URBAN WATER MANAGEMENT PLAN

2005

CITY OF FULLERTON, CALIFORNIA
303 WEST COMMONWEALTH AVENUE
FULLERTON, CALIFORNIA 92832
(714)738-6886

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

DWR CHECKLIST

DWR "REVIEW FOR COMPLETENESS FORM" CHECKLIST

UWMP ACT CODE	REFERENCE FULLERTON'S 2005 UWMP
Water Code §10620(d)(1)(2) – Agency Coordination	
Describe the coordination of the plan preparation and anticipated benefits.	Section 1.3.1 Table 1-1
Water Code §10620(f) – Resource Maximization Tool	
Describe water management tools/options maximize resources & minimize need to import	Section 4.5
Water Code §10621(a) – Plan Update and File	
Date updated and adopted the plan	Section 1.3 (Date expected to file = 12/23/05)
Water Code §10621(b) – City and County Notification and Participation	
City and County notification and participation	Section 1.3.1 Table 1-1
Water Code §10631(a) – Service Area Information	
Service area information, including population, climate, and other demographic factors	Sections 2.1, 2.2.1, & 2.2.2 Tables 2-1, 2-2, 2-3, & 2-4
Water Code §10631(b) – Water Sources	
Identify and quantify existing and planned water supply sources	Section 4.7 Table 4-5
Water Code §10631(b)(1-4) – Groundwater Identified as Existing or Planned Source	
Describe basin management plan, attach management plan, describe groundwater basins, describe plan to eliminate overdraft, analyze location, amount, and sufficient of production of last 5 years, and analyze location and amount projected in next 25 years	Section 4.2.1 Tables 4-1, 4-2a, & 4-2b
Water Code §10631(c)(1-3) – Reliability of Supply	
Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage	Section 4.8 Tables 4-6 & 4-7
Water Code §10631(c) – Water Resources Not Available on a Consistent Basis	
Describe reliability/vulnerability of the water supply to seasonal or climatic shortage	Section 4.8
Water Code §10631(d) – Transfer or Exchange Opportunities	
Describe short term and long term exchange or transfer opportunities	Section 4.8.3
Water Code §10631(e)(1)(2) – Water Use Provision	
Quantify past, current and future water use by sectors	Section 2.4 Table 2-6
Water Code §10631(f)(g) – Demand Management	
	Section 3 Appendix C

DWR "REVIEW FOR COMPLETENESS FORM" CHECKLIST

UWMP ACT CODE	REFERENCE FULLERTON'S 2005 UWMP
Water Code §10631(h) – Planned Water Supply Projects and Programs	
Detail description of expected future supply projects and programs	Section 4
Water Code §10631(l) – Opportunities for Development of Desalinated Water	
Describe opportunities for development of desalinated water	Section 4.5.3
Water Code §10631(j) – District is a CUWCC signatory	
Agency is a CUWCC member, attach 2001-04 annual updates	Section 3 Appendix C
Water Code §10631(k) – if Supplier Receives or will Receive Water from a Wholesale Supplier	
Provide written demand projections to wholesaler, and wholesaler provides written water availability to agency	Table 2-5
Water Code §10632, 10632(a) – Water Shortage Contingency Plan and Stage of Action	
Provide stages of action, include plan for shortage	Section 5.2.2 Appendix D
Water Code §10632(b) – Water Shortage Contingency Plan and Stage of Action	
Identify driest 3-year period, quantify minimum water supply available by source for the next three years	Table 5-4 Appendix D
Water Code §10632(c) – Preparation for Catastrophic Water Supply Interruption	
Provide catastrophic supply interruption plan	Section 5.3 Table 5-3 Appendix D
Water Code §10632(d) – Prohibitions	
List the mandatory prohibition against specific water use practice during shortage	Section 5 Appendix D
Water Code §10632(e) – Consumption Reduction	
List consumption reduction method	Section 5
Water Code §10632(f) – Penalties	
List excessive use penalties or charges for excessive use	Section 5
Water Code §10632(g) – Revenue and Expenditure Impact	
Describe impacts to revenue and expenditure, and describe measures to overcome them	Section 5
Water Code §10632(h) – Water Shortage Contingency Ordinance/Resolution	
Attach a copy of the draft water shortage contingency resolution or ordinance	Section 5 Appendix D
Water Code §10632(i) – Reduction Measuring Mechanism	
Providing mechanism for determining actual reduction	Section 5 Appendix D

DWR "REVIEW FOR COMPLETENESS FORM" CHECKLIST

UWMP ACT CODE	REFERENCE FULLERTON'S 2005 UWMP
Water Code §10633 – Recycling Plan Agency Coordination	
Describe agency coordination for the recycling plan	Section 4.3
Water Code §10633(a) – Wastewater System Description	
Describe and quantify wastewater collection and treatment	Section 4.3 Table 4-4
Water Code §10633(a-d) – Wastewater Disposal and Recycled Water Uses	
Describe method of wastewater disposal, describe uses of recycling water, quantify and describe potential uses for recycling	Sections 4.3 Table 4-4
Water Code §10633(e) – Projected Uses of Recycled Water	
Projected use of recycled water, compare UWMP 2000 projections with UWMP 2005 actual	Section 4.3
Water Code §10633(e) – Plan to Optimize Use of Recycled Water	
Describe action to encourage recycled water uses	Sections 4.3
Water Code §10634– Water Quality Impacts on Availability of Supply	
Describe water impacts upon water management strategies	Section 4.4
Water Code §10635(a)– Supply and Demand Comparison to 25 Years	
Compare the projected supply to projected water use under normal, single-dry, and multiple dry water years	Section 4 Tables 4-8a, b, c through 4-14a, b, c
Water Code §10635(b)– Provision of Water Service Reliability to Cities and Counties	
Provide water service reliability section of UWMP to cities and counties within supplier's service area	To be completed
Water Code §10642– Does the Plan Include Public Participation and Plan Adoption	
Encourage involvement of social, cultural, & economic community group, provide plan for public review, provide proof of public hearing, attach a copy of adoption resolution, provide meeting notice to local government	Plan was presented to Energy and Resource Management Committee and made available at City Hall, Main Library and on the Cities website
Water Code §10643– Review of Implementation of 2000 UWMP	
Review implementation of 2000 UWMP	During preparation of 2005 Plan
Water Code §10644(a)– Provision of 2005 UWMP to local government	
Provide 2005 UWMP to DWR, cities, and counties within 30 days of adoption	To be completed
Water Code §10645– Does the Plan or Correspondence Accompanying it show where it is available for public review	
Does UWMP show where it is available for public review	Plan available at City Hall, Main Library and on the Cities website

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

BACKGROUND

California's Urban Water Management Planning Act (Act) is a long range planning document that describes and evaluate reasonable and practical efficient water use, water quality issues and conservation activities. The Act requires that urban water suppliers 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 an Urban Water Management Plan. Since its passage in 1983, there have been many amendments to the Act to encourage increased regional planning. The Urban Water Management Planning Act requires all Plans to include discussions on the following:

- Description of existing planned sources of water supply;
- Additional information on groundwater where groundwater is identified as an existing or planned source;
- Coordination with cities an counties with the service area where the plan is being prepared;
- Conservation efforts to reduce water demands;
- Assessment of reliability and vulnerability of the water supply; and
- Water shortage contingency plan

FULLERTON'S PLAN

The City of Fullerton (City) regards an adequate supply of water as an essential service to ensure public health and safety, economic growth, and community well being. Water supply goals of the City are as follows:

- Quality - to provide water to the customer that complies with State and Federally-mandated water quality regulations
- Reliability - to provide water service with minimum interruptions at acceptable pressures; and
- Efficient Operation - to operate the Water Utility at the lowest feasible cost

Water Demands

This Plan describes the water demands and future trends in the City. Three key factors that have an effect on water demands in the City are climatic, demographic, and economic. The Plan shows that annual rainfall has a direct effect on water consumption in the City. Water use is also related to population increases/decreases. The population of the City of Fullerton was approximately 126,600 in 2000 and has increased to 135,700 in 2005. Although population has increased, water demands in the City have decreased from 33,530 AF to 33,268 AF, respectively. This decrease is thought to be due to a wetter than usual year in 2005, along with successful conservation efforts. Population projections for Fullerton indicate an increase to about 144,700

by 2030, or an increase of 6.2%. The current per capita water use of 206 gallons per capita per day (GPCD) is projected to decrease only slightly, by 3 percent, to 200 GPCD over the next 25 years. The following table shows the historical, current and future data for population, water production and water gallons per capita day produced:

CITY OF FULLERTON
Historic/Projected Population & Water Production

Population	Fiscal Year	Production		
		(Mil. Gal.)	(Acre Ft.)	(GPCD)
101,350	1979/1980	10,032	30,787	270
108,747	1984/1985	10,857	33,320	274
111,737	1989/1990	11,057	33,932	271
123,692	1994/1995	9,839	30,195	218
126,635	1999/2000	10,926	33,530	236
135,672	2004/2005	10,183	31,249	206
136,800	2009/2010	10,786	33,100	216
139,200	2014/2015	10,688	32,800	210
141,200	2019/2020	10,688	32,800	207
143,000	2024/2025	10,623	32,600	204
144,700	2029/2030	10,558	32,400	200

Water consumption within the City can be categorized into five customer classes: residential, commercial, industrial, municipal, and agricultural. It is expected that the percentage of total sales for all classes, except residential and industrial, will remain about the same from 2005-2030. Total residential class is expected to increase another 3% of total water sales, with the industrial class decreasing 3.5%.

Conservation

This Plan documents the City's water use efficiency efforts. The City recognizes water conservation as a priority in its water use planning. The long-term goal of the City's water conservation program is to achieve and maintain water use efficiency in Fullerton's service area. Specific objectives for achieving this goal include the following:

- Elimination of wasteful practices in water use;
- Continued development of information on both current and potential water conservation practices; and
- Ongoing implementation of conservation practices

The City participates in a number of conservation activities in southern California on a regional level. Municipal Water District of Orange County (MWDOC) implements regional conservation programs, such as school education programs, on behalf of the City.

On December 11, 1991, an agreement known as the "*Memorandum of Understanding Regarding Water Conservation in California*" (MOU) was signed in Sacramento. This agreement mandated the implementation of water conservation programs throughout the state known as Urban Water Conservation Best Management Practices (BMPs). Currently, there are 14 BMP's. The City became a signatory to the agreement in January 1996. One of the City's obligations as a

signatory to the MOU is to submit a BMP Retail Water Agency Report Filing (report) to the California Urban Water Conservation Council (CUWCC). This report is included in the Appendix of the Plan.

Water Supply & Management

The City is fully dependent on Metropolitan Water District of Southern California (Metropolitan) and Orange County Water District (OCWD) for water supply. Based on those agencies predictions, this Plan concludes that the City's service area will have sufficient supplies to meet 100% of its projected demand for the next 25 years under single dry year and multiple dry year scenarios.

This Plan also evaluates each source of water in the region. As stated previously, the City is dependent on Metropolitan for its imported supplies and OCWD for management of the groundwater source. Currently, the City produces its water supply from eleven active wells and eight imported water connections.

OCWD is responsible for managing the underground water reserves within its boundaries of the Santa Ana River (SAR) Basin. Based on projection by the Santa Ana Watershed Project Authority (SAWPA), wastewater discharge to the SAR are expected to increase from approximately 170,000 AFY in 2002 to over 240,000 AFY in 2025. This discharge will increase the amount of percolation into the basin. The SAR Basin is not an adjudicated basin, but rather a managed basin. Each year OCWD evaluates the amount of groundwater that can be taken from the Basin. For the last ten fiscal years, the City has pumped approximately 74% of its water from the groundwater supply. This is expected to remain at approximately 72% through 2030.

Metropolitan supplies the City with treated water conveyed through eight metered connections, with a total capacity of 48,000 gallon per minute. The City has imported about 30% of its water from Metropolitan over the past five fiscal years. This is expected decrease to approximately 28% through 2030. The following table shows that the City's demands are met by the available supplies from Metropolitan and OCWD.

Current and Planned Water Supplies - AFY

Water Supply Sources	2005	2010	2015	2020	2025	2030
Metropolitan Water District of So Cal	9,103	7,535	8,968	9,198	8,628	7,990
Orange County Water District	22,146	25,565	23,832	23,602	23,972	24,410
City Supplies	**31,249**	**33,100**	**32,800**	**32,800**	**32,600**	**32,400**

This Plan documents recycled water use, wastewater collection and treatment in the City. The direct projected use of recycled water within the City's service area is expected to be zero for the next 25 years because of the lack of a treatment facility for reclaimed wastewater... Wastewater generated in Fullerton is transported via large trunk sewer mains approximately to the OCSD facilities located in the cities of Fountain Valley and Huntington Beach. The City collects 15 Million Gallons a Day (MGD) of wastewater. OCSD recycles approximately 10% of the wastewater and the remaining is disposed through ocean outfalls. Similar to water use decreasing in the future, wastewater collection is expected to decrease to 13.5 MGD by 2030.

Completion of several regional groundwater and imported water supply improvements, along with those currently under development, will heighten reliability and provide greater flexibility in meeting the City's projected water demands. A key project for Metropolitan is Diamond Valley Lake (began filling in May 2000). This reservoir has a capacity of 810,000 acre-feet (AF) of storage, which 400,000 (AF) is available for emergency purposes. For OCWD, the Groundwater Replenishment System Project, which will be fully operational by 2007, will provide up to 72,000 acre-feet of reclaimed water annually for groundwater replenishment.

Water quality and assessment has been reviewed during the preparation of the Plan. The City diligently safeguards its water supply and, as in years past, the water delivered to its customers meets the standards required by the state and federal regulatory agencies. The region does not anticipate that any water quality issues would either reduce supply availability or could not be handled through current management practices.

Drought & Emergency Management

This Plan describes a water shortage contingency plan that ensures the City can meet demands during water shortages. The City passed Ordinance number 2752 in 1991, which added Chapter 12.06 to the City Municipal Code establishing an Emergency Water Conservation Plan (EWCP). The purpose of the ECWP is to provide a permanent mechanism that allows the City to deal with extended water shortages in a timely systematic way. The usefulness of activating the EWCP for a short-term emergency would be to invoke the prohibitive water use measures of the plan. The following table describes the 5 stages of the EWCP and required curtailment of water use during a shortage.

EWCP
Rationing Stages

Stage No.	Percentage of Base Year Demand
I	100%
II	90%
III	85%
Iv	80%
V	75%

Water supply conditions to induce rationing:

1. Increased demand or limited supplies.
2. Storage facility becomes inadequate.
3. Failure or contamination of the supply, storage or distribution of MWD, OCWD or City.

CONCLUSION

This Plan concludes that the City will be 100% reliable in meeting demands through 2030. The City, in compliance with the Act, is required to submit the Plan to the Department of Water Resources by December 31, 2005.

SECTION 1

INTRODUCTION

SECTION 1
INTRODUCTION

1.1 UWMP BACKGROUND

The California State Legislature passed the Urban Water Management Planning Act (Act), Water Code Section 10610 through 10656, which was added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. (See Appendix A). Over the past 21 years, the Act has been amended 18 times to include reclamation, a water shortage contingency plan, expanded water conservation and meter retrofitting. The Act 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, reclamation, and conservation activities. These plans must be filed with the California Department of Water Resources (DWR) every five years using a 20-year planning horizon. Urban Water Management Plans (Plan) are due to DWR by December 31, 2005.

Significant changes in the Act that has occurred from 2000 to the present:

- New legislative findings concerning water quality (Water Code § 10610.2, subds. (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 contacting water supplies (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, subd. (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 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).

The full text of the current version of the Act can be found at
http://www.owue.water.ca.gov/docs/UWMPAct.pdf.

In compliance with the Act, The City of Fullerton Water Utility (Utility or City) prepared urban water management plans in 1985, 1990, 1995, and 2000. This 2005 Urban Water Management Plan (Plan) is an update of the 2000 Plan to be used for the City's planning purposes. It provides useful water resources information and includes a description of those water conservation and water management activities that the City currently conducts or may conduct within the next ten years.

The City of Fullerton is fully dependent on The Metropolitan Water District of Southern California (Metropolitan) and the Orange County Water District (OCWD) for long-term water supply. All of the City's water supply planning relates to the policies, rules, and regulations of these two wholesalers. Based on this dependent relationship, the City's Plan incorporates portions of Metropolitan's Regional Urban Water Management Plan September, 2005 (Metropolitan Plan), the Groundwater Management Plan for the Orange County Water District March 2004 (GMP), and the Master Plan for the Orange County Water District, April 1999 (OCWD Master Plan)

Fullerton's Plan is a general information document intended to complement Metropolitan's Plan and the OCWD Master Plan. It will analyze water supply and conservation issues unique to Fullerton's service area, and summarize the current and proposed water management and conservation activities of the City.

1.2 FULLERTON WATER UTILITY

1.2.1 Water History

The City was, for many years, an agricultural community specializing in growing oranges and walnuts. To serve this growing agricultural and domestic community, a municipal water system was formed on August 25, 1906. The original source of water supply for the City was from shallow irrigation wells. As the city continued to grow and change from an agricultural to an urban community, the need for additional sources of water was recognized if economic development were to continue.

1.2.2 Regional Wholesalers

The need for additional water sources led the City to join with twelve other southern California cities to form the Metropolitan Water District of Southern California on February 27, 1931. Metropolitan, as a regional wholesaler, supplies imported water to southern California from the Colorado River and from the State Water Project. Metropolitan's primary purpose is to develop, store, and distribute water at wholesale rates to its member public agencies for domestic and municipal uses. Metropolitan is discussed in greater detail in Section 4.

In 1933, OCWD was formed by a special act of the State Legislature. Primary responsibilities of the OCWD are management of Orange County's groundwater supply and protection of the County's rights to water in the Santa Ana River Basin. In 1953 the City of Fullerton became a member of OCWD. The OCWD is discussed in greater detail in Section 4.

Another regional wholesaler of imported water in the County of Orange is the Municipal Water District of Orange County (MWDOC). As of January 2001, MWDOC served all of Orange County except for the cities of Anaheim, Fullerton and Santa Ana. Although the City of Fullerton is not a member agency of MWDOC, it contracts and joins with them in conducting water education, conservation programs, and other activities as discussed elsewhere in the Plan. Based on this relationship, the City's Plan incorporates portions of MWDOC's 2005 Regional Urban Water Management Plan Update (MWDOC Plan).

As regional wholesalers, Metropolitan, OCWD, and MWDOC provide services and programs that are broad reaching. Small retail agencies, such as the City of Fullerton, cannot reasonably provide such services and programs as single entities.

1.2.3 City Council

A non-partisan five-member City Council elected to serve staggered four-year terms governs the City. The City Council appoints the City Manager and various members of commissions, committees, and citizen advisory groups. The City Council appoints directors to represent the City on both the MWD and OCWD Board of Directors.

1.2.4 City Goals

The City of Fullerton regards an adequate supply of water as an essential service to ensure public health and safety, economic growth, and community well being. Water supply goals of the City are as follows:

- Quality - to provide water to the customer that complies with State and Federally-mandated water quality regulations

- Reliability - to provide water service with minimum interruptions at acceptable pressures

- Efficient Operation - to operate the Water Utility at the lowest feasible cost

A related water management objective involved the City becoming a signatory to the Memorandum of Understanding (MOU) in 1996, monitored by the California Urban Water Conservation Council (CUWCC). The MOU is built around 14 Best Management Practices (BMPs) for urban water conservation that are intended to reduce long-term urban demands from what they would have been without implementation of these practices. These BMPs are in addition to conservation programs that may be instituted during occasional water supply shortages.

Past Utility achievements and future objectives are presented in detail elsewhere in the Plan.

1.2.5 Service Area

Today, the City of Fullerton's Water Utility provides water service to approximately 135,000 persons within its 22.3-square mile service area. The service area and City boundary are contiguous. A map of the City's service area is shown in Figure 1-1 (See end of Section 1)

1.2.6 Conveyance and Distribution Facilities

Since the formation of the Water Utility in 1906, millions of dollars of water facilities have been installed. Today the Utility has over 430 miles of transmission and distribution mains, 16 reservoirs with a capacity of 89.5 million gallons, 12 pumping stations, and 12 wells (11 active). A schematic map showing key transmission mains, wells, reservoirs, and pumping stations is shown in Figure 1-2 (See end of Section 1).

1.3 DEVELOPMENT PROCESS OF THE 2005 PLAN

The City prepared this Plan update during fall 2005. The plan was reviewed and approved by the Fullerton Energy and Resource Management Committee. Section 10642 of the Act requires that the urban water supplier shall make the Plan available for a public hearing, which was held in December 2005. No comments were received during the public hearing.

The updated plan was adopted by the City Council in December 2005 and submitted to the California Department of Water Resources by December 31, 2005. A copy of the minute order which states the action Council took, along with the draft minutes, is included as Appendix D of the Plan. This plan includes all information necessary to meet the requirements of California Water Code Division 6, Par 2.6 (Urban Water management Planning)

1.3.1 Agency Coordination

The relationship of the City with the three regional wholesalers MWD, OCWD, and MWDOC was described previously in Section 1.2.2. City staff has coordinated the development of this Plan with these three regional agencies as well as with DWR. Information received from the Orange County Sanitation District (OCSD) was also used in the Plan's preparation. City utility staff met and coordinated the Plan's preparation with other City departments. Table 1-1 reflects agency coordination.

TABLE 1-1
Coordination with Appropriate Agencies

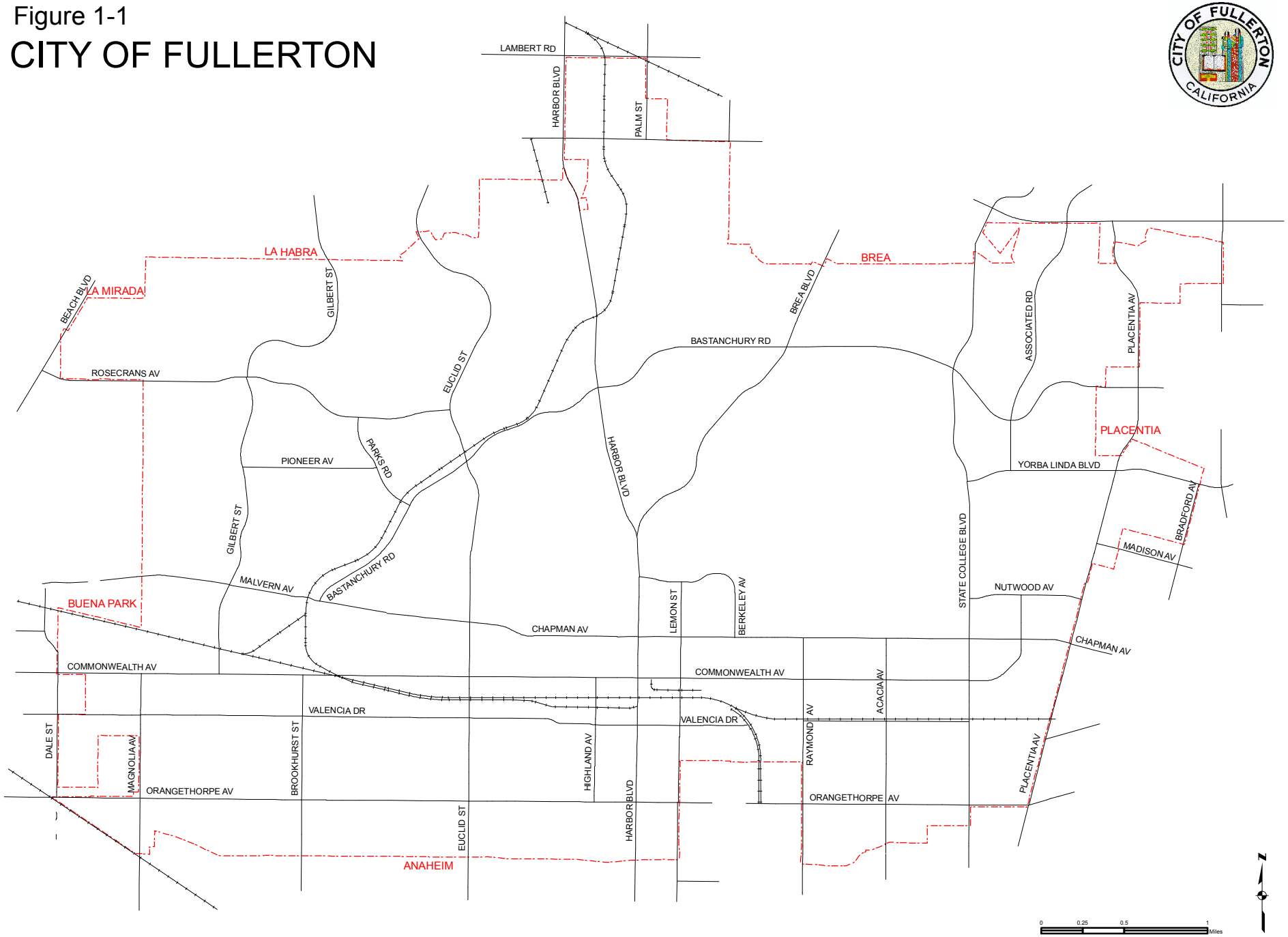
Check at least one box on each row	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a notice of intention to update the plan	Was sent a notice of intention to adopt*
Metropolitan Water District	X		-	X		X
Orange County Water District	X		-	X		X
Municiple Water District of O.C.	X		-	X		X
Southern California Water District			-		X	X
City of La Habra			-		X	X
City of Anaheim			-		X	X
City of Brea			-		X	X
City of Placentia			-		X	X
City of Buena Park			-		X	X
Fullerton City Council		X	-			
Energy and Resource Management Committee		X	-		X	X

1.4 FORMAT OF THE PLAN

The Sections in this Plan correspond to the outline of the Act, specifically Article 2, Contents of Plans and Sections 10631, 10632, and 10633. However, the sequence used to present the information differs from that of the Act in order to present the material in a manner reflecting the characteristics of the City.

Figure 1-1

CITY OF FULLERTON



September, 2005

SECTION 2

WATER DEMANDS

SECTION 2
WATER DEMANDS

Section 10631(a) of the Act requires that a plan contain an estimate of past, current, and projected water use and to the extent records are available, segregate the uses between residential, commercial, and governmental sectors. The following begins with historic water demands in Fullerton and reviews the factors affecting per capita consumption rates, variation in water demand, and summarizes projected water usage.

2.1 HISTORIC WATER DEMANDS

Water demands in Fullerton's service area from the FY 1971/72 to FY 2004/05 are listed in Table 2-1. During the aforementioned time period the lowest amount of water produced during any one FY occurred in 1972/73 in the amount of 25,620 AF. The greatest amount of water produced in the Fullerton service area was 34,926 AF in 1986/87.

Conservation measures such as hardware installations and education programs and the reduction of Industrial consumption have significantly assisted the reduction in water usage within the City. Water demands for FY 2004/05 are approximately the same as the demands of FY 1980/81, even though the City's population increased 24 percent over that time period. Figure 2-1 shows a graphic look at the historic and projected population for the City.

Table 2-1

CITY OF FULLERTON

Historic/Projected Water Production

Population [1] [2]	Sales/Demands [3]			Fiscal	Production [4]			Water	Rainfall
	(Mil. Gal.)	(Acre Ft.)	(GPCD)	Year	(Mil. Gal.)	(Acre Ft.)	(GPCD)	Losses [5]	Inches [6]
88,050	8,157	25,033	253	**1971/1972**	8,927	27,396	277	8.6%	7.0
90,000	7,840	24,060	239	**1972/1973**	8,348	25,620	254	6.1%	19.4
91,000	8,366	25,674	252	**1973/1974**	8,617	26,443	259	2.9%	13.8
92,450	8,551	26,242	253	**1974/1975**	9,212	28,270	273	7.2%	12.9
93,700	9,412	28,884	274	**1975/1976**	9,944	30,517	290	5.4%	8.1
94,900	8,904	27,325	257	**1976/1977**	9,447	28,992	273	5.7%	11.3
96,900	7,953	24,407	225	**1977/1978**	8,735	26,806	247	9.0%	36.7
99,600	9,283	28,488	255	**1978/1979**	9,628	29,547	265	3.6%	23.0
101,350	9,530	29,246	257	**1979/1980**	10,032	30,787	270	5.0%	26.2
102,994	9,863	30,268	262	**1980/1981**	10,605	32,545	282	7.0%	9.7
104,622	9,500	29,154	249	**1981/1982**	10,078	30,929	264	5.7%	15.8
106,001	9,095	27,911	235	**1982/1983**	9,687	29,728	250	6.1%	27.5
107,866	9,927	30,465	251	**1983/1984**	10,843	33,276	275	8.4%	12.1
108,747	9,838	30,192	248	**1984/1985**	10,857	33,320	274	9.4%	13.0
109,657	10,293	31,588	257	**1985/1986**	11,086	34,023	277	7.2%	17.1
110,265	10,617	32,582	264	**1986/1987**	11,381	34,926	283	6.7%	9.6
110,684	10,485	32,177	259	**1987/1988**	10,972	33,673	271	4.4%	10.8
111,749	10,809	33,171	265	**1988/1989**	11,321	34,742	278	4.5%	9.9
111,737	10,676	32,763	262	**1989/1990**	11,057	33,932	271	3.4%	8.9
115,450	9,816	30,124	233	**1990/1991**	10,153	31,158	241	3.3%	12.4
117,424	9,030	27,712	210	**1991/1992**	9,619	29,519	224	6.1%	19.8
119,527	9,464	29,044	217	**1992/1993**	10,021	30,752	230	5.6%	29.6
121,456	9,339	28,660	211	**1993/1994**	9,952	30,541	224	6.2%	10.7
123,692	9,547	29,299	211	**1994/1995**	9,839	30,195	218	3.0%	25.0
122,059	9,960	30,566	223	**1995/1996**	10,590	32,499	237	5.9%	11.3
122,804	10,382	31,861	232	**1996/1997**	10,869	33,357	242	4.5%	16.3
125,081	9,325	28,617	204	**1997/1998**	9,488	29,117	208	1.7%	31.8
126,757	9,641	29,587	208	**1998/1999**	10,160	31,181	220	5.1%	8.4
126,635	10,253	31,465	221	**1999/2000**	10,926	33,530	236	6.2%	9.2
127,861	9,889	30,347	212	**2000/2001**	10,303	31,619	221	4.0%	17.3
129,496	10,218	31,358	216	**2001/2002**	10,615	32,578	225	3.7%	4.9
131,659	9,997	30,681	208	**2002/2003**	10,271	31,522	214	2.7%	16.3
134,314	10,504	32,234	214	**2003/2004**	10,868	33,352	221	3.4%	10.4
135,672	9,886	30,338	200	**2004/2005**	10,183	31,249	206	2.9%	35.2
135,898	**10,265**	**31,501**	**207**	**2005/2006**	**10,840**	**33,268**	**219**	**5.3%**	**14.9**
136,123	10,252	31,461	206	**2006/2007**	10,827	33,226	218	5.3%	14.9
136,349	10,239	31,421	205	**2007/2008**	10,813	33,184	217	5.3%	14.9
136,574	10,226	31,381	205	**2008/2009**	10,799	33,142	217	5.3%	14.9
136,800	**10,213**	**31,341**	**205**	**2009/2010**	**10,786**	**33,100**	**216**	**5.3%**	**14.9**
137,304	10,194	31,285	203	**2010/2011**	10,766	33,040	215	5.3%	14.9
137,774	10,176	31,228	202	**2011/2012**	10,747	32,980	213	5.3%	14.9
138,235	10,157	31,171	201	**2012/2013**	10,727	32,920	213	5.3%	14.9
138,686	10,139	31,114	200	**2013/2014**	10,708	32,860	212	5.3%	14.9
139,200	**10,120**	**31,057**	**199**	**2014/2015**	**10,688**	**32,800**	**210**	**5.3%**	**14.9**
139,561	10,120	31,057	198	**2015/2016**	10,688	32,800	209	5.3%	14.9
139,985	10,120	31,057	198	**2016/2017**	10,688	32,800	209	5.3%	14.9
140,400	10,120	31,057	197	**2017/2018**	10,688	32,800	209	5.3%	14.9
140,806	10,120	31,057	197	**2018/2019**	10,688	32,800	208	5.3%	14.9
141,200	**10,120**	**31,057**	**196**	**2019/2020**	**10,688**	**32,800**	**207**	**5.3%**	**14.9**
141,590	10,108	31,020	196	**2020/2021**	10,675	32,760	207	5.3%	14.9
141,968	10,095	30,982	195	**2021/2022**	10,662	32,720	206	5.3%	14.9
142,337	10,083	30,944	194	**2022/2023**	10,649	32,680	205	5.3%	14.9
142,697	10,071	30,906	193	**2023/2024**	10,636	32,640	204	5.3%	14.9
143,000	**10,058**	**30,868**	**193**	**2024/2025**	**10,623**	**32,600**	**204**	**5.3%**	**14.9**
143,390	10,046	30,830	192	**2025/2026**	10,610	32,560	203	5.3%	14.9
143,722	10,034	30,792	191	**2026/2027**	10,597	32,520	202	5.3%	14.9
144,046	10,021	30,754	190	**2027/2028**	10,584	32,480	201	5.3%	14.9
144,360	10,009	30,717	190	**2028/2029**	10,571	32,440	201	5.3%	14.9
144,700	**9,997**	**30,679**	**189**	**2029/2030**	**10,558**	**32,400**	**200**	**5.3%**	**14.9**

(1) Population growth projections from SCAG Regional Transportation Plan-SANDAG 2030 Forecast

(2) 1999/2000 Population projections updated after 2000 Census.

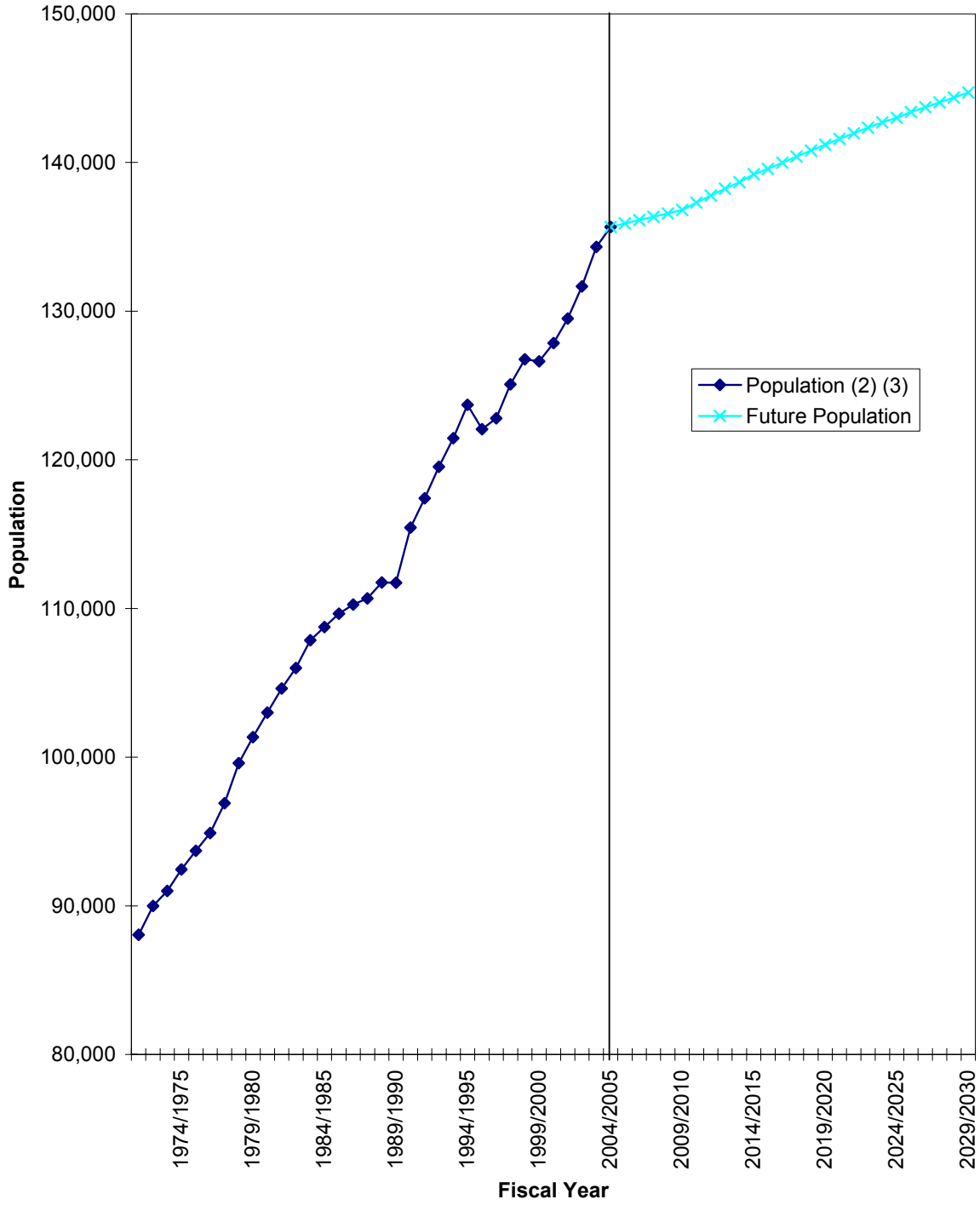
(3) Demand projections based on historic data, population projections and conservation efforts

(4) Production data based on historic data and projections provided by MWD and OCWD.

(5) Future Rainfall projections are assumed to be the average yearly rainfall from 1935-2005

(6) Future Water Losses are assumed to be the average from 1971-2005

Figure 2-1
City of Fullerton Population



2.2 WATER DEMAND FACTORS

Three key factors that have an effect on water demands in Fullerton are climatic, demographic, and economic. These factors have influenced water demands in the past and will continue to do so in the future.

2.2.1 Climatic

Fullerton weather is mild with an average mean temperature of 63.8 degrees (F). Average annual rainfall over the last 70 years has been 14.9 inches per year. Table 2-2 shows the average Evapotransporation (Eto), rainfall and temperature in the City, by month. Figure 2-2 depicts the Cities recorded rainfall for the last 20 years in Fullerton.

Table 2-2
Climate

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Standard Average Eto (in.) (1)	2.2	2.6	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	1.9
Average Rainfall (in.)	3.4	2.7	2.3	1.1	0.3	0.004	0.01	0.1	0.3	0.2	1.7	1.8
Average Temperature (F)	55	57	57	60	64	68	74	74	72	67	61	57

(1) DWR: Office of Water Use Efficiency 2005 evapotransporation values based on California irrigation mangement information system landscaping formula assuming wind speeds, daytime temperature & common landscape vegetation for coastal inland area of Southern California

Climate has the most dramatic annual effect on water demands of any of the three factors listed above. Severe deviations from average rainfall and normal temperatures can increase or decrease annual water demands by as much as 15 percent. This climate effect is more pronounced in Fullerton because of the many acres of landscape and turf areas associated with all classes of water users, especially residential. The effect that annual rainfall has on the City's annual water production is that there's a direct correlation between the two. Historical rainfall and gallons per capita per day produced, are graphed on Figure 2-3. The data reveals that as rainfall increases, production decreases due to lower demands.

The 1982-83 FY water production reduction is attributed to above-normal rainfall. Usage increased significantly in the late 1980's with the return of below-average rainfall patterns. Most recently, FY 2004-05 water production reduction is attributed to above normal rainfall.

Figure 2-2

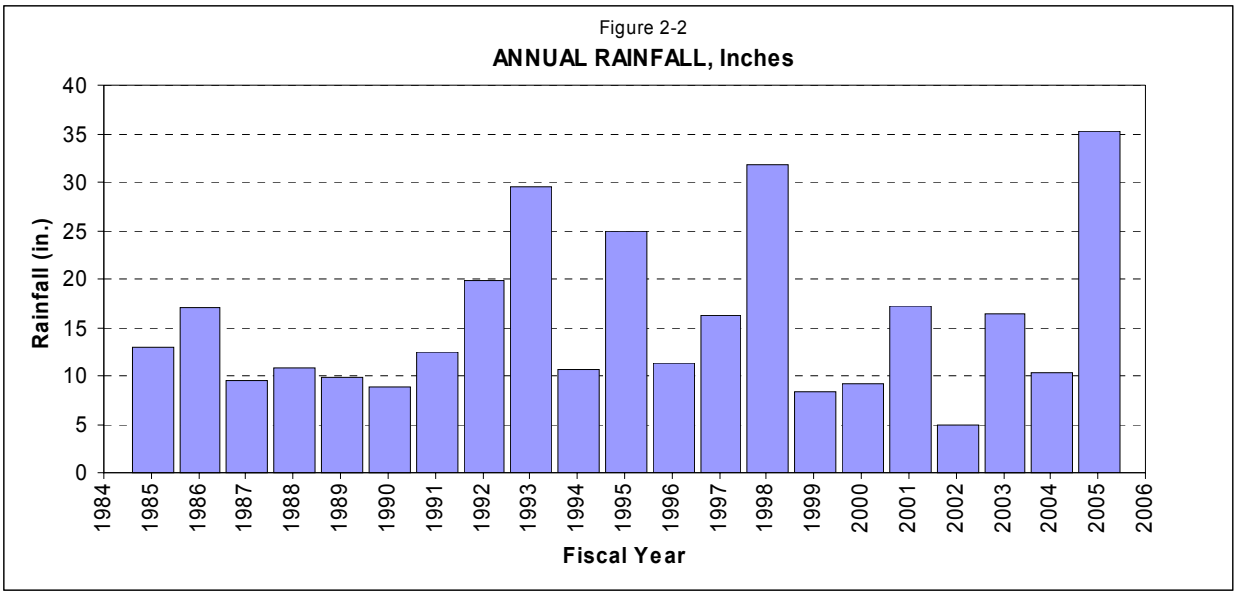
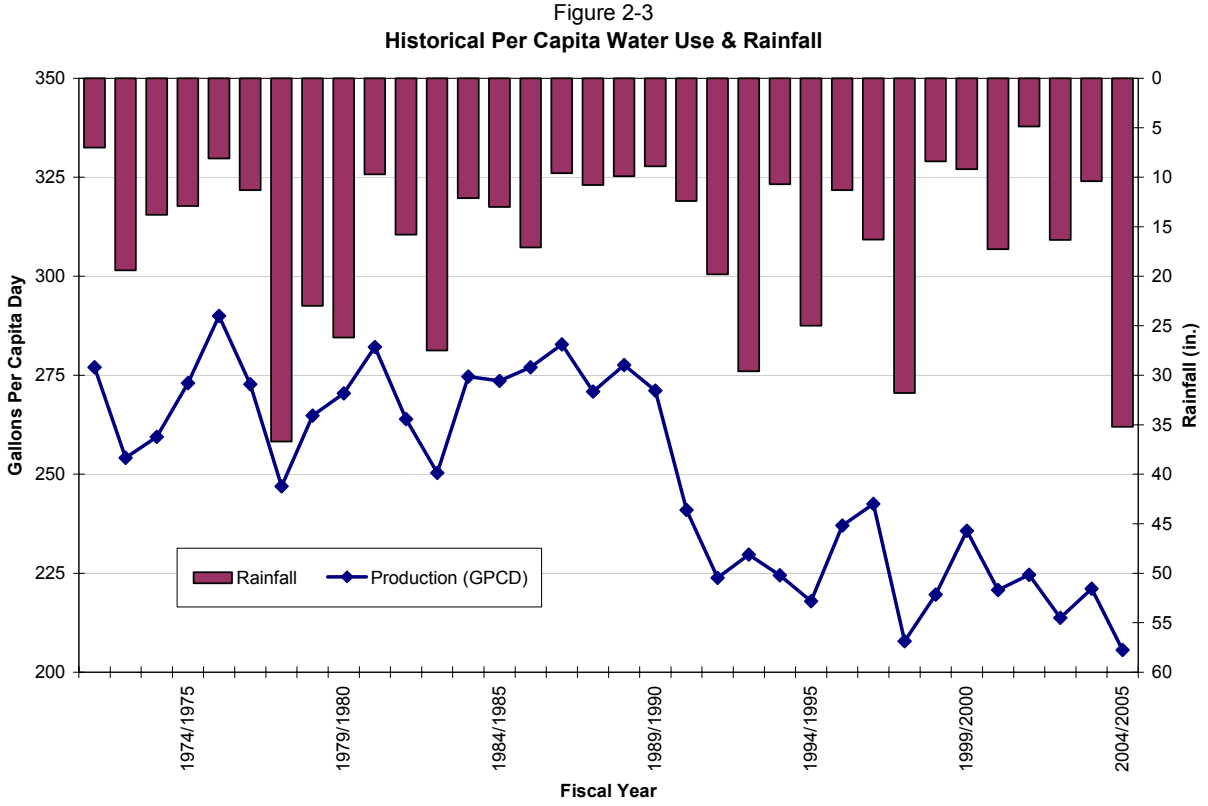


Figure 2-3



2.2.2 Demographic

Because water use is related to demographics, an accurate description of population and housing stock in the service area can serve as a basis for water planning activities described in the Plan. The population of the City of Fullerton was approximately 126,600 in 2000 and 135,700 in 2005. Table 2-3 presents past trends of population and

housing in Fullerton's service area since 1980. Table 2-4 highlights projected population growth both in Orange County and Fullerton.

Table 2-3

CITY OF FULLERTON

Historic/Projected Demographics [1] [2] [3]

	Population		Housing Units					
Fiscal Year	Total	Household [4]	Total	Single-Family	Multi-family	Occupied	% Vacant	Person Per Household
1979/1980	101,350	100,174	39,562	23,460	16,102	37,924	4.14%	2.53
1980/1981	102,994	100,938	40,106	23,938	16,168	38,326	4.44%	2.52
1981/1982	104,622	102,564	40,579	24,288	16,291	38,897	4.15%	2.53
1982/1983	106,001	103,833	40,778	24,450	16,328	38,989	4.39%	2.55
1983/1984	107,866	105,656	41,004	24,598	16,406	39,589	3.45%	2.58
1984/1985	108,747	106,553	41,452	24,760	16,692	40,020	3.45%	2.57
1985/1986	109,657	107,302	41,706	24,831	16,875	40,347	3.26%	2.57
1986/1987	110,265	107,968	41,857	24,825	17,032	40,518	3.20%	2.58
1987/1988	110,684	108,081	42,027	24,819	17,208	40,624	3.34%	2.57
1988/1989	111,749	109,019	42,438	25,044	17,394	41,175	2.98%	2.57
1989/1990	111,737	109,105	42,514	25,028	17,486	41,211	3.06%	2.57
1990/1991	115,450	113,506	43,299	25,541	17,758	41,157	4.95%	2.62
1991/1992	117,424	115,387	43,401	25,539	17,862	41,274	4.90%	2.66
1992/1993	119,527	117,423	43,737	25,655	18,082	41,572	4.95%	2.68
1993/1994	121,456	119,207	43,882	25,657	18,225	41,686	5.00%	2.72
1994/1995	123,692	121,443	44,099	25,727	18,372	41,894	5.00%	2.75
1995/1996	122,059	119,813	44,217	25,845	18,372	42,072	4.85%	2.71
1996/1997	122,804	120,559	44,311	25,959	18,352	42,161	4.85%	2.72
1997/1998	125,081	122,782	44,492	26,047	18,445	42,333	4.85%	2.76
1998/1999	126,757	124,444	44,553	26,105	18,448	42,391	4.85%	2.79
1999/2000	126,635	125,955	44,716	26,255	18,461	43,609	2.48%	2.82
2000/2001	127,861	125,078	45,010	26,452	18,558	43,842	2.59%	2.78
2001/2002	129,496	126,713	45,229	26,660	18,569	44,055	2.60%	2.80
2002/2003	131,659	128,453	45,537	26,783	18,754	44,355	2.60%	2.82
2003/2004	134,314	131,103	46,296	27,411	18,885	45,094	2.60%	2.83
2004/2005	135,672	132,461	46,606	27,703	18,903	45,396	2.60%	2.84
2009/2010	136,800	133,496	45,100	26,200	18,900	43,374	3.83%	2.96
2014/2015	139,200	135,900	45,300	26,100	19,200	43,565	3.83%	3.00
2019/2020	141,200	138,316	45,800	26,400	19,400	44,046	3.83%	3.02
2024/2025	143,000	139,524	46,200	26600	19,600	44,431	3.83%	3.02
2029/2030	144,700	141,198	46,600	26900	19,700	44,815	3.83%	3.03

(1) Historical data from State Dept. of Finance

(2) Growth projections from SCAG Regional Transportation Plan-SANDAG 2030 Forecast

(3) 1999/2000 Population projections updated after 2000 Census.

(4) The difference between total population and household population is the group "quarters"-defined as people in shelters, nursing homes,barracks domitories & prisons.

Table 2-4
HISTORIC AND PROJECTED POPULATION
CITY OF FULLERTON SERVICE AREA
AND TOTAL ORANGE COUNTY

YEAR	FULLERTON	ORANGE CO
1989-1990	111,737	2,326,211
1994-1995	123,692	2,675,900
1999-2000	128,255	2,846,289
2004-2005	135,672	2,964,074
2009-2010	136,800	3,081,859
2014-2015	139,200	3,199,644
2019-2020	141,200	3,317,429
2024-2025	143,000	3,435,214
2029-2030	144,700	3,553,000

(1) Historical data from State Dept. of Finance

(2) Growth projections from SCAG 2004 Regional Transportation Plan-SANDAG 2030 Forecast

Population projections for Fullerton indicate an increase from approximately 135,700 in 2005 to about 144,700 by 2030, or an increase of approximately 9,000. This averages out to be an increase of about 360 per year, with larger increases occurring in the earlier years.

Multi-family housing units are expected to increase at a faster rate than the single-family housing units. In the older areas of the City, multi-family and mixed use units are increasingly replacing older single-family dwellings. As a result of this trend, the household occupancy size (total population divided by total occupied dwelling units) in the City's service area is expected to increase from 2.92 to 3.03 persons per household from 2005 to 2030.

California State University, Fullerton (CSUF) occupies 236 acres within the east-central part of Fullerton. The present student population is above 35,000 students and 1900 full and part-time faculty. Fullerton participates with CSUF on its sub-area master planning to determine the effects of planned improvements on Fullerton's water and sewer system.

2.2.3 Economic

In the early 1990's, the rate of economic growth declined due to the severity and duration of the recession. The recession affected declines in the manufacturing sector, particularly in the defense and aerospace. During the late 1990's and early 2000's, the economy has been strong and has had an effect on increased water usage. However, even with the strong economy, industrial demands have decreased. This has been partly due to changes in operation such as installation of on-site recycled water systems. In addition, several

large companies have moved out of the area and have been replaced with different sectors whose water usage is lower.

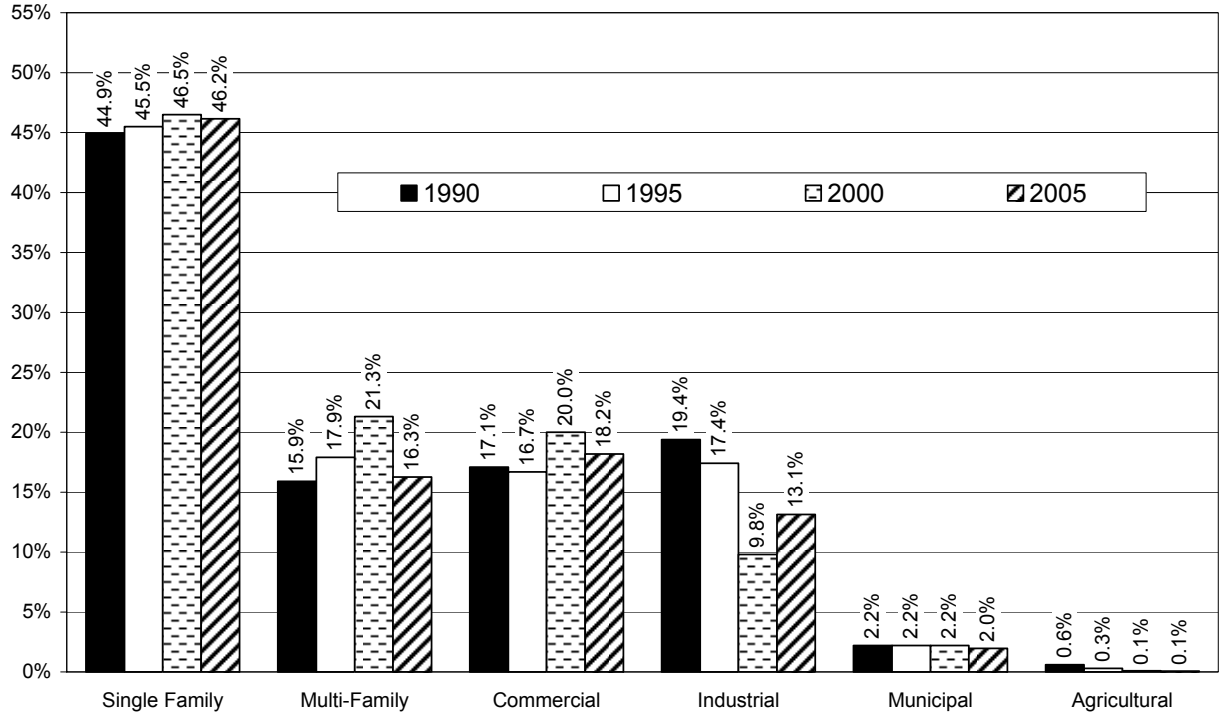
2.3 MAJOR WATER USE CATEGORIES

Water consumption within Fullerton can be categorized into five customer classes: residential, commercial, industrial, municipal, and agricultural. Figure 2-4 illustrates the percentage of total yearly water consumption for each customer class. It compares these percentages of each class for the Fiscal Years 1990, 1995, and 2000, and 2005. The calendar year 1989 was the base year adopted during the drought, as discussed later in Section 5. During the last ten years, single-family residential class increased by 0.7 percent, multi-family residential class decreased 1.7 percent, commercial class increased 1.5 percent, while the industrial class decreased by 4.3 percent of the total water sales.

Over 95 percent of lands with the City, exclusive of open space, parks and other recreational areas are developed. Land uses include 5,750 acres residential, 1,650 acres commercial, 1,250 acres industrial and 960 acres institutional. The largest area still to be developed is the proposed West Coyote Hills. This master planned community will compose of 760 single family attached and detached dwellings, 18.4 acres multiple use (public), 5.2 acres commercial, 282.9 acres habit conservation and 72.3 acres nature preserve.

It is expected the percentage of total sales for all classes except residential and industrial will remain about the same from 2005-2030. Total residential class is expected to increase another three percent of total water sales, with the industrial class decreasing 3.5 percent.

Figure 2-4
CUSTOMER CLASS PERCENT OF TOTAL WATER SALES
Fiscal Year 1989/1990, 1994/1995, 1999/2000, and 2004/2005



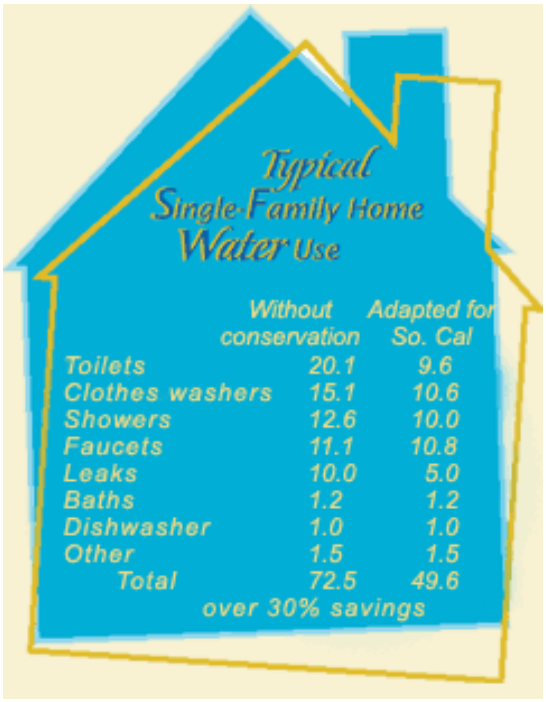
2.3.1 Residential Water Use

Single-family water use represents about 46.2 percent of total water sales in Fullerton's service area, down 0.3 percent in the last five years. In the same time period, multi-family water use represented about 16.2 percent of total water sales, a decrease of 5.1 percent.

Although single-family homes account for about 60 percent of the total occupied housing stock, they account for about 74 percent of the total residential water demands in the City of Fullerton. This is because, on a per-housing-unit basis, single-family households tend to use more water than households do in a multi-family structure such as apartment buildings. Reasons for this is that, on average, single-family households tend to have more persons living in the household, are likely to have more water-using appliances and fixtures, and tend to have more landscaping per home.

In order to project future water consumption and to determine potential water savings from conservation measures, it is important to determine the major areas of water usage. The MWDOC Plan estimates residential outdoor use at 55 percent and indoor use at 45 percent. Figure 2-5 presents an estimated indoor per capita use by fixtures. The "Adapted for So. Cal." column in the below chart indicates the gallons saved with conservation

Figure 2-5
Typical Single-Family Home Water Use (gallons)



Source: Metropolitan Water District

`2.3.2 Commercial Water Use

Commercial water use represents 18.2 percent of total water sales in Fullerton's service area, down 1.8 percent in the last five years. Although the number of accounts have increased, usage has decreased. A majority of this decrease is attributable to conservation. For the commercial customer class, the top water users include schools, colleges, government buildings other than municipal, regional parks, golf courses, hospitals, hotels, laundries, and restaurants.

2.3.3 Industrial Water use

Industrial water use represents about 13.1 percent of total water sales in Fullerton's service area, up 3.3 percent in the last five years. On average, residential and commercial uses had lower outdoor usage due to the wet year (FY 2004-05). Being that industrial users are a smaller sector, have little outdoor use, had an increase in indoor use, accounts for their increase as a percentage of total water sales. For the industrial customer class, major users include paper goods manufacturing, food processing, electronics, beverages, and other industries that use water as a major component of the manufacturing process.

2.3.4 Agricultural Water Use

Today, agricultural water use represents only 0.1 percent of Fullerton's total water sales. This is an insignificant amount compared with the City's agricultural demands during the 1950's. The ten remaining agricultural customers generally raise high-value crops such as nursery stock or strawberries.

2.3.5 Municipal (Institutional) Water Use

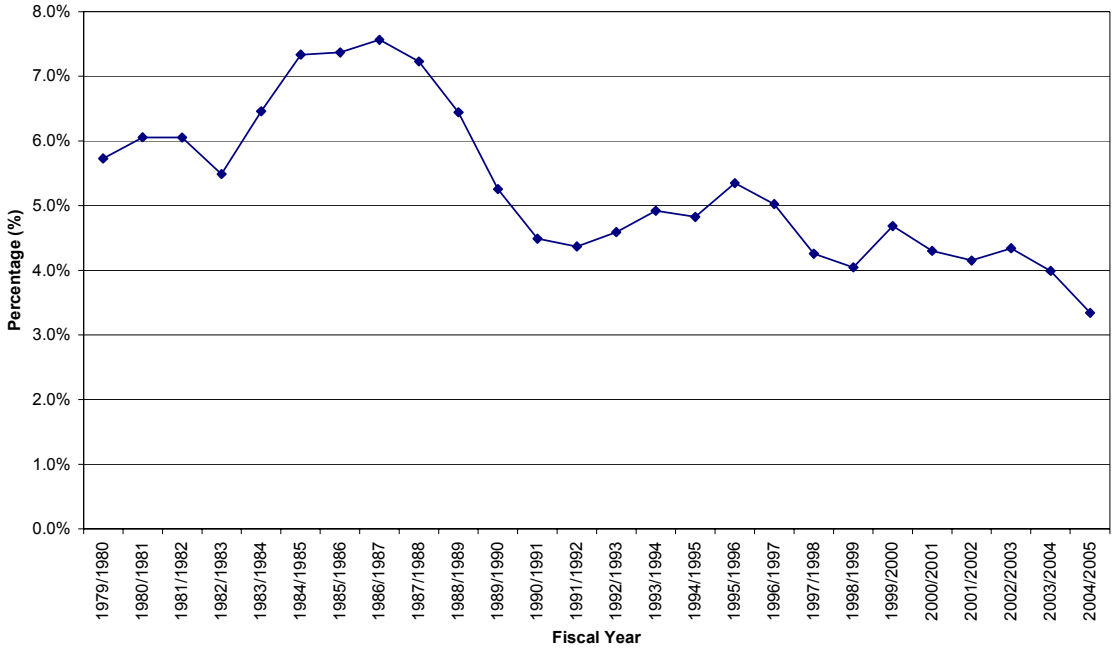
Municipal water use represents about 2.0 percent of total water sales in Fullerton's service area. Municipal water use includes parks, buildings, and facilities operated and maintained by the City of Fullerton.

2.3.6 Unaccounted (Unbilled) Water Use

The difference between a water utility's water production and water sales is classified industry-wide as unaccounted water. As mentioned previously, unaccounted water is fire line testing, and unbilled water such as fire fighting, storm drain cleaning, water main breaks, and broken or inefficient water meters. The nation wide average for unaccounted water is 16 percent. The American Water Works Association (AWWA) has established a benchmark of 9 percent as good water utility practice.

Shown in Figure 2-6, Fullerton's unaccounted water for the last five years has averaged 3.3 percent, well below AWWA's benchmark. The City has achieved this low percentage primarily through an aggressive meter testing and replacement program and a water main replacement program. For water production projections as discussed below, unaccounted water is assumed to be 5.3 percent of total water use through 2030.

Figure 2-6
WATER LOSSES - 5 YEAR RUNNING AVG.



2.3.7 Sales to Other Agencies

The City serves a small portion of Buena Park and La Habra directly. The City has connections to surrounding Cities/Agencies for emergency purposes only. These connections are described further in Section 5 of this Plan.

2.4 WATER DEMAND PROJECTIONS

Section 10631(k) of the Act requires that the City provides its wholesaler, Metropolitan and OCWD, projections of the water demand for the service are. Table 2-5 summarizes the City's current and projected water supplies. The water supplies projected here do not represent the total supply capacity, but rather the projected supplies to meet the projected demands.

Table 2-5
Agency demand projections provided to wholesale suppliers - AFY

	2005	2010	2015	2020	2025	2030
Fullerton Demands on MWD [1]	14,200	11,700	10,400	10,300	9,900	10,000
Fullerton Pumped-OCWD [1]	17,900	21,400	22,500	22,500	22,700	22,400
Total Demands on Fullerton [1]	**32,100**	**33,100**	**32,900**	**32,800**	**32,600**	**32,400**

(1) Projections provide by the City

Population, in general, affects water demand. Population densities, climatic factors, and temporal variations in water use based on characteristic behaviors of water consumers all

affect regional water use. The average gallons per capita per day demand (GPCD) is a useful criterion for evaluating the historic water demands of an area, as well as for projecting future water demands in conjunction with population and planning area projections.

It should be noted that per capita water use does not really express the amount of water used by an individual. This is because it includes all customer classes of water use (residential, commercial, industrial, municipal, and agriculture) and also unaccounted water use. As an example, the GPCD for the City for FY 1989-90 was 271. However, the GPCD, based on total residential water use divided by total population, was 159.

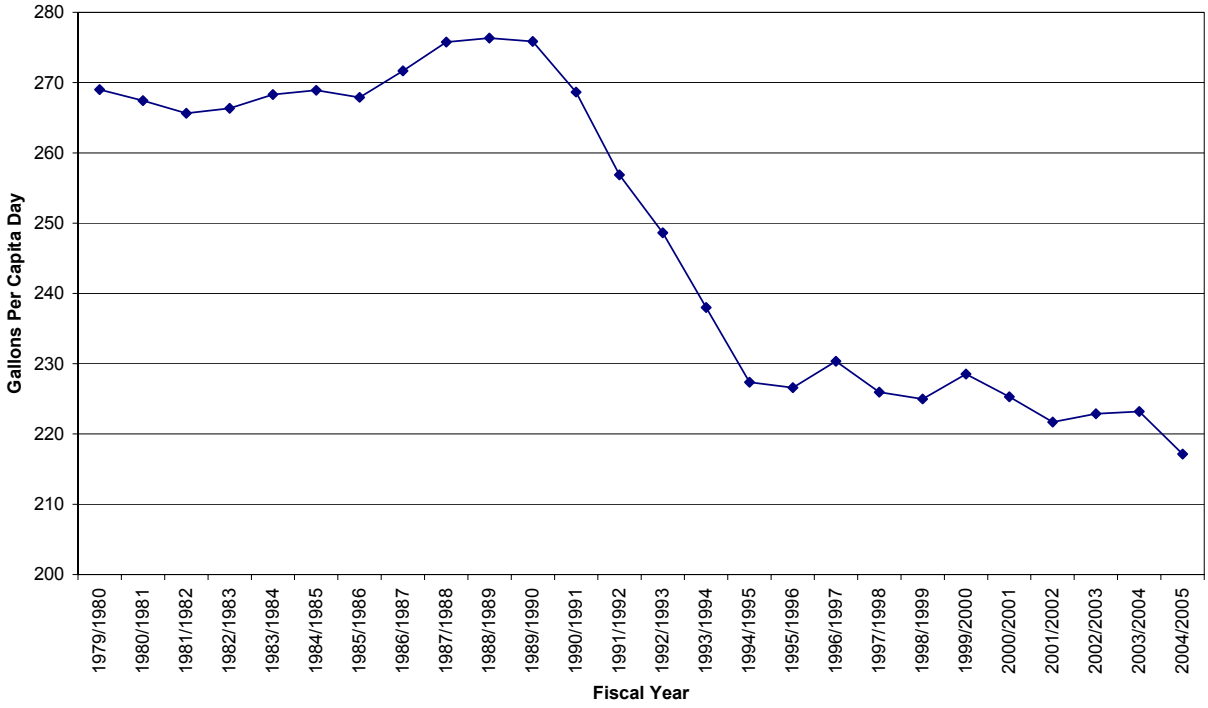
Key factors affecting per capita usage include relative share of residential versus nonresidential water use in an area, the number and type of housing units, number of employees, types of industry, types of commercial establishments, persons per household, lot sizes, income levels, and climate. Because of these various factors that affect per capita consumption, per capita consumption is not an accurate measure of water conservation efficiency, or for meaningful conservation program comparison of water agencies.

Historically, per capita consumption rates in the City have tended to increase at a low annual growth rate. Table 2-1 lists Fullerton's recorded annual water production and annual per capita consumption from 1972 to 2005. As shown, the overall per capita consumption from 1971-72 to 1989-90 averaged 277 gallons per capita per day (GPCD). However, in 1994-95, the GPCD decreased to 218 because of the abnormal conditions described below.

Figure 2-7 shows a five year running average of production GPCD. It illustrates the dramatic change that occurred to GPCD during the drought years and the lingering effects.

All water demand projections beginning in FY 2005-06 reflect demands under normal weather conditions. Per capita water demand is forecast to remain relatively constant over the 25-year forecast horizon.

Figure 2-7
WATER PRODUCTION (GPCD) - 5 YEAR RUNNING AVG.



2.4.1 Trends in Future Water Use

The current per capita water use of 206 gallons per capita per day (GPCD) is projected to decrease only slightly, by 3 percent, to 200 GPCD over the next 25 years. The total water use in the City's service area is expected to decline, although population is increasing. Figure 2-8 presents both the historic and projected FY water production amounts for the City.

Figure 2-8
Fullerton Water Production

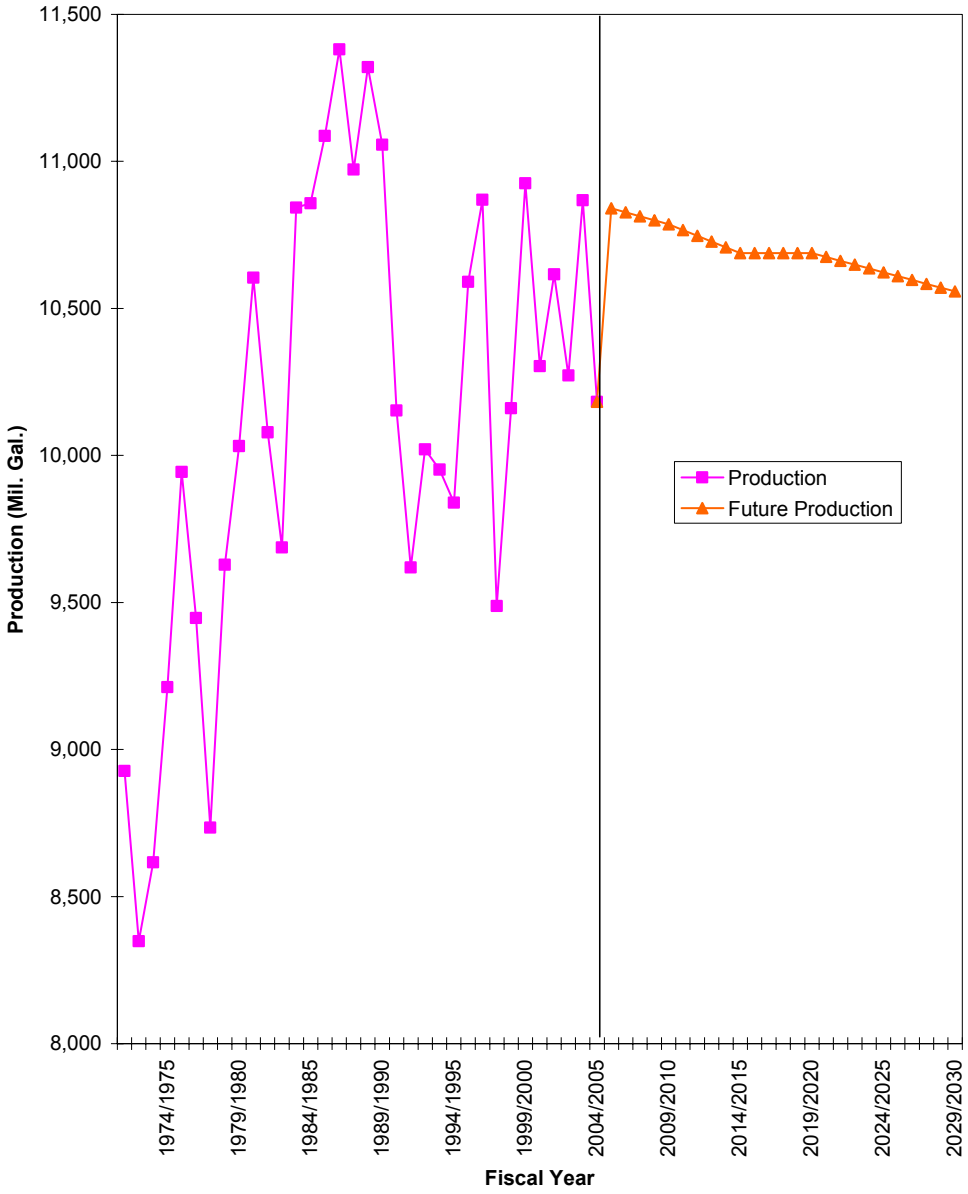
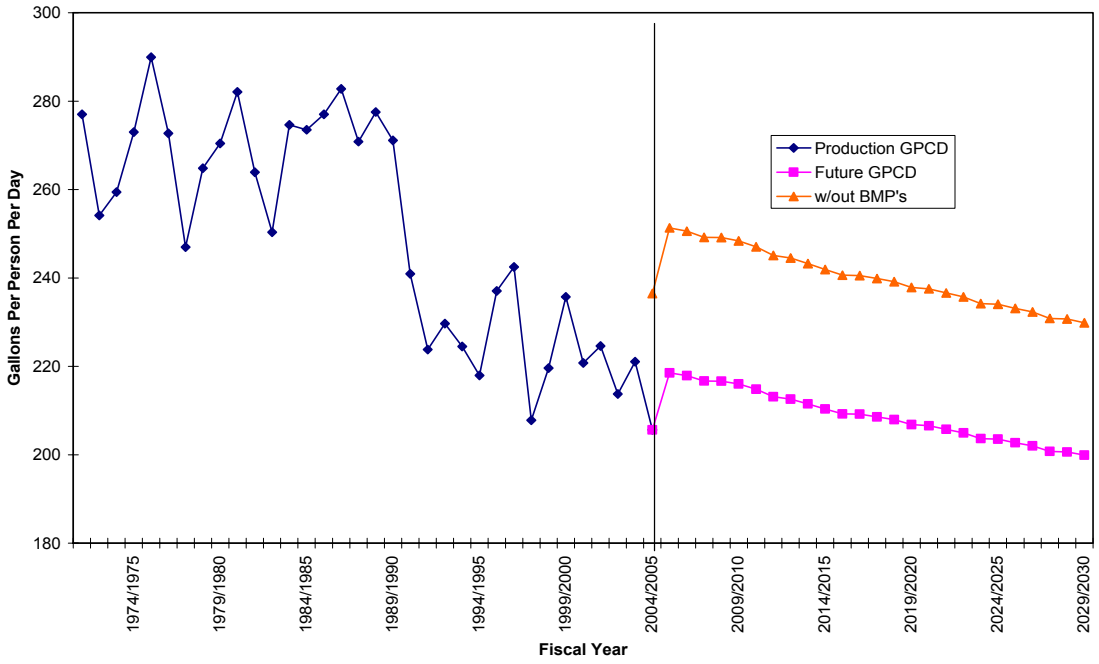


Figure 2-9 presents both the historic and projected per capita water use trends and shows the substantial impact of the implementation of the BMPs. Per capita usage is expected to rise to 237 GPCD, about 15 percent greater than the present unit demand factor, without such conservation measures. These unit demand factor projections are based on assumed normal (local average annual rainfall) conditions for the inland coastal area.

The long-range projections assume the City will implement a number of long-term water conservation measures, referred to as BMP's. A more detailed discussion of the City's efforts at implementing the BMPs is presented in Section 3.

Figure 2-9
Fullerton Gallons Per Capita Day (GPCD)



The City's water use by land use sector is expected to remain fairly constant over the next 25 years. Table 2-6 shows the projected the number of accounts and deliveries of water by land use sector through 2030. Both Figure 2-10 and Figure 2-11 present the 25 year forecast in graphical form. Residential, multi-family, commercial and institutional water use, both as a percentage of total water sales and total volume, should increase slightly and then taper off. In contrast, both industrial and agricultural shall decrease over next 25 years, with the agricultural class disappearing, replaced by residential and multi-family housing.

Table 2-6

CITY OF FULLERTON

Past, Current and Future Water Deliveries by Land Use Classification [1] [2]

Fiscal Year	2001		2005		2010		2015		2020		2025		2030	
Metered Water Use Sectors	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)	# of Accounts	Deliveries (AF)
Single Family	24,195	13,962	25,939	14,005	26,275	14,511	26,100	14,597	26,400	14,907	26,600	14,817	26,900	14,726
Multi-Family	1,947	5,438	1,941	4,937	2,000	5,265	2,100	5,249	2,200	5,249	2,250	5,217	2,300	5,185
Commercial	1,889	5,885	1,954	5,515	2,315	5,955	2,410	5,901	2,415	5,901	2,435	5,865	2,455	5,829
Industrial	136	3,324	133	3,986	135	3,510	135	3,323	135	3,137	135	3,025	135	3,007
Municipal	211	611	230	599	230	721	230	714	230	714	230	710	230	706
Agricultural	10	32	10	24	5	12	0	0	0	0	0	0	0	0
Landscape	250	1,012	344	1,262	355	1,097	365	1,087	375	1,087	375	1,080	375	1,074
Other (3)	387	84	411	16	425	1,367	425	1,273	425	1,149	425	1,235	425	1,227
Total	29,025	30,347	30,962	30,344	31,740	31,341	31,765	31,057	32,180	31,057	32,450	30,868	32,820	30,679

(1) Past and current sector usage data is based on billing account records at the City of Fullerton.
(2) Percentage of land use is based on past percentages, Coyote Hills development and demand projections provided by MWD and OCWD.
(3) From COF Table 2-1 - Includes temporary accounts and firelines.

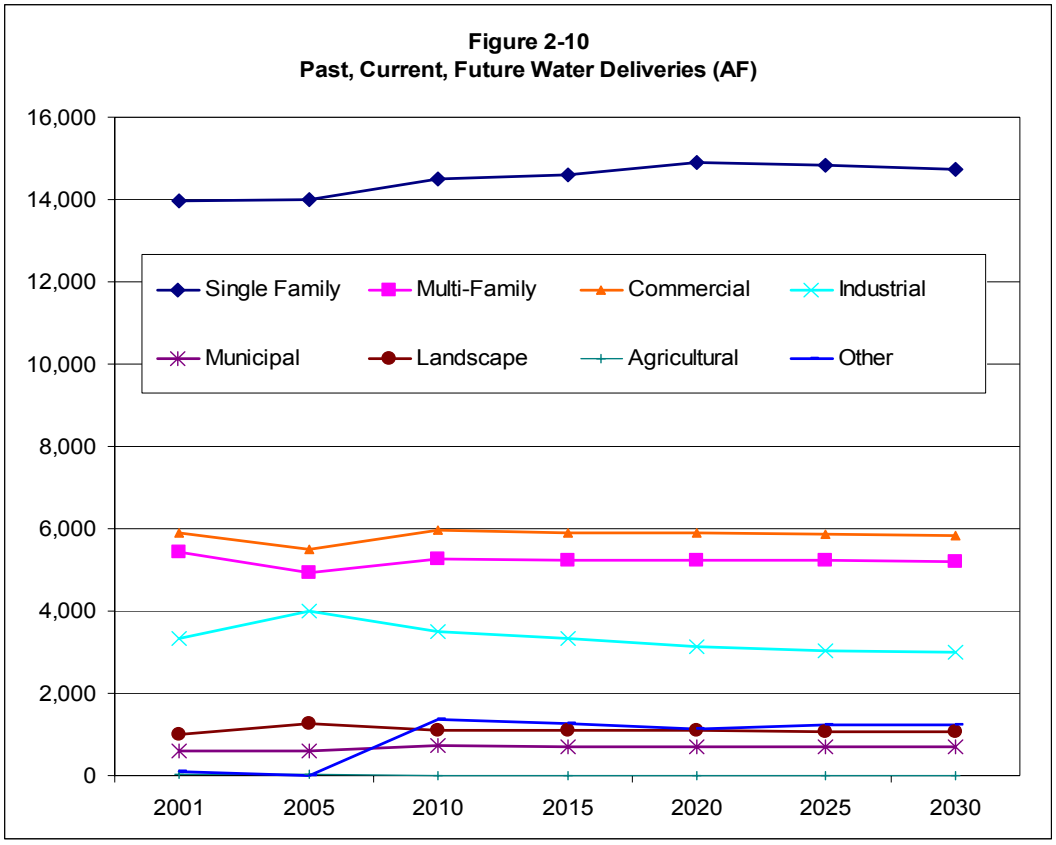
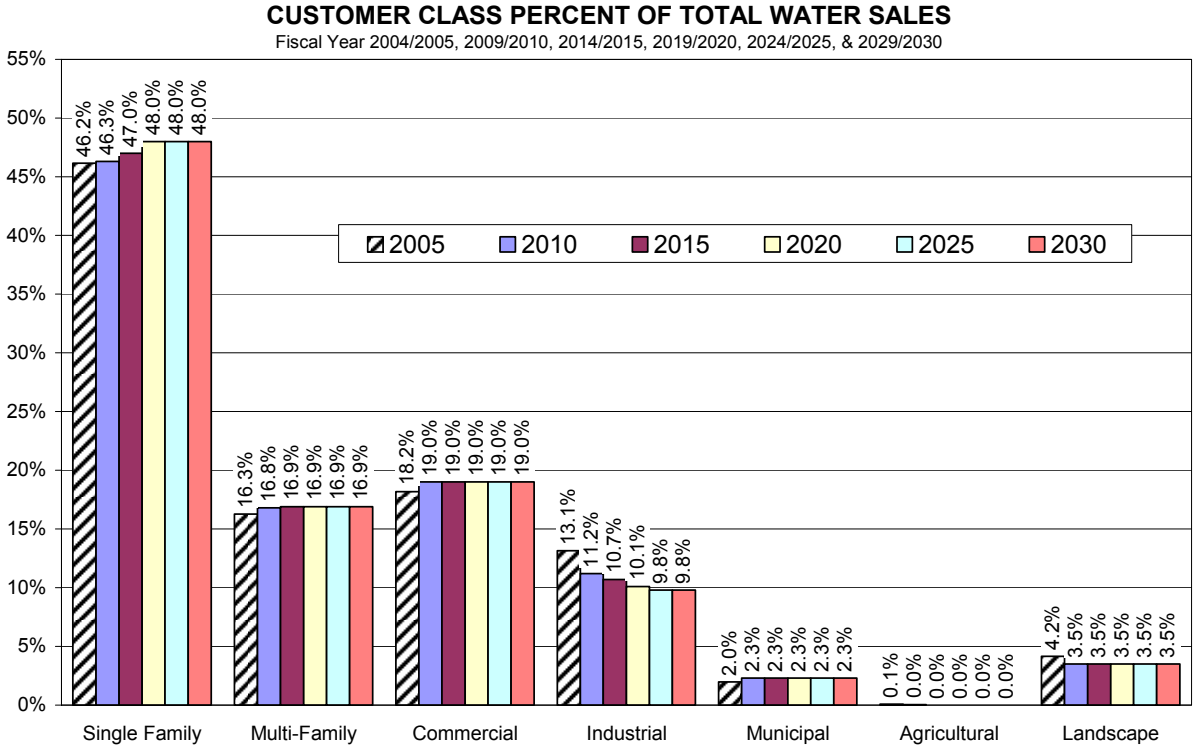


Figure 2-10
Past, Current, Future Water Deliveries (AF)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Single Family
Multi-Family
Commercial
Industrial
Municipal
Landscape
Agricultural
Other
2001
2005
2010
2015
2020
2025
2030

Figure 2-11


CUSTOMER CLASS PERCENT OF TOTAL WATER SALES
Fiscal Year 2004/2005, 2009/2010, 2014/2015, 2019/2020, 2024/2025, & 2029/2030
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
2005
2010
2015
2020
2025
2030
46.2% 46.3% 47.0% 48.0% 48.0% 48.0%
16.3% 16.8% 16.9% 16.9% 16.9% 16.9%
18.2% 19.0% 19.0% 19.0% 19.0% 19.0%
13.1% 11.2% 10.7% 10.1% 9.8% 9.8%
2.0% 2.3% 2.3% 2.3% 2.3% 2.3%
0.1% 0.0% 0.0% 0.0% 0.0% 0.0%
4.2% 3.5% 3.5% 3.5% 3.5% 3.5%
Single Family
Multi-Family
Commercial
Industrial
Municipal
Agricultural
Landscape

2.4.2 Demand Projection Model

To forecast urban water demand, Metropolitan uses the MWD-Main Water Use Forecasting System. MWD-Main features statistical models that have been adapted to conditions in Southern California. The model is based on demographic variables, including population, occupied housing, employment, and household income. Demographic and economic variables were projected from regional planning agencies (the Southern California Association of Governments, or SCAG and the San Diego Association of Governments, or SANDAG). The model also takes into account the price of water in a locality.

For groundwater supplies from the OCWD basin, MWDOC worked closely with OCWD to project the production of groundwater from Orange County Basin (Lower Santa Ana Basin) The projections were done by using the "Water Balance Model" developed by MWDOC and the following assumptions gathered in coordination with OCWD and MWD staff:

1. Projections of Santa Ana River base flow
2. Projections of Santa Ana storm flow
3. Projections of GWRS production
4. Evaluation of Basin spreading capacity based on current CIP
5. Evaluation of Basin maximum pumping capacity
6. Projection of MWD Replenishment Supply
7. Projection of Incidental Recharge
8. Determine the boundary of accumulated overdraft (ideal operational level).

Presently, the City's planning data is from the above sources, along with the City's planning department estimates, and Fiscal Year data is used instead of calendar year.

SECTION 3

CONSERVATION AND PUBLIC AFFAIRS PROGRAMS

SECTION 3
CONSERVATION AND PUBLIC AFFAIRS PROGRAMS

3.1 FULLERTON COMMITMENT TO CONSERVATION

The City of Fullerton recognizes water conservation as a priority in its water use planning. The long-term goal of the City's water conservation program is to achieve and maintain water use efficiency in Fullerton's service area. Specific objectives for achieving this goal include the following:

- Elimination of wasteful practices in water use
- Continued development of information on both current and potential water conservation practices
- Ongoing implementation of conservation practices

3.2 ELEMENTS OF FULLERTON CONSERVATION PROGRAMS

3.2.1 Summary of Fullerton's Water Conservation Activities

Table 3-1 shows a summary of the water conservation, distribution system management, and water management activities that have historically and/or currently being implemented by the City of Fullerton.

Table 3 - 1

WATER CONSERVATION MEASURES
BY CITY OF FULLERTON

ACTIVITY	DESCRIPTION
I. Education and Public Information	
A. Films and Videos	The City at no charge provides films and videos that promote water awareness and conservation on a loan basis.

ACTIVITY	DESCRIPTION
B. School Programs	The Municipal Water District of Orange County (MWDOC) is contracted by the City to conduct programs in Fullerton schools that teach and promote water conservation. A discussion of MWDOC's school program is discussed later in this Section and covered in the 2005 Regional Urban Water Management Plan Update prepared by MWDOC (MWDOC Plan).
C. Information Brochures	The City of Fullerton furnishes and displays informational brochures on water conservation key topics that include low-water-use landscaping and water-saving tips.
D. Billing	Water bills and billing inserts have been used to promote water conservation.
E. Press Releases	The City has developed press releases and conducted interviews concerning programs, resolutions, and ordinances relating to water conservation.
F. Speakers Bureau	The City provides speakers for unsolicited requests from various civic, business, community, and homeowner groups for oral presentations by City staff on key issues that affect the City's water supply such as drought and water conservation.
G. Water Awareness Month and the Fullerton Market	The City has for several years participated in Water Awareness Month activities. During Water Awareness Month the City sponsors a booth at the weekly Fullerton Market to distribute water awareness and conservation materials.
H. Cable TV Messages	Conservation messages have been presented on the City's cable TV channel.
I. Tours	The City, in association with the Metropolitan Water District of Southern California (Metropolitan), annually sponsors a three-day trip to the Colorado River for community leaders. This tour is instrumental in educating the public on issues relating to water conservation and to familiarize and educate them about the Colorado River Aqueduct and State Water Project facilities and the need to conserve and augment supplies

ACTIVITY	DESCRIPTION
	transported by those facilities. Tours of City facilities are available upon request for civic and community groups.
J. Awards and Recognition	The City has publicly recognized water customers who have demonstrated significant water reductions from their water conservation efforts. Greater emphasis is being placed on public recognition because of its motivational approach to encouraging community water conservation. Local Fullerton students have consistently won top honors in a water conservation poster contest sponsored by MWDOC. The City Council recognizes and awards the students and their teachers at a City Council meeting.
II. Promotional Measures	
A. Water Conservation Kits	During the 1977 drought, water conservation kits were distributed throughout the city. In 1981, water conservation kits were distributed in the Fullerton service area during the Department of Water Resources' mass mailing program. The Utility continued providing conservation device kits upon request through 1985. Utility policy from 1985 through 1988 was to provide information on the private purchasing of kits and devices. Since 1988 the Utility has resumed providing conservation device kits upon request. These kits generally contained toilet-tank displacement devices, showerhead flow restrictors, dye tablets that help identify toilet leaks, instructions, and conservation information.
B. Work with Other Agencies	
1. State Agencies	Work with the Department of Water Resources (DWR) on water audit and leak detection programs.
2. Other Organizations	Coordinate water conservation activities with those of other organizations such as the Orange County Sanitation

ACTIVITY	DESCRIPTION
	District.
3. Conferences	Participation in conferences and forums which promote water conservation.
C. Demonstration of Low-Water-Using Landscapes	The City encourages the development of low-water-using landscapes by making water customers aware they can view such demonstrations at the Fullerton Arboretum.
D. Landscape Classes	The City, in cooperation with Metropolitan and the Fullerton Arboretum, sponsors water efficient landscape irrigation classes at the Arboretum.
III. Distribution System Management	
A. Water Audit	In 1985 the City completed a detailed water audit of the entire distribution system.
B. Meter Program	All source supply lines and customer service lines are metered. Small water meters (1 ½ inch and smaller) are replaced every 15 years. Large water meters are tested and repaired as follows: • 2" every 3 years • 3" and 4" every year • 6" and larger every 6 months A large-meter upgrade program has recently been completed. This program added hardware to all two-inch and larger meters so they could easily be field tested without being removed from service. Being able to aggressively test large meters has been the single most important factor in reducing the unaccounted (unbilled) water of the Utility to below five percent.
C. Corrosion Control	A corrosion control program is maintained on all new water main installations since 1980.
D. Valve Maintenance	All valves are maintained and exercised every year or three years depending on size.
E. Leak Detection Program	The City participated in the Water Audit and Leak Detection program of the California Department of Water Resources.

ACTIVITY	DESCRIPTION
F. Pipeline Replacement	The City has an active pipeline replacement program with an annual capital expenditure of $750,000.
IV. Water Management	
A. Advisory Committee	The City has an Energy and Resource Management Committee consisting of eleven private citizens appointed by the City Council. The City Council relies on the committee for recommendations and input on water-related issues as well as other energy and resource related matters.
B. Pricing	See water pricing and rate structure discussion later in this Section.
C. Landscape Ordinance	The City of Fullerton's Ordinance No. 2700, requires water conservation landscaping in new and upgraded developments.
D. City's General Plan	The City's adopted General Plan outlines goals, policies, and programs relating to water conservation.

3.2.2 Participation in Metropolitan's and MWDOC's Regional Conservation Programs

Metropolitan and MWDOC implement a number of conservation activities in southern California on a regional level. A discussion relating to water conservation activities including conservation research is covered in Chapter III of Metropolitan and MWDOC Plans.

During the drought and at other times, Fullerton has worked with Metropolitan in distributing water conservation kits. The kits generally contain a low-flow showerhead, two faucet aerators, a toilet dam, toilet tank leak detection dye tablets, informational handouts, and a participation form. These kits, provided by Metropolitan, were distributed to customers upon request. Residents who received a kit were asked to fill out the participation form for tracking purposes.

The City relies heavily on Metropolitan for water conservation informational brochures and other water-related literature. This public education literature was extremely important during the drought. Metropolitan's media campaigns help the City get the conservation message across to its customers.

Fullerton's City Council appointed Metropolitan Director provides inspection trips of the Colorado River Aqueduct, the California Aqueduct, and other key Metropolitan facilities. These inspection trips show local residents and community leaders how Metropolitan is working to ensure reliable supplies and high-quality water for southern California. The inspection trips also

emphasize the importance of the efficient use of water as a way of life and not just a response to periodic droughts.

Metropolitan's Conservation Credits Program has driven much of the regional conservation effort by providing financial support to its member agencies. This program subsidizes approved conservation projects with its member agencies. Although Fullerton is not currently participating in this program, the City continues to review successful projects of other agencies to determine if similar projects can be implemented in Fullerton.

MWDOC's many conservation programs and its relationship with the City is discussed later in the Section.

3.2.3 Implementation of Conservation Best Management Practices

On December 11, 1991, an agreement known as the "*Memorandum Of Understanding Regarding Water Conservation in California*" (MOU) was signed in Sacramento. This agreement mandated the implementation of water conservation programs throughout the state known as BMP's. The MOU was revised in March of 2005.

The BMPs, as shown in Table 3-2, are generally thought of as conservation practices that are established and considered to be cost effective. The two groups that created these BMPs were comprised of various representatives of interest groups meeting to reach a consensus on a process to resolve the water conservation issue for the Bay/Delta hearings. Under this BMP process, participating urban water suppliers would agree to use "good faith efforts" to implement proven water conservation measures, and study additional conservation measures, implementing those that prove to be effective. In return for this commitment, participating environmental organizations would agree to recommend to the State Water Regional Control Board (SWRCB) that implementing the BMP process is a sufficient water conservation program and that the SWRCB should use only reliable estimates of conservation savings for the agreed-upon BMPs in its water rights decisions for the Bay/Delta hearings. Other important advantages of implementation of the BMPs will be the increased reliability of water supplies to the southern California area.

At the present time, over 328 water agencies throughout the state have signed the MOU. These agencies represent mostly the larger water districts and cities. Many of the smaller agencies may have been reluctant to sign because of staffing and funding restraints. Fullerton became a signatory to the agreement in January 1996.

One of the City of Fullerton's obligations as a signatory to the MOU is to submit a Best Management Practices Retail Water Agency Report Filing (report) to the CUWCC. The MOU established the CUWCC to monitor implementation of the BMPs. The report to the CUWCC details the City's progress in implementing the 14 BMPs as currently specified in the MOU. The City's most recent filing of the report is attached as Appendix C.

Metropolitan and OCWD, the City's two water wholesalers, have policies and procedures that incorporate the BMPs. It is expected that future water rate policies of these two agencies may have components tied to member agency participation in the BMPs.

The following section summaries the best management practices that have and are being employed by the City. These practices are at various stages from ongoing to the late development process as shown in the City's latest filing report in Appendix C. Many of these practices will be expanded if their technical, economic, and other effects are found to be satisfactory.

Table 3-2

BEST MANAGEMENT PRACTICES

No.	Practices
1.	Residential Water surveys
2.	Residential Plumbing Retrofits
3.	System Water Audits, Leak Detection
4.	Metering and Commodity Rates
5.	Large Landscape Audits
6.	High Efficiency Washing Machines
7.	Public Information
8.	School Education
9.	Commercial, Industrial, and Institutional
10.	Wholesale Agency Assistance (1)
11.	Conservation Pricing
12.	Conservation Coordinator
13.	Water Waste Prohibition
14.	Residential ULFT Replacements

(1) Applies only to wholesale water agencies and not to retailers such as the City of Fullerton

BMP #1 - Residential Water Surveys

The City does not have a residential water surveying program in place.

BMP #2 - Residential Plumbing Retrofits

The City enforces the plumbing code requirement of ultra-low-flush toilets in all new construction. Low-flow showerheads are distributed at the Engineering office and through special events such as the annual street market (Fullerton Market).

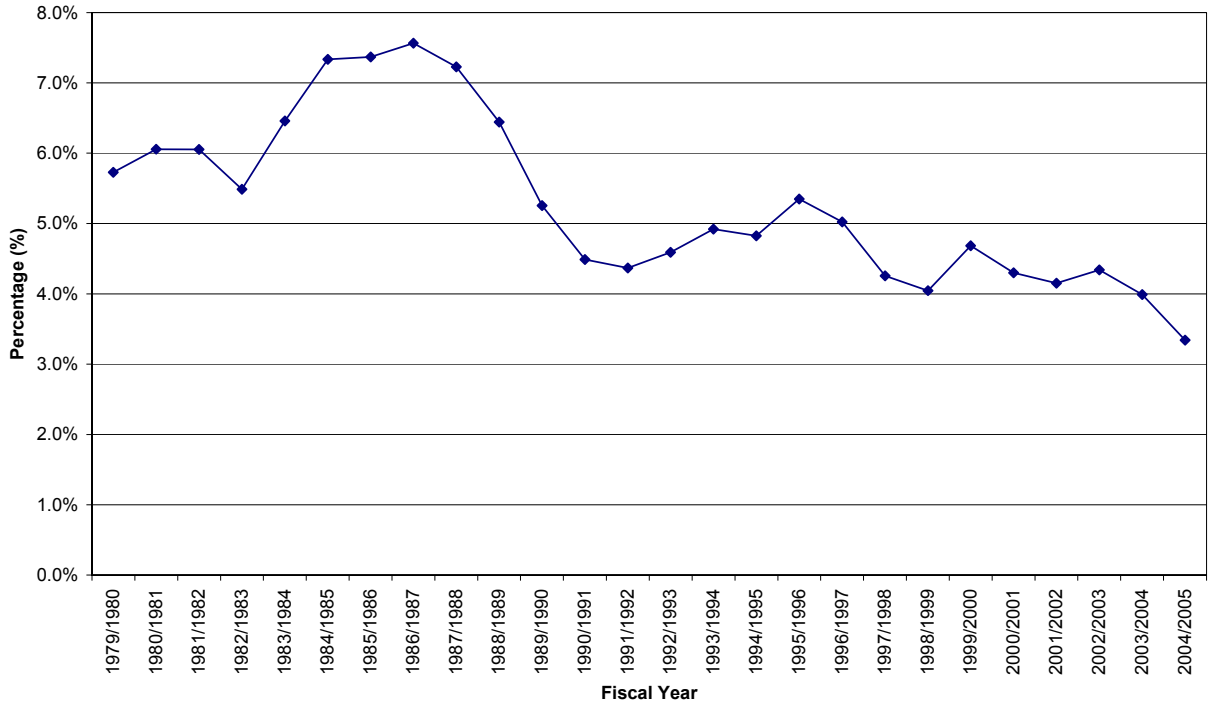
In 2000, MWDOC and MWD conducted the O.C. Saturation Study and found countywide low flow saturation rates of 66.9% in single-family units and 59.8% in multi-family dwellings. Linear extrapolations of the Saturation Survey for 2003-04 show 70% saturation for single families and 60% for multi-families for the City. This will be compared to the BMP requirement of 75% saturation to determine countywide compliance with the BMP.

BMP #3 - System Water Audits, Leak Detection

In 1985 the City completed a detailed water audit of its water distribution system and a leak detection survey of 25 percent of its distribution system. An audit measures the water into the water distribution system and the water delivered to users. It is a tool to quantify unaccounted (unbilled) water losses and evaluate the effectiveness of measures to reduce those losses. These programs were developed through the Department of Water Resources, which provided partial funding. A leak detection consultant conducted an electronic survey of the Utility's old downtown service area where most of the older mains are located. No main line leaks were found.

An American Water Works Association standard suggests that if a water system's unaccounted (unbilled) water losses exceed nine percent, a distribution system audit could be cost effective. The City's unaccounted water losses for the last five years, as shown in Figure 3-3, has averaged 3.3 percent. The City will continue to monitor annual water losses; however, it does not appear a distribution system water audit would be cost effective based on the low percentage of unaccounted water losses.

Figure 3-1
WATER LOSSES - 5 YEAR RUNNING AVG.



BMP #4 - Metering and Commodity Rates

All water service supplied by the City are fully metered and customers are billed by volume of water used. As mentioned in Table 3-1, the City's large water meter upgrade program and the aggressive testing of these meters has been the single most important factor in reducing unaccounted water losses to below five percent. Now that the upgrade program is nearing completion, efforts will be directed at continuing the City's aggressive meter testing program.

Until approximately fifteen years ago, a single meter generally served all customer demands, except fire. Since that time, many of the large multi-residential, commercial, and industrial customers have had separate meters installed for landscaping purposes. In recent years, the City is becoming more aware of the potential benefits of separate landscape meters. Separate landscape metering can measure the effectiveness of landscape water conservation efforts and be utilized for future drought allocation purposes.

Presently there are 344 landscape meters, with most of them associated with multi-family developments. The City plans to conduct a feasibility study of the merits of a program to separate landscape water from master meter accounts by providing dedicated landscape meters.

BMP #11 describes how the City is using water rates for conservation and a brief history of how the commodity rate has been altered over the years for conservation purposes. Also, a description of a newly adopted landscape water rate for residential customers is discussed.

BMP #5 – Large Landscape Audits

MWDOC performs a local program targeting landscape irrigation efficiency. This program includes a Landscape Contractor Certification Program; a computer controlled irrigation system retrofit program and a bilingual irrigation management training program for professional landscape contractors and residential do-it-yourselfers.

The Landscape Contractor Certification Program is designed to develop landscape irrigation budgets for dedicated landscape meters in cooperation with landscape contractors, property management companies, and school districts. This program also provides technical training for landscape contractors on how to irrigate more efficiently including landscape area measurement, irrigation system maintenance, irrigation system upgrades and marketing.

The computer controlled irrigation system retrofit projects are successfully utilized by homeowner associations in the City to better manage landscape irrigation. These systems allow irrigation system scheduling adjustments at one office location rather than at each irrigation controller in the field

The Protector Del Agua is a bilingual irrigation management training program for professional landscape contractors and residential do-it-yourselfers. The program provides training ranging from basic plant-soil-water interactions to advanced irrigation schedule programming.

Fullerton has joined with MWDOC in providing these programs in the City's service area. To date, one large landscape audit has been performed.

BMP #6 – High Efficiency Washing Machines

Fullerton offers a rebate program in conjunction with MWDOC (sponsored by MWD) for high-efficiency clothes washers (HECW). The customer calls an 800 number and receives the rebate application. An application can also be found on the City’s website. Once filled out, mailed and verified, the applicant will receive a rebate of $100 from Metropolitan. The City has installed 904 HECW with a cumulative water savings across all fiscal years of 34.50 acre feet through FY 2004-05.

BMP #7 - Public Information

Most of the public information programs have been described in Table 3-1. These are ongoing programs and will be continued at the present level or expanded. The main goal is to help the public understand current issues and the challenges, opportunities and costs involved in securing a reliable supply of high quality water.

As part of "Water Awareness Month" the Utility has a booth at the Fullerton Market. Water Utility employees participate by answering questions and handing out literature and water saving devices.

The City distributes conservation literature at City Hall and a number of other public venues. Monthly bill inserts and messages on water bills furnish customers tips and information on the efficient use of water.

The City has participated with the Fullerton Arboretum and Metropolitan to provide landscape irrigation classes that promote efficient use of irrigation systems. Currently, the Arboretum offers a class on California Native Landscaping twice per year. Also, Fullerton Junior College offers a landscape education program whose field work takes place at the Arboretum.

BMP #8 - School Education

The City contracts with the MWDOC to provide a school education program within the City's service area. Established in 1974, MWDOC's School Education Program is one of the oldest and most respected in the state. The program was created to educate the county's young citizens about water and to establish early habits of water conservation. The school program began in Fullerton on January 1, 1989.

Grade-specific programs with State-approved curriculum are offered for students from kindergarten through high school. Programs include classroom presentations by MWDOC staff teachers, audio-visual programs, hands-on activities, take-home materials for students, and workbooks and supplies for teachers.

Additional activities complement the class-room presentation. These activities include a poster and slogan contest for students to express their conservation ideas; live theater, teacher workshops, and in-services to supplement the program curriculum; participation in a variety of school events such as career days and science fairs; and distribution of literature and other educational materials. Fullerton students consistently win top honors in the poster and slogan contest and these students and their teachers are recognized by the City Council.

During FY 1990-00 through FY 2004-05, a total of 37,920 students in the City's service area were educated through MWDOC's school education program. MWDOC's Plan describes their Water Education Program in greater detail.

BMP #9 and #9A – Commercial, Industrial, and Institutional Programs

During the 1987-1992 drought, the City developed and adopted an Industrial Audit and Meter Loan Program. The purpose of this program was to encourage industrial water customers to conserve water by auditing their existing water usage. An audit is the first step in establishing an effective water conservation and management program. Water meters were loaned to industries so they could place them at strategic locations in their onsite systems to monitor usage. By determining leakage, inefficient usage, and areas where recycling or reclamation is economical, it was anticipated that industrial water customers would achieve average water savings of ten percent.

The City was disappointed in the response to its Industrial Audit and Meter Loan Program. The poor response indicates that promotion and exposure of the program may have been lacking, or that many of the industrial customers had proficient water conservation programs in place.

Recently MWDOC has participated with Metropolitan's Commercial, Industrial and Institutional (CII) rebate program. While Metropolitan utilizes a top down approach targeting corporate centers to affect major chains to retrofit multiple sites, MWDOC works with its member agencies and with the City to target smaller commercial and institutional sites to retrofit high water using devices. In order to provide the highest possible funding incentive, MWDOC is looking to OCSD and OCWD to augment the funding provided by Metropolitan and the U.S. Bureau of Reclamation (USBR) for the retrofitting of high-flow devices with low-flow devices.

The City of Fullerton is a participant in MWDOC's program. The City has installed 321 Retrofit devices with a cumulative water savings across all fiscal years of 78 acre feet. Table 3.2 lists the rebates available.

BMP #10 – Wholesale Agency Assistance

Applies only to wholesale water agencies.

BMP #11 - Conservation Pricing

The Utility's water rate structure is evaluated for its ability to provide adequate, stable revenues; promote equity among customer classes; facilitate implementation and administration; and encourage water conservation. Water rate schedules consist of two component charges: the customer charge, which varies by the size of the meter; and the water commodity charge, which depends on the actual consumption of water.

In 1982, the City Council approved replacing the existing three-block declining rate structure with a uniform rate structure. The change to a uniform rate had a positive conservation effect over the declining block rate structure, especially for large industrial and agricultural customers.

From 1982 to 1992 the customer charge component of the water rates remained the same, while the commodity component increased to provide revenues to meet increasing costs. This rate design, low customer charge and higher commodity charge, was structured intentionally to further encourage water conservation through pricing. The high-commodity, low-customer charge rate structure can present a shortfall revenue problem during years of high rainfall or years of low demand. This was evidenced for fiscal years 1990-91 through 1993-94 (at the end of the drought) when lower revenues did not meet costs.

In January of 1996 the City Council approved a three-block, ascending rate structure. This rate structure meets the Utility's goal of a schedule of water rates that provides for equitable cost recovery for customers while also promoting conservation of water by the use of pricing signals. The three-block ascending rate structure applies only to single-family and multi-family residential class customers with all other classes remaining on a uniform one-block rate structure.

This action has had an effect on water demands, as 68 percent of total water sales are from the residential sector.

In May of 2000, the City Council approved a new rate structure for landscape accommodation. It is applicable to single-family and multi-family customers for landscape purposes. In May of 2005 the City Council approved a new three-block rate structure. Once again, this rate structure provides equitable cost recovery for customers while also promoting conservation of water by use of pricing signals.

The City has chosen a surcharge of the water bill versus a fixed charge for its method of applying sanitation charges. This method helps encourage water conservation through pricing.

As the City is unable to serve reclaimed water in its service area, it has no reclaimed water rate. Reasons for the inability to serve reclaimed water are described in Section 4.

BMP #12 - Water Conservation Coordinator

The City has always assigned someone the responsibilities for handling water conservation programs. During the droughts these responsibilities were increased, and extra staff was provided. Presently the City has a designated water conservation coordinator responsible for managing and implementing the City's Water Use Efficiency Best Management Practices. This involves coordinating and working closely with DWR, MWDOC, Metropolitan, OCWD, and CUWCC.

BMP #13 - Water Waste Prohibition

City Ordinance 2436 Fullerton Municipal Code Section 12.04.090 prohibits water wasting. The City's adopted Emergency Water Conservation Plan described in Section 5 deals effectively with the wasting of water. However, this language is only in effect when one of the five phases outlined in the plan is implemented. The City reviews new construction and tenant improvement plans for potential water efficiency.

BMP # 14 – Residential ULFT Replacements

In the past, the City has worked with both OCWD and MWDOC in a toilet distribution program. Currently, the City participates in a region rebate program for both single-family residents and multi-family residents. MWDOC administers the program on the City’s behalf. The program encourages Orange County residents to replace their water guzzling toilets with 1.6 gallon per flush ULFTs. Both single and multi-family properties benefit from this on-going ULFT program.

The City has installed 16,180 low flow toilets with a cumulative water savings across all fiscal years of 3,675 acre feet through FY 2004-05.

3.3 POTENTIAL WATER CONSERVATION PRACTICES

Fullerton's future conservation efforts will be aimed towards committing resources in implementing the established BMPs as shown in Table 3-2 and Appendix C. If research or studies indicate a new BMP is proven to save substantial amounts of water in a cost-effective manner, then Fullerton will consider its implementation.

3.4 CONSERVATION PROGRAM EFFECTIVENESS

The CUWCC is charged with the responsibility to identify and adopt savings estimates for the BMPs. The MWD-MAIN Model, as discussed in Section 2, forecasts water demands on a regional basis. The BMPs reports in Appendix C give detailed information on the City's implementation and savings achieved from each BMP. Table 3-3 gives a summary of conservation programs effectiveness. The City relies on Metropolitan's research to evaluate the effectiveness of its BMPs and to better quantify future cost/benefit ratios.

Table 3-3
CONSERVATION ACHIEVEMENTS IN THE CITY OF FULLERTON
(Though FY 2004-05)

BMP Number	BMP Name/Agency	Number Implemented	Water Savings (AF)
1	Residential Water Surveys	-	-
2	Low Flow Shower Heads Distributed	70% Saturation for single-family • 60% Saturation for multi-family	-
3	System Water Leaks	Fullerton survey's & repairs each year	-
4	Metering and Commodity Rates	344	N/A
5	Large Landscape Audits	1	N/A
6	Residential High Efficiency Washer Rebate	904	34.50
7	Public Information: Material And Programs Provided	-	-
8	School Education	37,920 Students	N/A
9	Commercial, Industrial Institutional Retrofit Devices	321	78.0
10	Does Not Apply		
11	Conservation Pricing: Commodity Rate Structure In Place	N/A	N/A
12	Conservation Coordinator	1	N/A
13	Water Waste Prohibition: Ordinance Prohibiting Water Waste	N/A	N/A
14	Residential ULFT Replacement	16180	3675.0

SECTION 4

WATER SUPPLY AND MANAGEMENT

SECTION 4
WATER SUPPLY AND MANAGEMENT

4.1 WHOLESALER DEPENDENCY

While the City of Fullerton has methods of controlling service area water demands as discussed in Sections 3 and 5, it virtually has no control over water supply. The City is fully dependent on Metropolitan and the OCWD for water supply. Fortunately, these agencies have provided adequate, reliable water supplies to serve the City's needs. The City is optimistic that its current water supply from MWD and OCWD will be adequate to meet essential water demands for the next 20 years.

In order to meet short-term water demand deficiencies, and short or long-term drought requirements, the City has to implement or pass through the policies and requirements of Metropolitan and OCWD. It is difficult to project future City water supplies unless the restrictions and allocation assignments placed on the City by these wholesalers are known.

The City of Fullerton continually looks at practices aimed at providing its customers with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible manner. The City will coordinate its long-term water shortage planning with Metropolitan and the OCWD. This planning is outlined elsewhere in this Section, Chapters II and III of Metropolitan's Plan and OCWD's Master Plan.

4.2 CITY'S TWO WATER SOURCES

4.2.1 Groundwater Source (OCWD)

The OCWD is governed by a ten-member board of directors, with the City Council of Fullerton appointing a director from Fullerton. They are responsible for managing the underground water reserves that supply about 500 wells within its boundaries of the Santa Ana River Basin. Over the years, these reserves have become more a storage of supply than a source, as they are continually being recharged from natural runoff, treated wastewater, and imported water. This large groundwater basin is used as a reservoir to store water during wet years and overdraft storage in dry years.

OCWD operates a system of diversion structures and recharge basins along the Santa Ana River (SAR) that capture most of the storm runoff as well as reclaimed water from reclamation facilities in Riverside and San Bernardino counties. Reclamation programs in the upper SAR watershed could reduce SAR base flows and impact the amount of water captured and spread in Orange County. Based on projections by the Santa Ana Watershed Project Authority (SAWPA),

wastewater discharges to the SAR are expected to increase from approximately 170,000 AFY in 2002 to over 240,000 AFY in 2025. This water, which would otherwise flow into the Pacific Ocean, is allowed to percolate into the underlying aquifers and is later pumped for local use.

OCWD controls the amount of groundwater taken annually from the basin by assigning its member agencies a Basin Production Percentage (BPP). The BPP is the ratio of groundwater production to total water demands expressed as a percentage. The basin percentage has historically been increased during periods of droughts to reduce the need for imported water into southern California. Agencies that pump more than the established percentage are charged an additional fee that represents the cost differential between groundwater and imported water costs. Groundwater reserves are maintained by a recharge system as described above which replaces water that is pumped from the wells.

OCWD has many ongoing projects aimed at increased recharge of Santa Ana River flows, expanded recycling of wastewater and additional well head treatment. A key project is the Groundwater Replenishment System (GWR System) project that is discussed later in the reclaimed water Section. These many projects will reduce Fullerton and other OCWD member's needs for imported water.

The BPP remained at 75% from 1993 to June 2003, it was reduced to 72% in July 2003 and 66% in July 2004 due to drought conditions along the Colorado River watershed. For the current fiscal year, the BPP is 64%. Over the last five fiscal years, 2000-01 through 2004-05, the City has pumped an average of 70% of its water supply. This percentage is expected increase to approximately 72% through 2030. The OCWD Master Plan concludes that OCWD can generally maintain a 75 percent basin production percentage supply to the City and all its member agencies well into the future. For a full discussion of OCWD's water supply, including the above-mentioned projects, please see the OCWD Master Plan.

Tables 4-1 and 4-2 show the amount of groundwater pumped for the last five years and through 2030.

Table 4-1
Amount of Groundwater pumped - AF/FY

Basin Name (s)	2001	2002	2003	2004	2005
Lower Santa Ana Basin	23,937	24,012	20,752	23,912	20,628
% of Total Retail Water Supply	75.0%	73.6%	65.8%	71.7%	66.0%

Table 4-2
Amount of Groundwater projected to be pumped - AFY

Basin Name(s)	2010	2015	2020	2025	2030
Lower Santa Ana Basin	25,565	23,832	23,602	23,972	24,410
% of Total Retail Water Supply	77.2%	72.7%	72.0%	73.5%	75.3%

The Department of Water Resources has not identified the Santa Ana River Basin as overdrafted in its most current bulletin that characterizes the condition of the Basin, Bulletin 118 (2004).

OCWD's Act defines annual basin of overdraft to be the quantity by which production exceeds the natural replenishment of groundwater during a water year.

4.2.2 Imported Water (Metropolitan)

Metropolitan is governed by a 37-member board of directors, with the City Council of Fullerton appointing a director from Fullerton. MWD wholesales water to member cities and agencies in six southern California counties, supplying some eighteen million people. The City purchases water from Metropolitan that is imported from the Colorado River via the Colorado River Aqueduct and from northern California through the aqueducts of the State Water Project.

Metropolitan furnishes the City treated water from its filtration plants located in La Verne (Weymouth) and Yorba Linda (Diemer). This treated water is conveyed to Fullerton's service area through Metropolitan's Orange County, West Orange County, and Second Lower Feeder pipelines. Eight metered outlets with a total capacity of 48,000 gallons per minute transfer water from the Metropolitan feeder pipelines into the City's distribution system. This purchased treated water from Metropolitan requires no further treatment by the City.

Metropolitan has many ongoing projects and programs aimed at increasing reliability and reducing the vulnerability of droughts. Such programs include funding for local supply and conservation projects, off-river storage, groundwater storage, and regional storage. A key project that was constructed, and reached capacity in 2002, was the Diamond Valley Reservoir. The reservoir has a capacity of 800,000 acre-feet. An amount of 400,000 acre-feet is kept in storage for temporary interruptions of imported supplies due to emergencies such as an earthquake would cause. Metropolitan has identified several transfer/storage opportunities in their 2005 Plan to increase reliability.

Over the last ten fiscal years, 1995-96 through 2004-05, the City has purchased over 26 percent of its supply from Metropolitan. This percentage is expected to remain at approximately 31 percent through 2030. Metropolitan's Plan presents its supply reliability at the regional level, rather than at the member agency level. In Chapter II of their Draft Plan, Metropolitan was able to show that it can maintain 100 % reliability in meeting demands through 2030. For a full discussion of Metropolitan's water supply, please see Chapter II of Metropolitan's Plan.

Table 4-3 describes Metropolitans sources and quantities of imported water supplies to meet the Cities projected demands.

Table 4-3
Wholesaler identified & quantified the existing and planned sources of water- AFY

Wholesaler sources	2010	2015	2020	2025	2030
State Water Project/Colorado River	11,700	10,400	10,300	9,900	10,000

4.3 RECLAIMED WATER

The direct projected use of recycled water within the City's service area is expected to be zero for the next 25 years because of the lack of a source of reclaimed wastewater. Indirectly, the City will be part of a reclamation program by participating in the reclamation projects of OCWD and the OCSD as described below.

The City of Fullerton does not own or operate wastewater treatment facilities. The amount of wastewater collected in the past, currently and projected through 2030, is shown in Table 4-4.

Table 4-4
Wastewater Collection and Treatment - AFY

Type of Wastewater	2000	2005	2010	2015	2020	2025	2030
Wastewater collected & treated in service area	16,803	16,131	15,647	15,490	15,490	15,336	15,182
Volume that meets recycled water standard	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Data provided by the City of Fullerton's Sewer Department

Wastewater generated in Fullerton is transported via large trunk sewer mains approximately 15 miles to the OCSD facilities located in the cities of Fountain Valley and Huntington Beach. A portion of these treated effluents is reclaimed through tertiary treatment for injection into a seawater intrusion barrier. The remaining treated effluent is released into the ocean, four miles off the coast, via a pipeline from the Huntington Beach facility to over four miles off the coast.

The OCWD's Green Acres Water Reclamation Project furnishes reclaimed wastewater for landscaping, irrigation of parks, golf courses, greenbelts, and industrial purposes. This project has been in operation since 1991 and produces approximately 7 MGD of irrigation and industrial water by receiving clarified secondary wastewater effluent from the OCSD and providing additional treatment using filtration and chlorine disinfection.

OCWD and OCSD are developing a joint regional water recycling project that will provide up to 72,000 acre-feet of reclaimed water annually for groundwater replenishment. This proposed GWR System project will utilize a virtually drought-proof source of local reclaimed water supply. Wastewater that would normally be discharged to the ocean will be treated to levels that exceed current drinking water standards, using the most advanced, membrane and disinfection processes, prior to groundwater recharge. This treated water will be pumped through a 13-mile pipeline to spreading basins adjacent to the Santa Ana River. The project, when completed, will be the largest reclamation project in the United States.

The OCWD and OCSD had planned to construct up to three satellite water reclamation plants in Orange County with one being located in the City of Fullerton. The City had identified potential recycled water users within the service area and the routing of a reclaimed water distribution system. This satellite plant concept has been replaced with the GWR System project. The GWR System is far more cost effective by eliminating the need for satellite plants and additional miles of pipelines. It will produce many times the yield of reclaimed water than that of the proposed satellite plants. It will also enhance the quality of the groundwater by lowering salinity levels.

Construction of the GWR System began the first of three phases in 2003. From 2004-2007, the Interim Micro filtration Facility is providing 5 MGD of water for injection wells. The GWR System will be fully operational in 2007.

Current and future reuse projects are discussed in Chapter III of Metropolitan's Plan. Other potential reclamation projects are discussed in Chapter 9 of the OCWD Master Plan.

4.4 QUALITY OF CURRENT WATER SUPPLY

The City of Fullerton diligently safeguards its water supply and, as in years past, the water delivered to its customers meets the standards required by the state and federal regulatory agencies. In accordance with the Safe Drinking Water Act (SDWA), Fullerton monitors over 100 compounds in groundwater supplies. In some cases, Fullerton goes beyond what is required and monitors for additional contaminants that have known health risks. For example, the OCWD monitors Fullerton's groundwater for unregulated solvents and herbicides/pesticides. Each year the City prepares a Consumer Confidence Report that is distributed to all households within Fullerton's service area.

In response to the 1996 reauthorization of the federal SDWA, which included an amendment requiring states to develop a program to assess sources of drinking water and encouraging states to establish protection program, the Department of Health Services (DHS) developed and implemented California's Drinking Water Source Assessment and Protection (DWSAP) Program. The DWSAP includes a delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply; an inventory of possible contaminating activities (PCAs) that might lead to the release of microbiological or chemical contaminants within the delineated area; and a determination of the PCAs to which the drinking water source is most vulnerable.

Fullerton completed a source water assessment for each of its active wells in January 2003. The groundwater sources are considered most vulnerable to the following activities associated with contaminants detected in the water supply: chemical/petroleum processing/storage, dry cleaners, gas stations, known contaminant plumes, metal plating/finishing/fabricating, and plastic/synthetics producers. The groundwater sources are considered most vulnerable to the following activities not associated with detected contaminants: Airport maintenance/fueling areas, confirmed leaking underground storage tanks, and high density housing. MWD completed its source water assessment of its Colorado River and State Water Project supplies in December 2002. Colorado River supplies are considered to be most vulnerable to recreation, urban/storm increasing urbanization in the watershed and wastewater. State Water Project supplies are considered to be most vulnerable to urban/storm water runoff, wildlife, agriculture, recreation and wastewater.

Fullerton's groundwater and imported water supplies have experienced high levels of total dissolved solids (TDS) as a result of high mineral and salinity levels. Although TDS is not considered a health issue, increasing levels of TDS can have an undesirable aesthetic affect on

the taste of the water. As manager of Fullerton's groundwater basin, OCWD's Groundwater Replenishment System project is anticipated to reduce the levels of TDS by lowering salinity levels of the groundwater. In addition, during wet years, Metropolitan may capture and provide more water from the State Water Project for direct use and groundwater replenishment purposes. Historically, Metropolitan's State Water Project supplies have contained lower levels of TDS than its Colorado River supplies. The Maximum contaminate level (MCL) for TDS is 1000 parts per million (PPM). Metropolitan's TDS level averages 435 PPM, whereas the water pumped in Fullerton averages 604 PPM.

In 1985, Metropolitan switched its residual disinfectant from free chlorine to chloramines. Fullerton continues to use free chlorine as a residual disinfectant for its groundwater. The blending of Metropolitan's "chloraminated" water with Fullerton's "chlorinated" water can result in the mutual destruction of disinfection residual and subsequent development of water quality problems known as nitrification. Destruction of chlorine residual can cause uncontrolled bacterial growth in the distribution system leading to potential Total Coli form Rule violation. As such, Fullerton has implemented a Nitrification Monitoring Plan to prevent nitrification from occurring and to protect public health, maintain reservoir facilities integrity, and provide records for future reference.

Since the early 1980's Fullerton has detected minor concentrations of volatile organic compounds (VOCs) from its wells located in the southeasterly portion of the city. However, in January 1986, trichloroethylene (TCE) was detected above the MCL at Well No. 5. Subsequently, Fullerton implemented a program of blending water from Wells 3, 4, 5, 6, 7 and 8 in the Main Plant Reservoir to assure that TCE level is below the MCL before water is supplied to its customers. As part of Fullerton's blending monitoring program, effluent samples from the Main Plant Reservoir are collected on a weekly basis and a complete VOC analysis is performed by a local laboratory. In addition, samples are collected on a monthly basis from Wells 3, 4, 5, 6, 7 and 8 and a complete VOC analysis is completed. Fullerton's blending records indicate that, with blending waters in the Main Plant Reservoir, TCE levels have consistently stayed below the MCL.

4.5 LOCAL WATER SUPPLY MANAGEMENT

For the last ten fiscal years, the City of Fullerton has pumped approximately 74% of its water from the groundwater supply and imported about 26% of its water from Metropolitan. Currently, the City produces its water supply from eleven active wells and eight imported water connections. A schematic of all-major conveyance, production, and storage facilities in the Fullerton service area is shown in Figure 4-1 (See end of Section 4).

An aggressive capital improvement program over the last several years has enabled the City to increase its water production percentage capacity from wells from 55 percent to more than 80 percent. Future capital improvements, such as increasing the capacity of existing booster stations and the replacement of older shallow wells will continue to increase well capacity to meet an ultimate goal of 90 percent water production from wells. It should be noted that a larger

percentage of imported water is used during the summer when the capacities of City wells are exceeded by warmer weather water demands.

The City has 12 wells (11 active), located in the southern sector of the City. Six of these wells are located in the City of Anaheim just south of the City boundary as shown in Figure 4-1. Eight of the eleven wells pump into small surface reservoirs with booster stations pumping the water into the distribution system. The remaining wells pump directly into the City's distribution system. Water pumped from these wells has been naturally filtered as it passes through underlying aquifers of sand, gravel, and soil. This well water delivered into the City's water system requires only disinfectant treatment.

4.5.1 Conjunctive Use Programs

Conjunctive use refers to the practice of storing surface water supplies during periods of abundance in groundwater basins and reservoirs for later use during periods of low surface water supplies. OCWD, with its capabilities of storing vast amounts of water into the Santa Ana River basin underground, participates with Metropolitan in conjunctive use programs.

Although Fullerton does not have the facilities to spread water into the underground directly, it has participated in "in-lieu" groundwater replenishment programs conducted by Metropolitan and OCWD. These programs are generally implemented during wet seasons when surplus water is available from the Colorado River and all the regional reservoirs and groundwater recharge basins are full. Fullerton and other OCWD member agencies turn their wells off and purchase the imported surplus water, thus preventing it from going to the ocean. The quantities of groundwater, which would have been pumped "in-lieu," are treated as an indirect artificial recharge to the underground basin.

4.5.2 Non-Potable Groundwater Projects

In recent years, the City has drilled two pilot wells in an effort to produce non-potable water for golf course, cemetery, median, slope, and park uses. These projects have proven unsuccessful for finding an alternative source of non-potable water.

4.5.3 Desalinated Water Projects

At this time, the City has no plans for desalinated water projects.

4.6 WATER DISTRIBUTION MANAGEMENT

With the eventual replacement of older wells with new more efficient wells, increasing the capacity of some existing booster stations, and continued efforts in reducing water waste, Fullerton can meet projected demands with existing facilities and distribution system. The City's

Water System Master Plan Update identifies a Capital Improvement Program of facilities planned for construction over the next five years.

4.6.1 System Pressures

Reducing distribution system pressures will, to a certain degree, conserve water and pumping energy by reducing leaking in water and plumbing systems, as well as reducing water waste when turning water fixtures on and off. The City of Fullerton has conducted pressure zone studies to determine the feasibility of reducing system pressures by either lowering settings on distribution system pressure regulators or changing pressure zone boundaries. Results of these studies have indicated that potential fire protection (fire sprinkler systems) requirement deficiencies occur when pressures are reduced. Installing individual customer pressure regulators in high-pressure areas of the City's distribution system could reduce water demands but does not appear practical or cost effective.

4.6.2 Peak Demand

Water system demand patterns are a result of climatological, land use, sociological, and institutional factors, all of which affect the amount of water consumed. Reductions in peak demands can reduce the need for construction of new water storage and conveyance facilities and in certain instances, the development of new water sources. The City of Fullerton has a computerized telemetry system that allows water system operators to operate the system more efficiently by being able to alter water production facilities to meet these ever changing demand patterns. The City's addition of new wells in recent years, as described earlier, helps in reducing Metropolitan's summer peak demands.

4.7 COMPARISON OF EXISTING WATER SUPPLIES WITH PROJECTED DEMANDS

As mentioned previously, the City has no control over its water supply, relying on Metropolitan and OCWD. Both of these wholesalers have been and will continue conducting aggressive capital improvement water supply projects. These projects have and will in the next twenty years greatly reduce southern California's vulnerability to drought and emergencies such as earthquakes.

Both Metropolitan's Plan and the OCWD Master Plan indicate water supplies are firm for the next 10 years. And from projects underway or planned, water transfer agreements, additional storage facilities, and many other means, it appears firm water supplies may well be available through the next 20 years. Based on this data, Table 4-5 shows the current and projected water supplies from Metropolitan and OCWD through FY 2029-30 equal to projected City demands.

Table 4-5

Current and Planned Water Supplies - AFY

Water Supply Sources	2005	2010	2015	2020	2025	2030
Metropolitan Water District of So Cal	9,103	7,535	8,968	9,198	8,628	7,990
Orange County Water District	22,146	25,565	23,832	23,602	23,972	24,410
City Supplies	**31,249**	**33,100**	**32,800**	**32,800**	**32,600**	**32,400**

4.8 FUTURE RELIABILITY AND VULNERABILITY

4.8.1 Long Term Reliability

Section 10631(c) of the Act requires that the Plan describe the reliability of supply and vulnerability to seasonal or climatic shortage along with the reliability for the next 20 years, in five year segments.

Metropolitan updated their Integrated Water Resource Plan (IRP) in 2003 to meet present and future needs for dependable supplies of high quality water. The IRP identifies long-term water supply and reliability goals for future water supply planning. Metropolitan's adopted Water Surplus and Drought Management Plan (WSDM Plan) will guide management of regional water supplies to achieve the reliability goals of the IRP. Both of these plans are fully discussed in Metropolitan's Plan, Chapter II.

The City of Fullerton worked with MWDOC to develop the following section of the Plan. MWDOC developed the "Water Balance Model", which uses historical hydrology from 1922 to 2004 to simulated retail demand, local supplies, and imported supplies. Their analysis indicated that by the end of a multiple dry-year, local supplies-primarily groundwater from the Orange County Basin-are predicted to decline as storage is depleted. MWDOC found that the basis of water year data should be different for the Orange County area than the information presented in the Metropolitan Plan. Table 4-6 shows the basis of water year data which was provided to Fullerton by the MWDOC 2005 RUWMP.

Table 4-6
Basis of Water Year Data

Average Water Year	Average of Historical Hydrologic Years from 1922 to 2004		
Single-Dry Water Year	1961		
Multiple-Dry Water Years	1959	1960	1961

Table 4-7 shows the reliability of local and imported supplies in Fullerton's service area.
As shown in table 4-7, the local supply diminishes during the single-dry to and multiple-dry water year to as little as 86.5% and 84.5%, respectively. In contrast, imported supply increases during the single-dry to and multiple-dry water year to as much as 163.2% and 170.4%, respectively. Due to the flexibility of Metropolitan's regional plan, there are multiple resources to supply the increasing demand during the dry years.

Table 4-7
Supply Reliability - AF Year

2010	Normal	Single	Multiple Dry Water Years		
	Water Year (Average)	Dry Year (1961)	2008 (1959)	2009 (1960)	2010 (1961)
Local Supply	25,565	24,002	26,245	24,827	24,002
	% of Normal	93.9%	102.7%	97.1%	93.9%
		Dry Year (1977)	2008 (1990)	2009 (1991)	2010 (1992)
Imported Supply	7,535	11,084	8,930	10,304	11,084
	% of Normal	147.1%	118.5%	136.7%	147.1%
Total City Production	33,100	35,086	35,175	35,131	35,086
2015	**Normal**	**Single**	**Multiple Dry Water Years**		
	Water Year (Average)	Dry Year (1961)	2013 (1959)	2014 (1960)	2015 (1961)
Local Supply	23,832	21,079	21,882	20,867	21,079
	% of Normal	88.4%	91.8%	87.6%	88.4%
		Dry Year (1977)	2013 (1990)	2014 (1991)	2015 (1992)
Imported Supply	8,968	13,689	13,013	13,964	13,689
	% of Normal	152.7%	145.1%	155.7%	152.7%
Total City Production	32,800	34,768	34,895	34,832	34,768
2020	**Normal**	**Single**	**Multiple Dry Water Years**		
	Water Year (Average)	Dry Year (1961)	2018 (1959)	2019 (1960)	2020 (1961)
Local Supply	23,602	20,640	21,130	20,244	20,640
	% of Normal	87.5%	89.5%	85.8%	87.5%
		Dry Year (1977)	2018 (1990)	2019 (1991)	2020 (1992)
Imported Supply	9,198	14,128	13,511	14,354	14,128
	% of Normal	153.6%	146.9%	156.1%	153.6%
Total City Production	32,800	34,768	34,641	34,598	34,768
2025	**Normal**	**Single**	**Multiple Dry Water Years**		
	Water Year (Average)	Dry Year (1961)	2023 (1959)	2024 (1960)	2025 (1961)
Local Supply	23,972	20,727	22,042	20,263	20,727
	% of Normal	86.5%	91.9%	84.5%	86.5%
		Dry Year (1977)	2023 (1990)	2024 (1991)	2215 (1992)
Imported Supply	8,628	13,829	12,598	14,335	13,829
	% of Normal	160.3%	146.0%	166.1%	160.3%
Total City Production	32,600	34,556	34,641	34,598	34,556
2030	**Normal**	**Single**	**Multiple Dry Water Years**		
	Water Year (Average)	Dry Year (1961)	2028 (1959)	2029 (1960)	2030 (1961)
Local Supply	24,410	21,308	23,044	20,772	21,308
	% of Normal	87.3%	94.4%	85.1%	87.3%
		Dry Year (1977)	2028 (1990)	2029 (1991)	2030 (1992)
Imported Supply	7,990	13,036	11,385	13,615	13,036
	% of Normal	163.2%	142.5%	170.4%	163.2%
Total City Production	32,400	34,344	34,429	34,386	34,344

Projected Normal Water Year Supply and Demand

The water demands and supplies for Fullerton's service area over the next 25 years were analyzed in a multiple-dry years event, similar to the drought that occurred from 1959-1961 – (See MWDOC's Plan for further description). During normal conditions, demand does not fluctuate except for projected system growth or decline. Water supplies projected do not represent the total supply capacity available to Fullerton, but rather projected supplies that would be used to meet projected demands.

Table 4-8a and 4-8b present Fullerton's supply and demands under normal water years, in five year increments, through 2030.

Table 4-8a

Projected Normal Water Supply - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Supply	33,100	32,800	32,800	32,600	32,400
% of year 2005	106%	105%	105%	104%	104%

Table 4-8b

Projected Normal Water Demand - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Demand	33,100	32,800	32,800	32,600	32,400
% of year 2005	106%	105%	105%	104%	104%

Table 4-8c shows that in average demand years, Fullerton has sufficient water to meet customer needs through 2030.

Table 4-8c

Projected Supply and Demand Comparison - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Supply totals	33,100	32,800	32,800	32,600	32,400
Demand totals	33,100	32,800	32,800	32,600	32,400
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Projected Single-Dry Year Supply and Demand Comparison

Consistent with MWDOC's 2005 RUWMP, Fullerton's demand projection shows a 6 percent increase in demand during periods of dry weather. Tables 4-9a and 4-9b show Fullerton's supply and demands under a single dry water year, in five year increments normal years, through 2030.

Table 4-9a

Projected single dry year Water Supply - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Supply	35,086	34,768	34,768	34,556	34,344
% of projected normal	106.0%	106.0%	106.0%	106.0%	106.0%

Table 4-9b

Projected single dry year Water Demand - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Demand	35,086	34,768	34,768	34,556	34,344
% of projected normal	106%	106%	106%	106%	106%

Table 4-9c shows that in single dry water years, Fullerton has sufficient water to meet customer needs through 2030.

Table 4-9c

Projected single dry year Supply and Demand Comparison - AF Year					
	2010	**2015**	**2020**	**2025**	**2030**
Supply totals	35,086	34,768	34,768	34,556	34,344
Demand totals	35,086	34,768	34,768	34,556	34,344
Difference	0	0	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%

In the event of a single dry year, Fullerton has sufficient supply to meet demand without requiring any reduction in use. In regards to imported supplies, as stated in Metropolitans' Plan, they expect to be 100% reliable through the next twenty years through effective management of their water supplies.

Projected Multiple-Dry Year Supply and Demand Comparison

Tables 4-10a through 4-10c provide projections of supply and demand under multiple dry year scenarios for period ending 2010. Demands under these scenarios are assumed to increase by 6 percent over normal year demands similar to single dry year comparisons.

Table 4-10a

Projected supply during multiple dry year period ending in 2010 - AF Year			
Supply	**2008**	**2009**	**2010**
Normal Year			
Local Supply	26,904	26,568	25,565
Imported Supply	6,280	6,574	7,535
Supply Totals	**33,184**	**33,142**	**33,100**
Multiple Dry Years			
Local Supply	26,245	24,827	24,002
Imported Supply	8,930	10,304	11,084
Supply Totals	**35,175**	**35,131**	**35,086**
% of projected normal	106.0%	106.0%	106.0%

Table 4-10b

Projected demand multiple dry year period ending in 2010 - AFY			
Demand	**2008**	**2009**	**2010**
Normal	33,184	33,142	33,100
Multiple Dry Years	35,175	35,131	35,086
% of projected normal	106.0%	106.0%	106.0%

Table 4-10c

Projected Supply and Demand Comparison during multiple dry year period ending in 2010- AF Year			
	2008	**2009**	**2010**
Supply totals	35,175	35,131	35,086
Demand totals	35,175	35,131	35,086
Difference	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%

Tables 4-11a through 4-11c provide projections of supply and demand under multiple dry year scenarios for period ending 2015.

Table 4-11a

Projected supply during multiple dry year period ending in 2015 - AF Year			
Supply	**2013**	**2014**	**2015**
Normal Year			
Local Supply	23,820	23,933	23,832
Imported Supply	9,100	8,927	8,968
Supply Totals	**32,920**	**32,860**	**32,800**
Multiple Dry Years			
Local Supply	21,882	20,867	21,079
Imported Supply	13,013	13,964	13,689
Supply Totals	**34,895**	**34,832**	**34,768**
% of projected normal	106.0%	106.0%	106.0%

Table 4-11b

Projected demand multiple dry year period ending in 2015 - AFY			
Demand	**2013**	**2014**	**2015**
Normal	**32,920**	**32,860**	**32,800**
Multiple Dry Years	**34,895**	**34,832**	**34,768**
% of projected normal	106.0%	106.0%	106.0%

Table 4-11c

Projected Supply and Demand Comparison during multiple dry year period ending in 2015- AF Year			
	2013	**2014**	**2015**
Supply totals	34,895	34,832	34,768
Demand totals	34,895	34,832	34,768
Difference	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%

Tables 4-12a through 4-12c provide projections of supply and demand under multiple dry year scenarios for period ending 2020.

Table 4-12a

Projected supply during multiple dry year period ending in 2020 - AF Year			
Supply	**2018**	**2019**	**2020**
Normal Year			
Local Supply	23,511	23,508	23,602
Imported Supply	9,289	9,292	9,198
Supply Totals	**32,800**	**32,800**	**32,800**
Multiple Dry Years			
Local Supply	21,130	20,244	20,640
Imported Supply	13,638	14,524	14,128
Supply Totals	**34,768**	**34,768**	**34,768**
% of projected normal	106.0%	106.0%	106.0%

Table 4-12b

Projected demand multiple dry year period ending in 2020 - AFY			
Demand	**2018**	**2019**	**2020**
Normal	**32,800**	**32,800**	**32,800**
Multiple Dry Years	**34,768**	**34,768**	**34,768**
% of projected normal	106.0%	106.0%	106.0%

Table 4-12c

Projected Supply and Demand Comparison during multiple dry year period ending in 2020- AF Year			
	2018	**2019**	**2020**
Supply totals	34,768	34,768	34,768
Demand totals	34,768	34,768	34,768
Difference	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%

Tables 4-13a through 4-13c provide projections of supply and demand under multiple dry year scenarios for period ending 2025.

Table 4-13a

Projected supply during multiple dry year period ending in 2025 - AF Year			
Supply	**2023**	**2024**	**2025**
Normal Year			
Local Supply	23,789	23,886	23,972
Imported Supply	8,891	8,754	8,628
Supply Totals	**32,680**	**32,640**	**32,600**
Multiple Dry Years			
Local Supply	22,042	20,263	20,727
Imported Supply	12,598	14,335	13,829
Supply Totals	**34,641**	**34,598**	**34,556**
% of projected normal	106.0%	106.0%	106.0%

Table 4-13b

Projected demand multiple dry year period ending in 2025 - AFY			
Demand	**2023**	**2024**	**2025**
Normal	**32,680**	**32,640**	**32,600**
Multiple Dry Years	**34,641**	**34,598**	**34,556**
% of projected normal	106.0%	106.0%	106.0%

Table 4-13c

Projected Supply and Demand Comparison during multiple dry year period ending in 2025- AF Year			
	2023	**2024**	**2025**
Supply totals	34,641	34,598	34,556
Demand totals	34,641	34,598	34,556
Difference	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%

Tables 4-14a through 4-14c provide projections of supply and demand under multiple dry year scenarios for period ending 2030.

Table 4-14a

Projected supply during multiple dry year period ending in 2030 - AF Year			
Supply	**2028**	**2029**	**2030**
Normal Year			
Local Supply	24,203	24,324	24,410
Imported Supply	8,277	8,116	7,990
Supply Totals	**32,480**	**32,440**	**32,400**
Multiple Dry Years			
Local Supply	23,044	20,772	21,308
Imported Supply	11,385	13,615	13,036
Supply Totals	**34,429**	**34,386**	**34,344**
% of projected normal	106.0%	106.0%	106.0%

Table 4-14b

Projected demand multiple dry year period ending in 2030 - AFY			
Demand	**2028**	**2029**	**2030**
Normal	**32,480**	**32,440**	**32,400**
Multiple Dry Years	**34,429**	**34,386**	**34,344**
% of projected normal	106.0%	106.0%	106.0%

Table 4-14c

Projected Supply and Demand Comparison during multiple dry year period ending in 2030- AF Year			
	2028	**2029**	**2030**
Supply totals	34,429	34,386	34,344
Demand totals	34,429	34,386	34,344
Difference	0	0	0
Difference as % of Supply	0.0%	0.0%	0.0%
Difference as % of Demand	0.0%	0.0%	0.0%

4.8.2 Short Term Reliability

The Fullerton Water Utility does not have a short-term supply deficiency. All demands such as seasonal, daily peak hour, or fire, can be met with the existing facilities and distribution system. The City Water Utility's distribution system has a high degree of redundancy, flexibility and reliability. City wells are available and can supply the entire City should a loss of the Metropolitan supply of imported water occur. Two different electric utilities supply power to the City's wells and pumping stations. Permanent and standby emergency generators are available for City wells and pumping stations. The Metropolitan system can supply the entire City if a loss

of water supply from wells occurs. Three different Metropolitan supply feeder lines supply imported water to the City.

Existing City reservoir storage of 89.5 million gallons backs up both the wells and the Metropolitan supplies on a short-term basis. Existing storage can provide approximately three consecutive days of average day demands and for much longer time periods during extreme emergencies when demands would be curtailed. There are several water intertie connections (see Section 5) between the City's distribution system and distribution systems of neighboring cities that are available during local emergencies such as main breaks or facility outages.

4.8.3 Water Transfers and Exchanges

At the present time, the City relies on its wholesalers, Metropolitan and OCWD, to be the responsible parties for negotiating water transfers and exchanges. Details of these major transfers and of the innovative water exchanges, either in place or under active negotiation, are included in Chapter III of Metropolitan's plan. The OCWD Master Plan addresses the potential of water transfers and exchanges.

4.8.4 Emergency and Drought Response Planning

The City of Fullerton's emergency and drought response planning is discussed in Section 5. A discussion relating to management response during drought or other emergencies throughout southern California is covered in Chapter II and III of Metropolitan's Plan. OCWD discusses drought planning in Chapter 14 of the OCWD Master Plan.

SECTION 5

DROUGHT AND EMERGENCY MANAGEMENT

SECTION 5
DROUGHT AND EMERGENCY MANAGEMENT

The City of Fullerton is optimistic, as discussed in Section 4, that water supply from its two wholesalers will be adequate to meet essential City water demands for the next 25 years. This optimism is based on information from Metropolitan's Plan and the OCWD Master Plan

Even though water supply optimism is generated from the Plans mentioned above, the City must remain cautious and realize that future sources of water are vulnerable to shortages. The general welfare requires that water resources available to the City must be put to their maximum beneficial use, and waste or unreasonable uses must be prevented. The conservation of water must be practiced so that the limited supply of water will be available to serve the interests of the people of the City and for the public welfare. This Section discussed how the City has responded in the past and plans to act in the future should water supply shortages occur.

5.1 RESPONSE TO PRIOR DROUGHTS AND OTHER EMERGENCIES

5.1.1 Response to Short-Term Emergencies

The Water Utility continually updates its emergency response plan, which is a component of the City's Disaster Services Plan. This Utility component of the City's plan assigns responsibilities and establishes procedures and priorities associated with Utility operations during natural disasters and other emergencies.

The Utility has five emergency connections with neighboring cities to assist in short-term emergency situations (such as main breaks, fires, etc.). The two connections in Anaheim are located at Harbor Boulevard and La Palma Avenue and Raymond Avenue south of Orangethorpe Avenue. The connection in Brea is located on Placentia Avenue north of Rolling Hills Drive. The connection in La Habra is located at Euclid Street south of Imperial Highway. The connection with Placentia (Southern California Water Company) is located at Bastanchury Road east of Cambridge Avenue.

Fullerton has supplied La Habra and Placentia with emergency water for short durations in past years.

The City has a standby emergency generator at its major water production facility (Main Plant) and at the Upper Acacia Pumping Station. Other facilities are equipped with standby pumps driven by natural gas engines. Two mobile generators are available for other pumping stations and well sites that are not equipped with permanent standby power. This standby electrical power provides a limited emergency water supply to various areas of the City's water system in the event of an electrical outage.

The City's supervisory control and data acquisition system (SCADA) enables operators to control wells and Metropolitan connections remotely from a central location. This system provides continuous monitoring and allows for the curtailment or startup of select production sources in the event of an emergency.

In 1983, the Orange County water community developed a Water Supply Emergency Preparedness organization, Water Emergency Response of Orange County (WEROC), of which the City is a member. It was formed to coordinate an effective emergency response on behalf of all Orange County water agencies. The organization provides disaster training and provides an emergency communications network for all Orange County water agencies. The City is also a member of Metropolitan's Member Agency Response System (MARS), which is an emergency communications system to facilitate the flow of information, control, and exchange of materials and mutual aid within Metropolitan's service area.

The Emergency Water Conservation Plan (EWCP) that is discussed below is primarily for droughts or long-term water supply shortages. However, the plan also applies to short term emergencies related to the City's water system. The usefulness of activating the EWCP for a short-term emergency would be to invoke the prohibitive water use measures of the plan.

5.1.2 Response to Recent Droughts

During the 1976-77 drought, Fullerton was one of the few cities in Orange County to adopt and enforce an ordinance with strong sanctions against wasting water. Actions taken by the City in response to the 1976-1977 drought included:

- Preparing a drought emergency study
- Passing an ordinance prohibiting wasteful uses of water
- Appealing to all citizens for a voluntary 10 percent cutback of water use
- Distributing water conservation kits
- Passing a resolution commending organizations and citizens for their outstanding water conservation efforts

During the 1987-92 drought, staff monitored the water conservation efforts of the community. Fullerton's water customers did an exemplary job conserving water. During 1991 they were successful in reducing water demands by 16.4 percent from the adopted 1989 base year and 12.0 percent during 1992 from the base year as shown in Table 5-1. Actions taken by the City in response to the 1987-92 drought included:

- Participating in in-lieu water supply programs that involved storing excess water that would otherwise have been released into the ocean
- Passing a proclamation in 1989 calling for a voluntary 10 percent reduction of water use
- Distributing conservation retrofit kits
- Installing a drought telephone hotline
- Participating in conducting conservation seminars
- Preparing drought newsletters
- Participating in conservation media advertising
- Distributing restaurant table tent cards

- Conducting education and public information programs which included school programs, brochures, water bill inserts and messages, press releases, speakers bureau, exhibits, cable TV messages, tours, and conservation awards
- Passing a resolution in 1990 requesting and encouraging water conservation and that users reduce water usage by at least 10 percent
- Sending individual letters from Mayor to all customers with copy of resolution and list of ways to reduce water usage
- Passing an Emergency Water Conservation Plan (EWCP), Ordinance No. 2752, March 1991
- Developing a new water billing computer system needed for administering provisions of the EWCP
- Developing a new water bill format that provided room for conservation messages and compared customers water usage to 1989 historical usage
- Passing a resolution declaring a water shortage emergency and implemented Phase I of the Emergency Water Conservation Plan, April 1991
- Rescinding Phase I of the Emergency Water Conservation Plan, February 1992
- Developing industrial water audit and meter loan program
- Helping fund xeriscape conference
- Distributing conservation kits
- Passing Landscape Ordinance No. 2700

5.1.3 Response to Long-Term Emergencies

Fortunately the City of Fullerton has not had to respond directly to emergencies other than drought. While the drought was the catalyst for developing the City's Emergency Water Conservation Plan Ordinance as described below, the Ordinance is also in place for earthquakes or other emergencies that can create water shortage conditions.

5.2 EMERGENCY WATER CONSERVATION PLAN

The City passed Fullerton's EWCP on March 6, 1991, at the height of the drought. A copy of the EWCP, Ordinance No. 2752, is attached as Appendix B.

The purpose of EWCP is to provide a permanent mechanism that allows the City of Fullerton to deal with extended water shortages in a timely and systematic manner. It provides procedures, rules, and regulations for mandatory water conservation that gain results while minimizing the effect of a water shortage on the City's water customers. It helps ensure that, at a minimum, there will be a sufficient supply of water available for domestic use, sanitation, and safety.

5.2.1 Guidelines for Determining Phase Implementation

As discussed previously, Fullerton is fully dependent on its wholesalers, Metropolitan and OCWD, for its water supply. Confirmation of an extended water shortage emergency would generally be received from one or both of these agencies. Note that an actual shortage does not

have to exist; merely the threat of a shortage is sufficient cause to impose sanctions. In past droughts, actions taken by the governing boards of Metropolitan and OCWD have dictated the City's course of action.

Confirmation of a water shortage emergency could also be directly related to the City's water system. A phase implementation could be based on the City's distribution or storage facilities becoming inadequate, or failure or contamination of these facilities. Depending on how localized the emergency is within the City system, a phase implementation may only apply to a portion of the City.

When a water shortage appears imminent, the City Manager notifies the City Council and recommends holding a public hearing for the purpose of determining whether a water shortage emergency exists. If the City Council determines a water shortage exists, it then makes the decision as to the appropriate phase of the EWCP to implement. The phase selection will be based on allocations or sanctions adopted by the City's wholesalers or on how severe a local emergency's effect is on the City's water system.

5.2.2 Mandatory Provisions and Consumption Limits to Reduce Water

The EWCP sets forth five basic implementation phases keyed to the severity of the water shortage. Prohibited uses of low priority water identified in all five phases include:

- No hosing of hard-surfaced areas except as necessary for health and safety.
- No washing of motor vehicles and other types of mobile equipment unless with a hand-held water container or a hose equipped with a positive shutoff nozzle.
- No use of water in decorative fountains or similar aesthetic structures unless such water is recycled.
- No water served in restaurants unless requested.
- No leaky plumbing fixtures; no watering of landscape or other turf areas during certain identified time periods.
- No wasted water as runoff. Violations may result in issuing of notices, installation of flow restrictors, or, as a last resort, termination of water service.

Four of the five phases of the EWCP require percentage reductions in water consumption and impose surcharges on any water used over and above the required percentage reduction. Phase I requires no curtailment of water use. Phases II, III, IV, and V have 90%, 85%, 80%, and 75% curtailment provisions respectively. The curtailment provision means a customer must reduce his demands to 90% or less than his base year demands. Violations result in increased surcharges, written notices, installation of flow restrictors, and as a last resort, termination of water service.

5.2.3 Financial Impact Effects of Plan

Implementation of Phase I of the plan and conservation measures taken by the City has led to reduced demands and consequently reduced revenue from water sales. These reduced demands are still prevalent as evidenced in the historical water demands shown in Table 5-1 and Section 2, although demands are starting to increase in conjunction with population. The City drew heavily from water reserves during the drought years to meet expenditures.

The EWCP has two provisions for handling shortfalls of revenue that result from implementation of any of the five phases of the plan. The two provisions are described as follows:

A. An Emergency Water Conservation Plan Fund is established within the Utility's account system to be used for the Utility's costs and expenses of administering and enforcing the plan and for any revenue shortfall due to water shortages and conservation measures. Monies collected from penalty surcharges and the Water Conservation Surcharge described below is placed in the fund. The fund may also be used to offset the cost of and provide a Council-approved citywide incentive for customer conservation efforts and retrofits.

B. The City Council may adopt a system-wide Water Conservation Surcharge to make up for revenue shortages resulting from the implementation of the water conservation measures contained in the plan. Any funds collected are deposited in the Emergency Water Conservation Plan Fund described above. Implementation of the Water Conservation Surcharge may be determined at the time of the water shortage emergency plan implementation or at a later time.

5.2.4 Records, Reports, and Monitoring

The EWCP has a provision that allows the Utility to require all commercial and industrial customers of the Utility using 20,000 or more billing units per year to submit a water conservation plan to the City and quarterly reports on the progress of their conservation plans. This provision was not exercised during the drought due to the excellent conservation efforts put forth by the City's large users. Many of the large users voluntarily kept the City informed of their conservation actions and results.

The EWCP requires all City departments to submit to the City Manager monthly reports on their water conservation efforts. This provision along with many conservation measures exercised by the City resulted in a large reduction in City water demands during the drought as shown in Table 5-1 and 5-2.

Table 5-1

WATER USAGE COMPARISONS AND TRENDS BY RATE TYPE

CONSUMPTION IN HUNDRED GALLONS

Rate Type	1989/1990	1990/1991	1991/1992	1992/1993	1993/1994	1994/1995	1999/2000	2004/2005
Single-Family	47,880,811	44,256,204	39,274,795	42,216,880	43,206,441	43,444,559	47,695,566	45,634,166
Multi-Family	17,003,325	16,435,521	15,359,071	16,190,919	16,518,092	17,106,101	21,837,525	16,088,210
Commercial	18,202,499	16,457,862	15,552,069	15,992,177	15,863,031	15,945,944	20,548,267	18,005,410
Industrial	20,682,249	18,382,082	17,830,889	17,950,409	15,504,703	16,572,288	10,020,164	12,989,973
Municipal	2,342,132	1,913,900	1,585,152	1,863,588	2,019,634	2,081,667	2,267,751	1,953,063
Agriculture	624,454	691,392	669,581	415,027	265,491	297,733	138,920	76,710
Landscape	*	*	*	*	*	*	*	4,111,187
Total	106,735,470	98,136,961	90,271,557	94,629,000	93,377,392	95,448,292	102,508,193	98,858,719

*Prior to FY 2001-02, landscape consumption was not available as separate values.

Table 5-2

WATER USAGE COMPARISONS AND TRENDS BY RATE TYPE

PERCENTAGE CHANGE FROM FISCAL YEAR 1989 -1990

Rate Type	1989/1990	1990/1991	1991/1992	1992/1993	1993/1994	1994/1995	1999/2000	2004/2005
Single-Family	0.0%	-7.6%	-18.0%	-11.8%	-9.8%	-9.3%	-0.4%	-4.7%
Multi-Family	0.0%	-3.3%	-9.7%	-4.8%	-2.9%	0.6%	28.4%	-5.4%
Commercial	0.0%	-9.6%	-14.6%	-12.1%	-12.9%	-12.4%	12.9%	-1.1%
Industrial	0.0%	-11.1%	-13.8%	-13.2%	-25.0%	-19.9%	-51.6%	-37.2%
Municipal	0.0%	-18.3%	-32.3%	-20.4%	-13.8%	-11.1%	-3.2%	-16.6%
Agriculture	0.0%	10.7%	7.2%	-33.5%	-57.5%	-52.3%	-77.8%	-87.7%
Total	0.0%	-8.1%	-15.4%	-11.3%	-12.5%	-10.6%	-4.0%	-7.4%

As mentioned previously, a new computer billing system was necessary to handle the provisions of the EWCP. While the implemented Phase I did not mandate required customer consumption reductions, the billing system allowed for monitoring and com-paring all customer monthly demands with their historical monthly demands for the adopted base year of 1989. Yearly records are maintained of customer usage.

It is anticipated that for future water shortages that require implementation of any phase of the EWCP, which City Council will adopt a new base year. By selecting a recent year, it reduces the number of customer account changes, requiring fewer estimates of water usage for their base year. These fewer estimates of base year accounts will reduce the number of potential appeals and administrative problems.

5.3 WORST CASE WATER SUPPLY AVAILABILITY

The Act requires estimates of minimum water supply available at the end of twelve, twenty-four and thirty-six months, assuming the worst case water supply shortages. The Act also requires a description of action to be undertaken in response to water supply shortages of up to 50 percent. A worst case scenario would be an extended drought. As the City is fully dependent upon Metropolitan and OCWD for its water supply, this worst case scenario will make assumptions as to the degree of availability of imported and groundwater from these agencies. In this scenario it

is assumed that Metropolitan has allocated water to its member agencies of fifty percent and this will be in effect for three years

Metropolitan catastrophic planning is based on a major earthquake damaging the aqueduct that transports southern California water. The adopted criteria assume that damage from such an event could render the aqueducts out of service for six months. To safeguard the region from catastrophic losses of water, Metropolitan has made substantial investments in emergency storage. Metropolitan completed construction of Diamond Valley Lake, which reached its capacity in 2002. Metropolitan has reserved half of Diamond Valley Lake storage capacity to meet emergencies. With a few exceptions, MWD can deliver emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted by a major earthquake.

In April of 1999, Metropolitan's adopted The Water Surplus and Drought Management Plan (WSDM Plan). The plan has seven shortage stages, with the extreme shortage stage being number seven. This is the only stage where allocation of water to member agencies is identified. Metropolitan Regional Urban Management Plan states that the overriding goal of the WSDM Plan is to never reach Shortage Stage 7. Table 5-4 summarizes the seven stages. Metropolitan's planning is based on 100 percent reduction in its supplies for a period of six months. .

Table 5-3

Water Supply Shortage Stages and Conditions
Rationing Stages

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/temporarily 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 upon adopted principles of fairness and need

Source: Metropolitan, Water Surplus and Drought Management Plan

Continuing with this worst case scenario of 50 percent allocation, it is assumed that OCWD, as in past droughts would raise the basin percentage that its member agencies can pump from the underground from the normal 75 to 80 percent. With its vast amount of underground storage, OCWD can sustain this level of pumping over a three-year period.

Considering these conditions, the City would suffer a 25 percent reduction of water supply from the previous year's amount. Under this worst case scenario, the City would respond to this 25 percent reduction of supply by implementing Phase V of its Emergency Water Conservation Plan (See Appendix B) in a manner as described above. In this worst case scenario, Fullerton's supply would remain the same for the twelve-, twenty-four-, and thirty-six-month periods.

Section 10632 (b) of the Act requires the Plan to identify water available for the next three years (e.g., 2006-2008) based on the driest three-year historic sequence for Fullerton's water supply. Table 5-4 looks the demand/supply balance under three different scenarios. The first shows demands and supplies under multiple dry water years. This is based on the historic three-year sequence from 1989 through 1991 that resulted in Fullerton's worst supply situation on record. The second and third scenarios show demand and supply for a single-dry water year and an average water year. The single-dry was based on fiscal year 1988-89, as that was the highest City water demand on record. Average year data is the supply and demand projected for FY 2005-06. City water demands equal total water production that includes water metered sales plus unaccounted for water.

Data from MWDOC's Plan shows that Orange County's semi-arid region, during periods of dry weather, would demand approximately 6 percent more urban water than in normal weather. This factor was used to adjust normal demands for the three years.

Table 5-4

City of Fullerton Demand/Supply Balance Under Three Different Scenarios

(Acre-Feet)

Scenario	2005/2006	2006/2007	2007/2008
Multiple Dry Years (1)			
City Demand	35,264	35,220	35,175
Pumped from wholesaler OCWD	23,475	26,097	27,155
Purchased from wholesaler Metropolitan	9,649	9,122	8,020
Single Dry Year			
City Demand	35,264		
Pumped from wholesaler OCWD	23,475		
Purchased from wholesaler Metropolitan	9,649		
Average Dry Year			
City Demand	33,268	33,226	33,184
Pumped from wholesaler OCWD	22,146	24,620	25,618
Purchased from wholesaler Metropolitan	9,103	8,606	7,566

(1) Based on driest three-year historic sequence water years

(2) Includes all unaccounted water

(3) 6% Increase from average year to dry year

Table 5-5 shows the effects BMP implementation has on water demand increase/decrease during critical dry years.

Table 5-5
PERCENT INCREASE IN DEMAND

BMP Number	With BMP	With Out BMP
Average	0	0
1 Year Dry	5	0
2 Year Dry	7	13
3 Year Dry	9	15
Critical Drought	11	20

(1) Based on data from the City of Fullerton's 2004 Water Assessment and Verification Report

5.4 FUTURE VOLUNTEER WATER REDUCTION CONCERNS

During the 1987-92 drought water customers adopted a conservation ethic (Use Water Wisely) and installed low flow toilets and showerheads resulting in an excellent job of conserving water. These actions continue to have a reduced effect on water use. As the City implements the BMPs as discussed in Section 3, a greater reduction in water use will occur from measures that promote the more efficient use of water.

The City's efforts to promote the efficient use of water, along with other Cities and agencies throughout the State, will collectively reduce demands, extend supplies, and therefore, provide for greater long-range water supply reliability. However, with this on going more efficient use of water, it should be recognized that the ability to achieve water reduction during droughts by voluntary measures may be more difficult in the future

SECTION 6

REFERENCES

REFERENCES

1. City of Fullerton Water System Management Plan Update, November 1997.

2. The Regional Urban Water Management Plan for the Metropolitan Water District of Southern California, September 2005.

3. Before the Well Runs Dry, Volume 7; A Handbook for Designing a Local Water Conservation Plan; American Water Works Association.

4. 2005 Regional Water Management Plan for the Municipal Water District of Orange County.

5. Water Conservation Guidebook No. 3; Designing a Public Information Program for Water Conservation; California Department of Water Resources.

6. AWWA Research Foundation, Residential End Uses of Water 1999.

7. Memorandum of Understanding Regarding Urban Water Conservation in California, California Urban Water Conservation Council.

8. Water Surplus and Drought Management Plan, April 1999, The Metropolitan Water District of Southern California.

9. Master Plan Report for the Orange County Water District, 1999.

10. Orange County Regional Water Reclamation Project, Final Feasibility Study Report, March 1995; Orange County Water District and County Sanitation Districts of Orange County.

11. Water rates, Rules, and Regulations, June 2005, City of Fullerton Engineering Department.

12. City of Fullerton Water Assessment and Verification Report (per SB610 and SB211).

13. The City of Fullerton General Plan.