Sacramento-San Joaquin watersheds, introduction of saline non-project waters by upstream parties, as well as saline intrusion in the Sacramento San Joaquin Bay Delta. Variations of

TDS levels over short periods of time are attributed to seasonal and tidal flow patterns presenting a unique challenge in trying to achieve 500 mg/L TDS objective. During periods when TDS levels are high at the SWP intake facilities and in the Colorado River it may not be possible to meet MWD salinity objective and maintain water supply reliability. MWD Board has adopted a statement of needs “to meet Metropolitan’s 500 mg/L salinity-by-blending objective in a cost-effective manner while minimizing resource losses and ensuring the viability of recycling and groundwater management programs.”

Management Actions

MWD has taken numerous actions to reduce TDS concentrations in its water supplies. For more detailed discussion of the management actions please refer to MWDOC RUWMP.

6.1.2 Perchlorate Management

Perchlorate has been detected at low levels in the CRA water supply, but not in the SWP water supply. A concentration limit for perchlorate has not been adopted at this time by State Department of Health Services (DHS). However, DHS has adopted a notification level of 6 µg/L, requiring agencies to inform their governing bodies. Notification to customers of the potential health risks is also recommended. DHS recommends non-utilization of sources with perchlorate levels greater than 60 µg/L. Perchlorate primarily interferes with the production of hormones for normal growth and development in the thyroid gland. Further research on the health effects of Perchlorate is pending. MWD began monitoring for perchlorate in June 1997 after it was detected in the Colorado River and the Lake Mead outlet at Hoover Dam. Sampling was able to isolate the source to the Las Vegas Wash and its potential source in Henderson, Nevada. A quarterly monitoring program for Lake Mead was initiated in August 1997 followed by monthly monitoring of the CRA. The Nevada Department of Environmental Protection manages a remediation project in Henderson area. Since inception, the amount of perchlorate entering the Colorado River has been reduced from 900 pounds per day in 1997 to less than 150 pounds per day as of December 2004.

Management Actions

In 2002, MWD adopted a Perchlorate Action Plan. Through its Perchlorate Action Plan, MWD has taken a proactive approach towards addressing a potential water quality issue and ensuring minimal or no water supply losses associated with perchlorate. For more detailed discussion of the management actions please refer to MWDOC RUWMP.

6.1.3 Total Organic Carbon and Bromide Management

Treatment of SWP water supplies containing high levels of total organic carbon (TOC) and bromide with disinfectants, such as chlorine, creates disinfection byproducts (DBPs) linked to specific cancer types. CRA water does not have high levels of TOCs and bromide. TOC and bromide in the Delta region of the SWP are of a significant concern to MWD as concentration levels increase as Delta water is impacted by agricultural drainage and seawater intrusion. In 1998, the USEPA adopted more stringent regulations for DBPs that took effect in 2002. Even more stringent regulations are expected to be proposed in 2005.

Management Actions

MWD Board adopted a Statement of Needs for the CALFED Bay-Delta Program in 1999 stating that MWD requires a safe drinking water supply for compliance with existing and future regulatory requirements. CALFED Program has developed numerous conceptual actions to improve Bay/Delta water, however MWD asked CALFED to adopt water quality improvement milestones. These milestones are necessary to assure that MWD and its member agencies will be able to comply with pending water quality regulations.

MWD Board has committed to install ozone treatment processes at its two treatment plants that solely treat SWP water to avoid the production of DBPs through chlorination. In addition to the concern of DBPs, some studies have linked negative reproductive and developmental effects to chlorinated water. The other three treatment plants that receive a combination of SWP and CRA water utilize blending to reduce levels of DBPs below regulatory requirements. By 2010, MWD plans to install ozonation facilities at the remainder of its treatment facilities reducing the percentage of SWP water that requires blending.

6.1.4 Other Contaminants of Concern

MWD has identified various other contaminants of concern to MWD water supply sources. These include MTBE, arsenic, and uranium as well as emerging contaminants. For detailed discussion of these please refer to MWDOC RUWMP.

6.1.5 Water Quality Protection Programs

MWD participates in multiple programs to improve water quality supplies. These programs include: watershed sanitary surveys, source water assessment, support of DWR policies and programs improving the quality of deliveries to MWD, support of the Sacramento River Watershed Program, water quality exchange partnerships, and implementation of additional security measures.

6.1.6 Imported Water Quality Impacts on Supply Reliability

Through its management strategies and in coordination with member agencies, MWD is able provide member agencies supply options that allow local agencies to meet regulatory standards. Currently known and foreseeable water quality issues are already incorporated into existing management strategies and the reliability of MWD supplies for the next 25 years. However, unforeseeable water quality issues could potentially alter MWD water and potentially impact MWD supply reliability.

6.2 Local Groundwater Quality Issues

Groundwater pumping from the San Juan Basin has declined over the years due to the poor water quality. The mineral content of groundwater is variable, however, the basin typically has calcium bicarbonate or bicarbonate-sulfate character below the upper reaches of the valleys, and calcium-sodium sulfate or sulfate-chloride near the coast. In general, TDS content in groundwater increases from below 500 mg/L in the upper reaches of the valley to near 2,000 mg/L near the coast. TDS content of water from 3 public supply wells averages 760 mg/L and ranges from 430 mg/L to 1,250 mg/L.

Groundwater in the western part of the basin has a high TDS content, and water coming from springs in Thermal Canyon has high fluorine content. Groundwater found in the lower basin is also high in manganese and iron.

7.0 WATER SERVICE RELIABILITY

MNWD is dependent on MWD to meet its water demands. Therefore, reference is made to MWD Regional UWMP for the reliability of MWD water supplies and its vulnerability to seasonal or climatic shortages.

To evaluate supply reliability, MWD developed a computer model named IRPSIM. This model uses 70 years of historical hydrology (from 1922 to 1991) to develop estimates of water surplus and shortage over the 20-year planning horizon. The IRPSIM results show (see Section 2.5 Reliability of Supply) the region's ability to respond in future years under a repeat of the 1990-92 hydrology, that is, in the case of **multiple-dry years**. It also shows that the region can provide reliable water supplies under a series of **multiple-dry years**. The results demonstrate that a similar analysis using the historic hydrology of 1977, the single driest hydrologic year to date, the region can provide reliable water supplies.

The IRPSIM analyses show that MWD can maintain reliable supplies under the conditions that have existed in past dry periods throughout the period 2005 through 2030.

Water supply figures employed in the following Tables, are derived from existing infrastructure currently in place for MNWD water system. The imported water supply information presented relies on the availability of imported supplies as documented above in MWD reliability assessment and is based on the District's connected capacity to MWD/MWDOC importation system. **Therefore, the imported water supplies are equal to the physical ability of the District's importation system to tap into the imported water supplier's infrastructure.** This does not necessarily mean that the amount of imported supply shown on the Tables will be available from MWD at a given time. However, MWD as the **imported supplier has the capability to provide more than the aggregate of all import demands** on MWD system. Therefore, as long as MWD has enough supplies, the District has the capability to purchase up to the imported supply figures shown.

For the MNWD projected normal water supply to projected normal water use is compared in the following Tables.

Table 33					
Projected Normal Water Supply - AF/Yr					
(from table 7)	2010	2015	2020	2025	2030
Supply	66,344	66,344	66,344	66,344	66,344
% of year 2005	103 %	103 %	103 %	103 %	103 %

Table 34					
Projected Normal Water Demand - AF/Yr					
(from tables 17 and 18)	2010	2015	2020	2025	2030
Demand	46,926	47,251	47,763	48,260	50,897
% of year 2005	110 %	111 %	112 %	113 %	119 %

Table 35					
Projected Supply and Demand Comparison - Normal Year in AF/Yr					
	2010	2015	2020	2025	2030 - opt
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	46,926	47,251	47,763	48,260	50,897
Difference	19,418	19,093	18,581	18,084	15,447
Difference as % of Supply	29.3 %	28.8 %	28.0 %	27.3 %	23.3 %
Difference as % of Demand	41.4 %	40.4 %	38.9 %	37.5 %	30.3 %

Projected single-dry year water supply to projected single-dry year water use is compared in the following Tables.

Table 36					
Projected Single-dry Year Water Supply - AF/Yr					
	2010	2015	2020	2025	2030
Local Supply	9,800	9,800	9,800	9,800	9,800
Imported Supply	56,544	56,544	56,544	56,544	56,544
Supply Totals	66,344	66,344	66,344	66,344	66,344
% of projected normal	100	100	100	100	100

Table 37					
Projected Single-dry Year Water Demand – AF/Yr					
	2010	2015	2020	2025	2030
Demand	49,507	49,850	50,390	50,914	53,696
% of projected normal	105.5%	105.5%	105.5%	105.5%	105.5%

Table 38					
Projected Single-dry Year Supply and Demand Comparison – AF/Yr					
	2010	2015	2020	2025	2030
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	49,507	49,850	50,390	50,914	53,696
Difference	16,837	16,494	15,954	15,430	12,648
Difference as % of Supply	25.4 %	24.9 %	24.0 %	23.3 %	19.1 %
Difference as % of Demand	34.0 %	33.1 %	31.7 %	30.3%	23.6 %

Projected multiple-dry year water supplies and projected multiple-dry year water demand is compared in the following tables. The District has significant supply reserves in multiple-dry years even with very conservative assumption of zero yields from the groundwater basin. Therefore, substituting the more conservative single dry-year water demand projections for multiple-dry year water demand, comparison is made between multiple-dry year supplies and more conservative and higher single dry-year demands as if they are occurring in a string of three years.

The following table shows projected multiple-dry year water supplies available to the District.

Table 39					
Projected Multiple-dry Year Water Supplies – AF/Yr					
	2006	2007	2008	2009	2010
Groundwater					
Recycled Water Supply	9,800	9,800	9,800	9,800	9,800
Imported Supply	56,544	56,544	56,544	56,544	56,544
Supply Totals	66,344	66,344	66,344	66,344	66,344
Normal Year Supply Totals	66,344	66,344	66,344	66,344	66,344
% of projected normal	100 %	100 %	100 %	100 %	100 %

Table 39 Continued					
Projected Multiple-dry Year Water Supplies – AF/Yr					
	2011	2012	2013	2014	2015
Groundwater					
Recycled Water Supply	9,800	9,800	9,800	9,800	9,800
Imported Supply	56,544	56,544	56,544	56,544	56,544
Supply Totals	66,344	66,344	66,344	66,344	66,344
Normal Year Supply Totals	66,344	66,344	66,344	66,344	66,344
% of projected normal	100 %	100 %	100 %	100 %	100 %

Table 39 Continued					
Projected Multiple-dry Year Water Supplies – AF/Yr					
	2016	2017	2018	2019	2020
Groundwater					
Recycled Water Supply	9,800	9,800	9,800	9,800	9,800
Imported Supply	56,544	56,544	56,544	56,544	56,544
Supply Totals	66,344	66,344	66,344	66,344	66,344
Normal Year Supply Totals	66,344	66,344	66,344	66,344	66,344
% of projected normal	100 %	100 %	100 %	100 %	100 %

Table 39 Continued					
Projected Multiple-dry Year Water Supplies – AF/Yr					
	2021	2022	2023	2024	2025
Groundwater					
Recycled Water Supply	9,800	9,800	9,800	9,800	9,800
Imported Supply	56,544	56,544	56,544	56,544	56,544
Supply Totals	66,344	66,344	66,344	66,344	66,344
Normal Year Supply Totals	66,344	66,344	66,344	66,344	66,344
% of projected normal	100 %	100 %	100 %	100 %	100 %

The following table shows the projected multiple-dry year water demands on the District.

Table 40					
Projected Multiple-dry Year Water Demands – AF/Yr					
	2006	2007	2008	2009	2010
Demand	49,507	49,507	49,507	49,507	49,507
% of projected normal	105.5%	105.5%	105.5%	105.5%	105.5%

Table 40 Continued					
Projected Multiple-dry Year Water Demands – AF/Yr					
	2011	2012	2013	2014	2015
Demand	49,850	49,850	49,850	49,850	49,850
% of projected normal	105.5%	105.5%	105.5%	105.5%	105.5%

Table 40 Continued					
Projected Multiple-dry Year Water Demands – AF/Yr					
	2016	2017	2018	2019	2020
Demand	50,390	50,390	50,390	50,390	50,390
% of projected normal	105.5%	105.5%	105.5%	105.5%	105.5%

Table 40 Continued					
Projected Multiple-dry Year Water Demands – AF/Yr					
	2021	2022	2023	2024	2025
Demand	50,914	50,914	50,914	50,914	53,696
% of projected normal	105.5%	105.5%	105.5%	105.5%	105.5%

The following table compares projected water supplies and demands for multiple-dry year.

Table 41					
Projected Multiple-dry Year Supply and Demand Comparison – AF/Yr					
	2006	2007	2008	2009	2010
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	49,507	49,507	49,507	49,507	49,507
Difference	16,387	16,387	16,387	16,387	16,387
Difference as % of Supply	25.4 %	25.4 %	25.4 %	25.4 %	25.4 %
Difference as % of Demand	34.0 %	34.0 %	34.0 %	34.0 %	34.0 %

Table 41 Continued					
Projected Multiple-dry Year Supply and Demand Comparison – AF/Yr					
	2011	2012	2013	2014	2015
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	49,850	49,850	49,850	49,850	49,850
Difference	16,494	16,494	16,494	16,494	16,494
Difference as % of Supply	24.9 %	24.9 %	24.9 %	24.9 %	24.9 %
Difference as % of Demand	33.1 %	33.1 %	33.1 %	33.1 %	33.1 %

Table 41 Continued					
Projected Multiple-dry Year Supply and Demand Comparison – AF/Yr					
	2016	2017	2018	2019	2020
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	50,390	50,390	50,390	50,390	50,390
Difference	15,954	15,954	15,954	15,954	15,954
Difference as % of Supply	24.0 %	24.0 %	24.0 %	24.0 %	24.0 %
Difference as % of Demand	31.7 %	31.7 %	31.7 %	31.7 %	31.7 %

Table 41 Continued					
Projected Multiple-dry Year Supply and Demand Comparison – AF/Yr					
	2021	2022	2023	2024	2025
Supply totals	66,344	66,344	66,344	66,344	66,344
Demand totals	50,914	50,914	50,914	50,914	50,914
Difference	15,430	15,430	15,430	15,430	15,430
Difference as % of Supply	23.3 %	23.3 %	23.3 %	23.3 %	23.3 %
Difference as % of Demand	30.3 %	30.3 %	30.3 %	30.3 %	30.3 %

8.0 ADOPTION AND IMPLEMENTATION OF UWMP

8.1 UWMP adoption process

The District has encouraged the involvement of social, cultural & economic community groups prior to and during the preparation of MWDOC regional UWMP. Before adopting the MWDOC regional UWMP, it was made available for public review. Several public hearings were held regarding the MWDOC regional UWMP by the MWDOC staff. The County of Orange and the citizens within the MWDOC service area, including MNWD customers, were served with notice of the time and place of the public hearing in accordance with Section 6066 of Government Code.

The District Board of Directors approved and adopted this UWMP, subsequent to the MWDOC UWMP, during their regularly scheduled meeting held on December 15, 2005.

8.2 Review the Implementation of Programs in 2000 Plan

As required by California Water Code, below is a summary of the implementation of the Water Conservation and Water Recycling Programs to date, and compare the implementation to those as planned in its 2000 UWMP.

8.2.1 Comparison of 2000 Planned Water Conservation Programs with 2005 Actual Programs

Please see Appendix B “BMP Activity and Coverage Reports” for details.

8.2.2 Comparison of 2000 projected Recycled Water Use with 2005 Actual Use

The District’s UWMP for 2000 projected recycled water use in 2005 to be **9,796** AF. However, only **7,868** AF of recycled water was utilized. The goal was not reached mainly because the cities in the District service area Mission Viejo, Laguna Niguel and Laguna Hills and two school districts were not able to finance the retrofitting of a number of city parks and school sites to recycled water irrigation. The cities and school districts have obtained funds to convert these parks and school sites to recycled water use and presently have those sites scheduled for conversion to recycled water.

APPENDIX

9.1 Appendix A References

- 1- “Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan” by California Department of Water Resources
- 2- Metropolitan Water District of Southern California – Regional Urban Water Management Plan December, 2005
- 3- Municipal Water District of Orange County - Regional Urban Water Management Plan December – 2005
- 4- NOAA Climate Data – Official Web Site <http://www.wrcc.dri.edu/CLIMATEDATA.html>
- 5- MNWD UWMP 2000

9.2 Appendix B: Cross Reference of MNWD UWMP v. DWR Tables

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9.3 Appendix C BMP Coverage Reports for 2003-2004