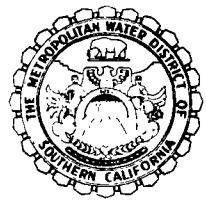


The Metropolitan Water District of Southern California

The Regional Urban Water Management Plan for The Metropolitan Water District of Southern California

July 1985

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

THE REGIONAL URBAN WATER MANAGEMENT PLAN

FOR

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

July 1985

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Carl Boronkay
General Manager

Richard W. Balcerzak
Assistant General Manager

Robert A. Gough
Assistant General Manager

Myron B. Holburt
Assistant General Manager

PLANNING DIVISION

Donald C. Brooks
Director

F. Wiley Horne
Assistant Director

WATER CONSERVATION AND ENVIRONMENTAL BRANCH

Edward J. Thornhill — Water Conservation Coordinator

The Report Was Prepared By

David A. Ward — Administrative Analyst

With Assistance From

Jan P. Matusak	Engineer
Phillip E. Hitchcock	Sr. Administrative Analyst
Martha Rosalino	Administrative Assistant II
Vivian F. Cate	Administrative Assistant I
Gail K. Gallegos	Secretary II
Aurora S. Johnson	Secretary I

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

The Regional Urban Water Management Plan

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Tables

List of Figures

CHAPTER I

INTRODUCTION

A. Urban Water Management Planning Act and Need for Report

This report has been prepared as a result of the Urban Water Management Planning Act (Act), Water Code Sections 10610 through 10656 which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. The Act was known as AB 797 while pending before the Legislature. The Act requires that many urban water suppliers prepare an Urban Water Management Plan (Plan). There are several important provisions in the Act which affect urban water suppliers required to prepare a plan, and which must be taken into account in the Plan. These provisions are presented below; however, the sequence used is different from that in the Act so as to present the material in the most effective sequence.

1. "Every urban water supplier serving water directly to customers shall, not later than December 31, 1985, prepare and adopt an urban water management plan...." (Water Code Section 10620[a]; all future section references are to the Water Code.)

2. "Urban water supplier means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right,

which distributes or sells for ultimate resale to customers." (Section 10617)

3. "An urban water supplier indirectly providing water to customers may adopt an urban water management plan or participate in areawide, regional, watershed, or basinwide urban water management planning; provided, however, an urban water supplier indirectly providing water shall not include planning elements in its water management plan...that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies." (Section 10620 [c])

4. "A plan shall include all of the following elements:

(a) Contain an estimate of past, current, and projected water use and, to the extent records are available, segregate those uses between residential, industrial, commercial, and governmental uses.

(b) Identify conservation measures currently adopted and being practiced.

(c) Describe alternative conservation measures, if any, which would improve the efficiency of water use with an evaluation of their costs and their environmental and other significant impacts.

(d) Provide a schedule of implementation for proposed actions as indicated by the plan.

(e) Describe the frequency and magnitude of supply deficiencies, including conditions of drought and emergency, and the ability to meet short-term deficiencies."

(Section 10631)

5. "In addition to the elements required pursuant to Section 10631, a plan projecting a future use which indicates a need for expanded or additional water supplies shall contain an evaluation of the following:

(a) Waste water reclamation.

(b) Exchanges or transfer of water on a short-term or long-term basis.

(c) Management of water system pressures and peak demands.

(d) Incentives to alter water use practices, including fixture and appliance retrofit programs.

(e) Public information and educational programs to promote wise use and eliminate waste.

(f) Changes in pricing, rate structures, and regulations."

(Section 10632)

6. "The plan shall contain an evaluation of the alternative water management practices identified in Sections 10631 and 10632, taking into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

"Evaluation of the elements in Section 10632 shall include a comparison of the estimated cost of alternative water management practices with the incremental costs of expanded or additional water supplies, and in the course of the evaluation first consideration shall be given to water management practices, or combination of practices, which offer lower incremental costs than expanded or additional water supplies, considering all the preceding evaluation factors."

(Section 10633)

7. "An urban water supplier shall file with the department [of Water Resources] a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department within 30 days after adoption. The department shall annually prepare and submit to the Legislature a report summarizing the status of the plans adopted pursuant to this part."

(Section 10644)

8. "Each urban water supplier shall periodically review its plan at least once every five years. After the review, it shall make any amendments or changes to its plan which are indicated by the review."

(Section 10621)

9. "The adoption of a plan shall satisfy any requirements of state law, regulations, or order, including those

of the State Water Resources Control Board, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board in obtaining that information."
(Section 10653)

10. "The conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions."
(Section 10610.4 [f])

11. "Urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use."
(Section 10610.4 [c])

Although Metropolitan is not legally required to prepare a regional urban water management plan, it has prepared this plan at the request of its member agencies under the discretion granted in Water Code Section 10620 (c), and in accordance with the provisions discussed above. The plan includes a description of those water conservation and water management activities that Metropolitan currently conducts or may conduct within the next five years on a regional basis in cooperation with its member agencies. It does not include a discussion of the activities being conducted by Metropolitan's member agencies or subagencies. These activities will be included

in plans prepared by those agencies. It is anticipated that many of the urban water suppliers in Metropolitan's service area will use the information in this plan in developing their local plans. However, participation in any regional planning activity is voluntary. As required by Water Code Section 10620, the planning elements in this plan are not applicable to any of the urban water supliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

Subject to applicable laws and regulations, Metropolitan's Board of Directors establishes the policies under which Metropolitan operates. As such, the Board has established the policy that Metropolitan will continue and expand its current efforts to encourage the efficient use of water in its service area through voluntary water conservation programs conducted in cooperation with its member agencies. The programs in which Metropolitan may participate in the future which are discussed in this report will be voluntary programs conducted in cooperation with its member agencies, and therefore, are in keeping with Metropolitan's existing policy. Implementation of some of these proposed programs may require Board approval.

B. Report Format

The chapters in this report correspond to the outline presented in the Act, specifically Sections 10631, 10632, and 10633 of AB 797. These sections were previously quoted.

The elements set forth in Section 10631 are required to be included in all plans. Those set forth in Section 10632 are required to be included in all plans prepared by agencies which will have a "...need for expanded or additional water supplies." Section 10633 requires a discussion of the impacts of implementing the alternative water management practices discussed in Sections 10631 and 10632.

The first four chapters following this introduction discuss past, current, and projected water demands; current water conservation practices; alternative water conservation measures; and water supply deficiencies. These four chapters are:

Chapter II, Section 10631(a): Past, Current, and Projected Water Use

Chapter III, Section 10631(b): Current Water Conservation Measures

Chapter IV, Section 10631(c) and (d): Alternative Conservation Measures and Implementation Schedule

Chapter V, Section 10631(e): Frequency and Magnitude of Supply Deficiencies, and Ability to Meet Short-Term Deficiencies

The next six chapters are concerned with future water management practices which could provide additional water supplies or reduce water demands. The six topics covered are waste water reclamation, exchanges and transfers of water, management of water system pressure and peak demands, incentives to alter water use practices, public information and educational programs, and changes in pricing rate structure and regulations.

These six chapters are:

Chapter VI, Section 10632(a): Waste Water Reclamation

Chapter VII, Section 10632(b): Exchange or Transfers of Water

Chapter VIII, Section 10632(c): Management of of Water System Pressure and Peak Demands

Chapter IX, Section 10632(d): Incentives to Alter Water Use Practices

Chapter X, Section 10632(e): Public Information and Educational Programs

Chapter XI, Section 10632(f): Changes in Pricing, Rate Structures, and Regulations

The last chapter contains an evaluation of the impacts of Metropolitan's potential alternative water management practices. A comparison of the estimated capital cost, firm yield, and incremental unit costs of the potential alternative water management practices is also included in the final chapter:

Chapter XII, Section 10633: Effects and Evaluations of Alternative Water Management Practices.

CHAPTER II

SECTION 10631(a): PAST, CURRENT, AND PROJECTED WATER USE

Section 10631(a) requires that the Plan "...contain an estimate of past, current, and projected water use and, to the extent records are available, segregate those uses between residential, industrial, commercial, and governmental uses." The Metropolitan Water District of Southern California was created for the purpose of meeting the supplemental domestic and municipal water demands of its member agencies. Supplemental water demands are the portion of each agency's total water demand which cannot be met from local water supplies available to each member agency. The three primary uses of Metropolitan's supplemental water are for domestic and municipal (or urban), agricultural, and replenishment purposes. However, since Metropolitan does not sell water at the retail level, urban uses are not subdivided in Metropolitan's records into residential, industrial, commercial, and municipal uses. Consequently, in this report it is not possible to "...segregate uses between residential, industrial, commercial, and governmental uses." Such information may be provided in reports by local water agencies if such agencies have appropriate records.

The three types of uses recorded by Metropolitan are expected to be the same in the future, although the amounts of water sold for each type of use, and the relative proportions of such uses, will probably change. In describing water uses in Metropolitan's service area, it is appropriate to start with

a description of the Metropolitan Water District, its service area, and the water supplies available to the area.

A. The Metropolitan Water District

The Metropolitan Water District of Southern California was incorporated in 1928 by the enactment of The Metropolitan Water District Act, followed by a public vote in several cities, which became the "Original Member Agencies" of Metropolitan. The Metropolitan Water District Act has always provided that Metropolitan may provide supplemental water at wholesale to its member agencies. Metropolitan has expanded significantly since its incorporation. Currently, there are 27 member agencies which serve 136 cities and many unincorporated communities in the Southern California Coastal Plain. The total population in the area is about 13 million.

Metropolitan is governed by a Board of Directors consisting of at least one director from each member agency, with additional directors appointed in proportion to the assessed valuation of property within each agency.

Metropolitan's primary purpose is to develop and sell water at wholesale for municipal and domestic use. However, Metropolitan also wholesales water for other beneficial purposes, including agriculture and replenishment of ground-water basins. Hydroelectric power is also developed in the operation of Metropolitan's water delivery system.

Metropolitan only supplies water at wholesale to its member agencies. These agencies, in turn, either retail the

water directly to their customers, or wholesale it to other public agencies and private water companies for resale to retail customers. There are about 225 such water purveyors in Metropolitan's service area. Most of Metropolitan's member agencies have some local sources of water, but when water demands exceed this local supply, the member agencies look to Metropolitan to supply their needs for additional water. Local sources account for approximately one-third of the total water supply in Metropolitan's service area. Two-thirds of the water used in the Southern California Coastal Plain is imported from the Owens Valley-Mono Basin by the City of Los Angeles Department of Water and Power; from the Colorado River by Metropolitan, and from Northern California by the State of California Department of Water Resources.

Importing water into Southern California from distant sources is expensive; therefore, in carrying out its programs for meeting the demands of its member agencies, Metropolitan encourages the efficient use of water in its service area, and operates and maintains its aqueduct and distribution system to maximize its efficiency. In connection with encouraging the efficient use of water, Metropolitan participates in many water conservation and water management programs. Many such programs have already been implemented, and additional programs are expected to be implemented in the future.

As a wholesale water agency, Metropolitan's primary water conservation functions are (1) to encourage water users

in its service area to conserve water through programs conducted in cooperation with its member agencies, (2) to assist the State, the member agencies, and other organizations in promoting water conservation, (3) to coordinate conservation activities, and (4) to develop and implement regional conservation programs which will complement other programs being conducted in Southern California. These programs will enable existing water supplies to serve a larger number of people, or a larger water demand, thereby reducing the risk and/or severity of potential water shortages in the future. However, because of variations in the weather, demands for water from Metropolitan vary greatly from year to year, and during dry years the increase in water demands will generally exceed the reduction in demands due to water conservation activities. Therefore, construction of additional facilities to increase supply cannot be delayed.

Making efficient use of water is in the interest of all the people within Metropolitan's service area. Because Metropolitan only wholesales water to other agencies which in turn retail or wholesale the water to other agencies, it is impracticable for Metropolitan to implement mandatory water conservation measures for retail water users. This is the role of the retailing agencies. However Metropolitan informs people of the need for and advantages of conserving water. For this reason, Metropolitan for many years has conducted an extensive public information program on the need for and benefits of efficient water use. Indeed, the need to institute conservation

measures has been the motive and justification for many of the programs described herein.

In addition to its public information activities, Metropolitan conducts many other programs which increase the efficient use of water in its service area, but do not require direct public participation. These programs include such activities as studies to determine water use and methods to reduce such use, as well as various programs to improve water management such as water auditing, metering, and preventative maintenance. Metropolitan works very closely with its member agencies and other organizations to disseminate information developed from its water conservation and management programs.

B. Service Area Description

The Metropolitan Water District of Southern California serves water to member public agencies in about 5,200 square miles of the coastal plain in Southern California, including portions of the Counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. Included within Metropolitan's boundaries are 136 incorporated cities plus numerous unincorporated communities and county areas. There are about 13 million people in this area, which is slightly more than half the population of the State. Metropolitan has 27 member public agencies consisting of 14 cities, 12 municipal water districts, and one county water authority. The service areas of the member agencies are shown in Figure 1. The climate in Metropolitan's service area is

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

MAP SHOWING METROPOLITAN'S MEMBER AGENCIES AND FACILITIES FOR THE DISTRIBUTION OF COLORADO RIVER WATER AND STATE PROJECT WATER

LEGEND

- DEPARTMENT OF WATER RESOURCES' CALIFORNIA AQUEDUCT
- METROPOLITAN'S WATER DISTRIBUTION SYSTEM
- PROPOSED ADDITIONS TO METROPOLITAN'S SYSTEM
- ▲ POWER PLANTS
- ▲ PROPOSED POWER PLANTS
- ● PUMPING PLANTS
- ● WATER FILTRATION PLANTS

REVISED TO JUNE 1985

characterized by warm, dry summers and mild winters, with average annual rainfall ranging from 10 inches in the City of San Diego to 15 inches in the City of Los Angeles.

C. Water Demands and Supplies

The water demands of, and the supplies available to, Metropolitan's member agencies involve complex interrelationships. Tables 1 and 2 show data on such water demands and supplies for the past 10 years. Table 1 shows the average amount of water used by each agency over the ten-year period 1974-75 through 1983-84, with the values shown in acre-feet. Table 2 shows data for the same period expressed in percent, showing the average percentage amount of water obtained from each source. It should be noted that both the acre-feet and percentage amounts change from year to year, with the total gradually increasing over time. The total water use in 1983-84 was a record high, being 3,381,162 acre-feet.

The primary use of the supplemental water provided by Metropolitan is to meet urban water demands. This use includes demands for domestic, municipal, commercial, and industrial purposes. In fiscal year 1983-84 Metropolitan delivered approximately 1,168,000 acre-feet for urban uses, or about 82 percent of the total supplemental supply of 1,426,700 acre-feet. The percentage of urban use is expected to increase in the future as population increases and agricultural demands decline.

Another use of Metropolitan's supplemental water is

Table 1

Major Sources of Water Supply for Metropolitan's Member Agencies
(Ten-year Average, 1974-75 Through 1983-84)
(in acre-feet)

Member Agencies	Local Water Supplies	Metropolitan's Deliveries 1/	Los Angeles Aqueducts	Total Water Supply
Beverly Hills	517	13,124	0	13,641
Burbank	4,120	18,185	0	22,305
Central Basin MWD	151,350	100,192	0	239,787
Compton	4,667	3,004	0	7,671
Foothill MWD	6,210	8,300	0	14,510
Glendale	5,514	20,319	0	25,833
Las Virgenes MWD	289	10,953	0	11,242
Long Beach	28,090	40,004	0	68,094
Los Angeles	81,293	38,305	462,700	582,298
Pasadena	17,727	16,656	0	34,383
San Fernando	3,260	48	0	3,308
San Marino	4,667	12	0	4,679
Santa Monica	5,517	10,885	0	16,402
Three Valleys MWD	52,037	37,823	0	89,860
Torrance	10,880	17,506	0	28,386
Upper San Gabriel Valley MWD	121,603	32,926	0	154,529
West Basin MWD	43,491	163,329	0	174,291
Los Angeles County	496,948	531,571	462,700	1,491,219
Anaheim	32,986	24,273	0	57,259
Coastal MWD	886	32,847	0	33,733
Fullerton	12,265	17,865	0	30,130
MWD of Orange County	122,794	201,214	0	324,008
Santa Ana	26,322	12,447	0	38,769
Orange County	195,253	288,646	0	483,899
Eastern MWD	90,460	34,974	0	125,434
Western MWD of Riverside County	169,493	41,371	0	210,864
Riverside County	259,953	76,345	0	336,298
Chino Basin MWD	141,292	23,120	0	164,412
Calleguas MWD	23,330	65,532	0	88,862
San Diego CWA	99,477	358,816	0	458,293
Total	1,260,538	1,344,030	462,700	3,022,983

1/ Includes all deliveries by Metropolitan.

Table 2

Major Sources of Water Supply for Metropolitan's Member Agencies
(Ten-year Average, 1974-75 Through 1983-84 in percent)

Member Agencies	Local Water Supplies	Metropolitan's Deliveries 1/	Los Angeles Aqueducts	Total Water Supply
Beverly Hills	4	96		100
Burbank	18	82		100
Central Basin MWD	60	40		100
Compton	61	39		100
Foothill MWD	43	57		100
Glendale	21	79		100
Las Virgenes MWD	3	97		100
Long Beach	41	59		100
Los Angeles	8	7	85	100
Pasadena	52	48		100
San Fernando	99	1		100
San Marino	100	0		100
Santa Monica	34	66		100
Three Valleys MWD	58	42		100
Torrance	38	62		100
Upper San Gabriel Valley MWD	79	21		100
West Basin MWD	20	80		100
Los Angeles County	33	36	31	100
Anaheim	58	42		100
Coastal MWD	3	97		100
Fullerton	41	59		100
MWD of Orange County	38	62		100
Santa Ana	68	32		100
Orange County	40	60	0	100
Eastern MWD	72	28		100
Western MWD of Riverside County	80	20		100
Riverside County	77	23	0	100
Chino Basin MWD	86	14		100
Calleguas MWD	26	74		100
San Diego CWA	22	78		100
Total	40	45	15	100

1/ Includes all deliveries by Metropolitan.

for irrigated agriculture. The demand for water for agricultural use is not distributed uniformly throughout Metropolitan's service area but is concentrated in certain member agencies primarily in San Diego, Riverside, and Orange Counties. During fiscal year 1983-84, the amount of water delivered for agricultural use was about 180,000 acre-feet, or 13 percent, of the total supplemental supply. Agricultural demands are expected to decrease in the future as agricultural lands become urbanized.

The third use of Metropolitan's supplemental supply is for replenishment purposes, which include surface reservoir storage, groundwater basin storage, and maintenance of seawater barriers. In fiscal year 1983-84, 79,000 acre-feet, or five percent, of Metropolitan's total deliveries were used for replenishment. This amount is lower than in past years because the high rainfall and runoff in recent years has led to substantial replenishment of the basins. Deliveries by Metropolitan are projected to increase in the future when the effects of the recent years of high rainfall have passed.

A detailed discussion of projected population increases and water demands for Metropolitan's service area is included in Metropolitan's Report No. 946, "1982 Population and Water Demand Study," dated December 1982. A detailed discussion of Metropolitan's projected water supplies in relation to its projected demands is included in Metropolitan's Report No. 948, "Water Supply Available to Metropolitan Water

District Prior to Year 2000," dated August 1983.

There are four main sources of water supply used to meet demands in the area served by Metropolitan. These are: local groundwater and local surface supplies, and water imported via the Los Angeles Aqueducts, the Colorado River Aqueduct, and the State Water Project's (SWP) Governor Edmund G. Brown California Aqueduct. Local groundwater supplies are composed of the supply that occurs naturally due to rainfall, the percolation to the underground of a portion of the water delivered for public uses, and the replenishment of the groundwater basins with reclaimed waste water. The water supplies available to Metropolitan are primarily limited to water from the Colorado River and State Water Project. These water supplies are briefly discussed in this report. A more detailed discussion of the supply of Colorado River water can be found in Metropolitan's Report No. 947, "Future Colorado River Water Supply of the Metropolitan Water District" and in a letter to Metropolitan's Board of Directors from the General Manager dated January 4, 1985. This letter discusses the prospects of obtaining additional Colorado River water. Report No. 948, "Water Supply Available to Metropolitan Water District Prior to Year 2000," includes a discussion of both the Colorado River supply and the supply from the State Water Project. A ten-point program to help insure that Metropolitan meets the demands of its member agencies for water in the future is included in Report No. 946, "1982 Population and Water Demand Study." This

program has been approved by Metropolitan's Board of Directors.

Member Agency Local Supplies

Many member agencies obtain water supplies both from Metropolitan and from local sources. The local supplies include those obtained from groundwater basins and from surface sources.

Groundwater

The amount of water extracted from the groundwater basins includes water that enters the basin from several sources. The primary source is natural replenishment, or the replenishment that occurs as a result of percolation of rainfall and stream runoff into the groundwater basin. Recharge is accomplished by capturing local runoff in flood control reservoirs and releasing it at controlled rates to the streambeds and spreading grounds adjacent to the stream channels to allow it to percolate into the groundwater basins. Another source of supply to the basins is the percolation of some of the water used on the surface for watering of lawns and gardens. In some areas, as water deliveries to users increase, the replenishment of the groundwater basin increases also. A third element of supply to the basins is the percolation of reclaimed wastewater provided from some of the sanitation agencies. A fourth element of supply for some basins is water that flows into the basins from up-stream basins. As used in Tables 1 and 2, the groundwater supply is the sum of these four components.

When available, water imported by Metropolitan also is used to recharge groundwater basins in its service area. This is accomplished by spreading basically in the manner described above, and by injecting water through wells located near the ocean to form a seawater barrier. Without this imported supply, most groundwater basins in Metropolitan's service area would be seriously overdrafted, and those adjacent to the coast contaminated with seawater. The replenishment accomplished with water provided by Metropolitan is not counted as a local supply, but is included in the deliveries by Metropolitan on Tables 1 and 2.

Most of the groundwater supply in Metropolitan's service area has been fully developed, with pumping rights in most basins having been established by adjudication or local agencies. In the future there are two contradictory influences that could affect groundwater supplies. As mentioned above, in some areas, as water uses increase, a portion of the water percolates to the groundwater basin and adds to the groundwater supply. However, in other areas a variety of chemicals have been discovered in recent years that have led health officials to order a shutdown of use of water extracted from some wells in the basins. This problem may increase in the future. In Metropolitan's studies, it has been assumed that the increases in supplies will offset the decreases in supplies, so that the total groundwater supply will remain relatively unchanged in the future.

Local Surface Water

The local surface water sources consist of runoff captured in storage reservoirs and held for later direct use, and some direct diversions from streams into local water systems. The major reservoirs and their capacities are listed by member agency and subagency in Table 3. Data on the firm annual yield, or firm annual water supply, of the individual reservoirs are not available. The yield varies widely between wet and dry years, and most reservoirs are operated with minimal carryover storage.

Several of the storage reservoirs also are used to regulate imported supplies. There are numerous other reservoirs (not listed) in Metropolitan's service area that are used only for regulating purposes, or for retaining flood flows for subsequent groundwater recharge.

Los Angeles Aqueducts

The Los Angeles Aqueducts are owned and operated by the City of Los Angeles Department of Water and Power (LADWP). The aqueducts transport water 338 miles from Owens Valley and the Mono Basin to the City of Los Angeles. Average annual deliveries are about 470,000 acre-feet. However, legal actions are pending that could reduce the yield of the Owens Valley groundwater and Mono Basin supplies.

One legal action which is pending regards the Owens Valley groundwater pumping. As a result of a 1972 lawsuit by Inyo County, LADWP is required to prepare an Environmental

Table 3

Major Local Storage Reservoirs
in Metropolitan's Service Area

Member Agency/Subagency	Reservoir	Capacity 1,000 AF
Calleguas MWD	Lake Bard	10.0
Eastern MWD		
Rancho California WD	Vail Lake	51.0
Lake Hemet MWD	Lake Hemet	14.0
Las Virgines MWD	Westlake Reservoir	10.0
MWD of Orange County		
Irvine Ranch WD & Serrano ID	Santiago	25.0
San Diego County WA		
Bueno Colorado MWD	Henshaw	53.0
Escondido	Lake Wohlford	7.5
Helix ID	Cuyamaca	11.7
City of San Diego	Barrett	44.8
	El Capitan	112.8
	Lake Hodges	33.6
	Morena	50.2
	Otay	56.3
	San Vicente	90.2
	Sutherland	29.0
South Bay ID	Lake Loveland	27.7
	Sweetwater	27.7
Western MWD of Riverside		
Temescal Water Company	Railroad Canyon	12.0
TOTAL		817.0

Impact Report (EIR) on the effects of increased pumping from Owens Valley. Two EIRs have been prepared, but have been rejected by the State Appellate Court, and LADWP is working on a third. This legal action could result in a decision that would limit the amount of groundwater LADWP can pump from Owens Valley.

In 1983 a Superior Court judge declared unconstitutional an Inyo County ordinance that had been designed to regulate Owens Valley groundwater pumping. In 1984, Los Angeles and Inyo County signed a Memorandum of Understanding to work together to meet the needs of Owens Valley and the City. As a result, multi-year cooperative studies of the Owens Valley Groundwater Basin and its environment have been initiated. The goal of the studies is to develop a groundwater management model.

Actions also are pending on LADWP diversions from Mono Basin. Water has been diverted from Mono Basin by LADWP for 40 years under a perfected State appropriative right. These diversions are believed by some to be the main factor contributing to the declining water level of Mono Lake. Concerns over the effect of the lowering water levels on scenic values, the California gull rookery, local air quality, and other factors led to formation in 1978 of the Interagency Task Force on Mono Lake. In its 1979 report, the task force, with the LADWP member dissenting, recommended that the water level of Mono Lake be stabilized by reducing the LADWP

diversions from 100,000 to 15,000 acre-feet per year. In the meantime, the Mono Lake Committee and Audubon Society initiated litigation that challenges LADWP's diversions because of the effect on the lake. This litigation is still pending in federal court. Future proceedings could result in actions that reduce the amount of water LADWP can divert from the Mono Basin. Should Los Angeles lose its rights to some of the Owens Valley groundwater or Mono Basin's water, the City would depend on Metropolitan to deliver water to make up any loss.

Colorado River

Metropolitan owns and operates the Colorado River Aqueduct, which transports Colorado River water 242 miles from Lake Havasu on the Colorado River to the San Diego Pipelines and then to the aqueduct's terminus at Lake Mathews near the City of Riverside. Metropolitan and several other Southern California water agencies have contracts with the Federal Government for water supplies from the Colorado River. Prior to executing the Colorado River contracts, the California agencies agreed among themselves on priorities for diverting water. Under this agreement (the Seven Party Agreement), Metropolitan has a fourth priority for 550,000 acre-feet per year and a fifth priority for an additional 662,000 acre-feet, for a total of 1,212,000 acre-feet per year. The terms of the agreement have been included in the federal contracts.

This existing dependable supply will be reduced as a result of the 1964 United States Supreme Court decree in

Arizona v. California. The 1964 decree limited California's apportionment of Colorado River water to 4.4 million acre-feet a year, enough to meet just the first four priorities, and half of any surplus water as determined by the Secretary of the Interior. This limit takes effect once water is delivered by the Central Arizona Project. As Metropolitan holds the fifth priority, Metropolitan would be entitled to divert the surplus water first. Also, water apportioned to another state and not used by that state may, at the discretion of the Secretary, be available for California's use according to the decree, and Metropolitan would have first call on that water.

The impact of the Supreme Court decree may not be fully felt in 1986 as the Colorado River reservoirs are full and a surplus may be declared. Metropolitan could be limited to its 550,000 acre-foot entitlement in the fourth priority as a dependable supply at any time as the Central Arizona Project is now operational. The rights to share in California's apportionment were also awarded to certain Indian tribes and other users along the lower Colorado River in California. As the Indian tribes and others put their entitlements to use, these rights are charged to the fourth priority and Metropolitan's share of Colorado River water will be further reduced by 55,000 acre-feet annually.

Of the amount of water diverted from the Colorado River, about 50,000 acre-feet a year are lost through evaporation and seepage, and about 60,000 acre-feet a year must be

delivered to other agencies in accordance with water exchange agreements. Deducting these amounts leaves 385,000 acre-feet as a firm and dependable supply available to meet needs in Metropolitan's service area. Prospects of obtaining additional Colorado River water are discussed in Chapter V.

State Water Project

Metropolitan's second source of water is the State Water Project. Metropolitan has a contract with the State for delivery of water from Northern California via the California Aqueduct, with deliveries being made to the northern boundary (Castaic Lake) and eastern boundary (Devil Canyon Afterbay and Lake Perris) of Metropolitan's service area. Deliveries began in 1972. Annual entitlements will build up to a maximum annual entitlement of 2,011,500 acre-feet in 1990, although actual deliveries are not expected to reach this amount until after the turn of the century. In addition, Metropolitan receives the entitlements of the two agencies with which it holds exchange agreements for Colorado River water.

The supply of water for the State Water Project is subject to several conditions. First, any water used must be water that is surplus to the needs of the areas of origin. As uses in these areas increase in the future, the supply available to the State project is diminished. Second, the supply varies from year to year. Currently, in normal or wet periods the project could supply about 3.0 million acre-feet. In dry periods it could only provide about 2.2 million acre-feet (and this amount

will be reduced in the future as area of origin uses increase).

The State has executed contracts with 30 public agencies for an ultimate dependable water supply of 4.23 million acre-feet a year. To obtain this supply it will be necessary to construct additional reservoirs and other water conservation works in Northern California.

To ensure that Metropolitan's water needs are met in the future, it will be necessary to construct additional State Water Project facilities. Construction of additional facilities to increase the dependable supply of water to Metropolitan will be staged to the extent considered prudent and to avoid water shortages and unnecessary expenditures.

Total Water Supply

The projected dependable supplies available in Metropolitan's service area after allowance for system losses are summarized in Table 4. There are four sources of supply--local sources, and supplies imported via the Los Angeles Aqueducts, the Colorado River Aqueduct, and the California Aqueduct. Each of these supplies is faced with potential or known reductions. The local supplies could be reduced as a result of contamination of groundwater basins. The Los Angeles Aqueducts' supplies could be reduced as a result of litigation. The dependable Colorado River supply will soon be reduced as a result of the U.S. Supreme Court decision. The State water supply will be reduced as a result of increased use of water in areas of origin.

Table 4

Projected Water Supplies in Metropolitan's Service Area
(in million acre-feet a year)

	Year		
	1990	1995	2000
Dependable Water Supply			
Existing Facilities			
Local Production	1.11	1.11	1.12
Los Angeles Aqueducts	0.47	0.47	0.47
Colorado River	0.45	0.45	0.45
State Water Project	1.08	1.03	0.99
Subtotal	3.11	3.06	3.03
Potential Measures and Facilities to Increase Dependable Supply			
Additional Local Supply Developed Within Metropolitan	0.02	0.04	0.08
Additional Colorado River Water	0.10	0.25	0.25
Coordination of State Water Project With Central Valley Project and Interim Purchase of Water from CVP	0.30	0.25	0.20
Facilities in the North, South, and Western Delta	0.00	0.16	0.25
Subtotal	0.42	0.70	0.78
Total	3.53	3.76	3.81
"Normal" Projection of Demand	3.35	3.48	3.61
"Extra" water for conjunctive use programs in groundwater basins, and implementation of Colorado River Banking Program	0.18	0.28	0.20

As a result of these impending reductions, Metropolitan's water supply will be much less dependable in the future than in the past, and the supply could vary significantly from year to year. Furthermore, future water supplies will be subject to uncertainty because of four factors: (1) annual variations in precipitation and runoff; (2) the timing and implementation of measures to obtain additional Colorado River water and additional State project water; (3) the effects of litigation, legislation, and administrative policies on changing rights to water; and (4) the timing of construction of additional facilities to obtain and distribute additional amounts of State project water throughout Metropolitan's service area.

To help offset the uncertainties, and to help provide an increase in the region's assured water supplies, efforts will be needed to obtain the additional water supplies shown on Table 4. These include additional Colorado River water, additional development of local supplies, and additional development of supplies for the State Water Project.

CHAPTER III

SECTION 10631(b): CURRENT WATER CONSERVATION MEASURES

Section 10631(b) of the Act requires that conservation measures currently adopted and being practiced be identified. Metropolitan has developed and implemented a broad range of both water conservation and water management programs in its service area. The water conservation programs currently being conducted by Metropolitan include in-school education, public information, and various promotional measures. These programs involve public participation and are coordinated with Metropolitan's member agencies and other organizations. In addition, many programs have been implemented which also contribute to the efficient use of water in Metropolitan's service area, but do not require direct public participation. Some of these programs, hereinafter called water management programs, include operational policies and procedures, (water audits of Metropolitan's distribution system, metering of deliveries at all service connections, valve exercising, leak detection, cathodic protection, and preventative maintenance), conjunctive use and water service programs that involve in-lieu replenishment, and interruptible service of surface and underground supplies. Each of the water conservation and water management programs is discussed below. Also, they are presented in summary form in Table 5 at the end of the chapter.

A. In-school Education and Public Information Programs

Two in-school education programs for elementary

schools have been developed and implemented by Metropolitan to encourage the efficient use of water and to achieve a greater water conservation awareness by the public. In addition, education programs have been designed for high schools and colleges. Although water savings resulting from education programs are difficult to measure, long-term savings could be expected by improving water awareness and water-use habits of the public. These education programs emphasize regional and local water conditions, water conservation, and address the relationship between water and energy. The programs are described below.

Elementary Schools

A new comprehensive in-school education program, developed by Metropolitan, has been implemented during the past two years. An education development specialist, under contract to Metropolitan, developed a formal elementary school program for the fourth and sixth grades. The program for the fourth grade is entitled "Admiral Splash," and the sixth grade program is entitled "Water for Ursa." These two grades were selected because their curriculum includes courses in science and California history which are subjects where it is appropriate to teach water issues. This program includes teacher-training workshops, a planned curriculum with educational materials for the teacher and pupil, and audio-visual aids. The program is designed so that the students participate in 10 lessons, each approximately 30 to 45 minutes long. The lessons emphasize

where water comes from, why water awareness is important, and how to use water wisely. Metropolitan provides the program and materials in cooperation with its member agencies to public and private schools within its service area, free of charge. Metropolitan also furnishes staff assistance in implementing and coordinating the program in its service area. Requests for educational materials outside of Metropolitan's service area are considered on an individual basis. Materials to maintain the program are furnished by Metropolitan each year. During the first year the program was implemented, 2,700 teachers and 79,000 students participated in the program. The costs to Metropolitan for this first year were approximately $220,000. This program is expected to continue until all the fourth and sixth grade classes in Metropolitan's service area are reached.

In addition, Metropolitan, upon request, furnishes speakers to any elementary school within its service area free of charge. Topics discussed by its speakers include the hydrologic cycle, sources of water for Southern California, methods for reducing water use, and general water-use information. Presentations are prepared to address all elementary grade levels. Tours of Metropolitan's filtration plants are also made available.

Literature is distributed to each student at the presentations, including 25 Ways To Do A Good Turn And Save Water, The Guzzler Gang, A Journey Down The Colorado River Aqueduct, and other appropriate brochures. The films "Guzzler

Gang", "Water Follies", and "Water for Southern California" are also shown.

High Schools and Colleges

Metropolitan, upon request, will furnish a speaker to any high school or college in its service area free of charge. Topics discussed at these levels include hydraulics, design, hydroelectric generation, water conservation, and water supply and demand.

Literature distributed to these students include, 25 Ways To Do A Good Turn And Save Water, Water For Southern California, How To Have A Green Garden In A Dry State, Reclaiming Water, How Saving Water Saves Energy, and other appropriate brochures. Films are also available on loan.

Metropolitan actively seeks to expand its high school and college education programs by promoting these presentations to administrators at these school levels.

Public Information Programs

One of the most widely practiced water conservation activities is the dissemination of public information. These activities can be effective in reducing demands, especially if the public perceives a real and present need to conserve. Although it is very difficult to estimate how much water is saved as a result of public information activities, and therefore very difficult to estimate cost effectiveness, formal public information programs are an important part of Metropolitan's programs to maximize the efficient use of water

in its service area. The following public information activities are conducted by Metropolitan as a part of its effort to encourage efficient use of water:

1. Literature
2. Publications
3. Films
4. Exhibits and related programs at fairs and expositions
5. Speakers Bureau
6. Advertising
7. News Releases
8. Tours
9. Committees

1. Literature

Metropolitan currently distributes approximately 500,000 pieces of literature annually to its member agencies, schools, libraries, industries, other organizations, and individuals. This literature is given free of charge or at a nominal expense for large quantities. The available literature includes:

"25 Ways To Do A Good Turn And Save Water." This brochure was first used during the 1976-1977 drought and discusses 25 ways water can be saved in residential use, both inside and outside of the home. The information in this brochure is updated as required.

"How Saving Water Saves Energy." This brochure discusses the relationship between power and water as well as several ways water can be saved in residential use, both inside and outside the home.

"How To Have A Green Garden In A Dry State." This full-color brochure discusses water-efficient landscaping, and includes pictures and a listing of low-water-using plants. It

also contains the design and layout of three model residential low-water-using landscapes.

"Wa'ter." This brochure begins with a definition of water and is designed to produce conservation awareness. It also discusses the importation of water to Southern California and interesting facts regarding its use. This brochure is primarily used for school groups.

"The Guzzler Gang." This comic book is written for elementary school age children and discusses how more water than necessary is sometimes used in the home, through the improper use of automatic appliances, and outside the home by overwatering landscapes.

"A Journey Down The Colorado River Aqueduct." This illustrated brochure is designed for young children, and discusses the importation of water by Metropolitan from the Colorado River and how water is used in the home.

"Reclaimed Water." In this brochure, the sources, uses, and methods of treating reclaimed water are discussed. Illustrations show the treatment methods and uses of reclaimed water. The brochure was designed to increase public awareness and acceptance of the use of reclaimed water.

"Questions And Answers About Water Reuse In Orange And Los Angeles Counties." This brochure was produced as part of the Orange and Los Angeles Counties Water Reuse Study, which was jointly sponsored by Metropolitan, and is designed to increase public awareness and acceptance of the use of reclaimed water.

"Drip Its Time Has Come." This is a reprint of a seven-page article, published by Sunset Magazine, which discusses in detail how to install drip irrigation systems for residential landscaping.

"For Summer-Dry California--Water Saving Planning Ideas." This is a full color reprint of a 10 page article also published by Sunset Magazine. The article includes low-water-using landscape ideas, color pictures, and a list of low-water-using plants.

"Water For Southern California." This pamphlet presents a brief discussion of the Metropolitan Water District, the Colorado River Aqueduct, the State Water Project, and Metropolitan's water distribution system. A list of the member agencies and the cities and unincorporated areas they serve is included.

Other Literature. Other literature includes items such as bill stuffers, bumper stickers and book markers. A set of six bill stuffers is available which discuss why it is beneficial to save water and how to conserve water in residential use. Bumper stickers and book markers promoting water conservation are also available. Metropolitan will continue to distribute literature and information to any interested organization or individual and will publicize the availability of such information.

2. Publications

Metropolitan currently publishes one full-color

magazine titled Aqueduct, one newsletter titled Focus on Water, and one magazine titled People. Aqueduct is published four times a year and Focus on Water is published up to 10 times a year. Each is distributed to more than 20,000 readers. Both of these publications contain articles promoting water awareness and conservation. People is an internal publication distributed primarily to Metropolitan's employees and covers topics of interest such as water conservation.

Metropolitan will continue its publication program, and will frequently include articles promoting water awareness and conservation of both water and energy in its publications.

3. Films

Metropolitan furnishes films promoting water awareness and conservation to its member agencies, libraries, and schools free of charge, and loans films to any interested organization or individual free of charge. The films are also used in Metropolitan's speakers bureau programs. The following films are dedicated to water conservation.

"The Guzzler Gang." This animated film, a companion to the Guzzler Gang comic book, is designed for your children and discusses how to reduce residential water use.

"Water Follies: A Soak Opera." This humourous animated film was produced by the Denver Water Department and is used primarily for children of all ages. It exaggerates abuses in residential water use.

"Noah--Water To Waste." A six minute, humorous film

featuring television personality Richard Simmons promoting water conservation.

"Gardening California Style." This film was produced by the Bay Film Association and discusses ways to conserve water in residential landscaping through the use of low-water-using plants, soil preparation, water schedules, and other methods.

"Without Water." This humorous film discusses how water is taken for granted by removing water-using consumer goods from a home. The film was produced by the California Water Resources Association.

"Wasting Not." This film is an adaptation of a slide show produced to demonstrate water conservation in Southern California.

Metropolitan believes that its library of films and method of distributing the films is very effective. Production of additional films will be considered as the need arises. Metropolitan will continue to furnish films to its member agencies, schools, and libraries, and will continue to use the films in its speakers bureau programs and loan films to any interested organization or individual.

4. Exhibits and Related Programs at Fairs and Expositions

It is possible to reach thousands of people relatively inexpensively at county and state fairs. Metropolitan therefore participates in local fairs, including the Del Mar Fair in San Diego County, Orange County Fair, Hemet Farmers Fair,

Los Angeles County Fair, and the Ventura County Fair. Periodically Metropolitan participates in the State Fair in Sacramento.

At large county fairs, a live show is presented. The show was originated in 1981 by Metropolitan specifically for the fair program. Through the use of props and audience participation, the relationship between water and energy is demonstrated, and water awareness and conservation are promoted. It is anticipated that the show will be viewed by thousands of fair visitors each year.

Metropolitan maintains approximately 70 exhibits which are used to display materials to encourage water awareness plus water and energy conservation. The exhibits are placed in high-traffic areas such as banks, shopping malls, fairs, water agency lobbies, and in other areas deemed appropriate. Periodically the exhibits are moved to new locations.

Metropolitan maintains a display at the Museum of Science and Industry in Los Angeles. This display is designed to produce an awareness that much of the water used locally is imported. Water conservation literature is available at this display. Metropolitan will continue to encourage the efficient use of water through such programs.

5. Speakers Bureau

Metropolitan's speakers bureau is staffed by employee volunteers. There are currently about 40 active members, and many speeches include a water conservation message. In 1980, the speakers were given formal speech training. Each speaker

is also trained to discuss water conservation and other water issues before he or she is assigned speeches on specific topics.

Metropolitan actively seeks requests for its speakers. Periodically, Metropolitan mails letters to more than 4,000 service clubs, associations, and other organizations to advise them of the availability of speakers and the topics available for discussion. There is no charge for any speaker furnished by Metropolitan. News releases are furnished by Metropolitan to all local newspapers, and advertisements are placed in other publications to further advertise the speakers program.

Metropolitan closely coordinates its speakers program with its member agencies. A notice of each meeting at which a Metropolitan speaker will be present is sent to the directors of the member agency within whose service area the meeting will take place. The Directors representing the member agency are encouraged to attend the meeting to discuss local issues. Metropolitan will continue to furnish speakers and to actively promote its speakers bureau program.

6. Advertising

Since 1977, Metropolitan has conducted an advertising program. The program has included paid television, radio, billboard, and newspaper advertising plus public service announcements, news releases, and other activities designed to capture public attention. The program has included such topics as why it is important to conserve water; including information on how water is used, the relationship between

water and energy, and why a "wet" year doesn't mean the public can ignore water awareness.

7. News Releases

Metropolitan issues many news releases and features each year to more than 250 major and local newspapers. During fiscal year 1983-84, more than 200 news releases were issued, many of these containing a water conservation message. Metropolitan will continue periodically to issue news releases and features specifically addressing water conservation.

8. Tours

Metropolitan offers tours of its facilities to interested groups, organizations, or individuals. Metropolitan's directors also sponsor one-day and three-day tours of Metropolitan's Colorado River Aqueduct facilities and the Department of Water Resources' State Water Project facilities. During fiscal year 1983-84 there were approximately 50 one-day tours of Metropolitan's facilities. All tours include a discussion of water conservation.

9. Committees

Water conservation advisory committees are utilized for many different purposes, and the members of the committees vary depending on the purpose of the committee. For example, a committee was formed in 1982 to offer advice and aid in the development and implementation of Metropolitan's elementary school program. That committee was made up primarily of members with an expertise in water and/or education, including

school administrators and teachers, and representatives from water agencies.

Metropolitan currently has a Member Agency Water Conservation Advisory Committee made up of representatives from its member agencies. This committee was formed in February 1981 to offer advice and assistance to Metropolitan on matters relating to Metropolitan's water conservation activities. The committee also offers a forum where ideas and experiences can be shared by our member agencies.

Metropolitan also has a Public Information Liaison Committee which was developed in 1981. This committee currently has 50 members that meet periodically to discuss water conservation issues. The committee is responsible for providing water conservation and water awareness materials to Metropolitan's member agencies and their subagencies.

It is anticipated that Metropolitan will form other committees from time to time as the need arises. The purpose of these committees would be to offer advice regarding specific water conservation programs or other functions deemed appropriate. In addition to these committees, Metropolitan's Board of Directors' and committee meetings are open to the public. These meetings are held each month, and public input on Metropolitan's activities is received at the meetings.

B. Promotional Measures

Metropolitan's existing promotional measures are implemented primarily to bring about water conservation

awareness throughout its service area. This section of the chapter includes a discussion on landscaping, water-saving devices, and work with other agencies.

Landscaping

Increasing the use of low-water-using vegetation within Metropolitan's service area could reduce residential, industrial, and commercial water demand. It is estimated that almost half of all residential water used in urban areas in Metropolitan's service area is used for landscape irrigation, and some commercial and industrial water is also used for irrigation. Another important reason to reduce landscape irrigation is to reduce summer peak demands. Most landscape irrigation occurs during the hot, dry summer months. This increases the demand on the water supply system at a time when supplies would be at their lowest during dry years. Another important aspect of low-water-using landscapes is that they normally require less maintenance and fertilizers and are therefore less costly and time consuming to maintain.

1. Literature, Films, and Speakers Bureau

The public generally perceives a low-water-using landscape as one made up of cactus and rock, and therefore is hesitant to use low-water-using plant materials. It is important to disseminate information to the public in order to dispell this myth. The distribution of literature and the use of films showing how colorful low-water-using landscapes are beneficial for this purpose. A detailed description of the

literature and films that include a discussion of low-water-using landscapes was included earlier in this section.

Public presentations are also helpful for this purpose. Metropolitan actively seeks speaking engagements for members of its speakers bureau at homeowners associations, garden clubs, landscape associations, and other organizations interested in landscaping. Letters discussing the availability of Metropolitan speakers have been sent to such organizations. Metropolitan will continue to seek such engagements.

2. Demonstration Garden

The public may be more likely to accept low-water-using landscapes if colorful examples of the landscapes are available for public viewing. Demonstration landscapes can also serve as an area where new varieties of low-water-using plants can be tested. During the 1976-77 drought, Metropolitan planted and has maintained ever since a demonstration low-water-using garden at the main entrance to its Headquarters Building in Los Angeles. The garden remains in use today and includes signs identifying the plant materials, examples of drip irrigation systems, and porous paving materials. The garden is situated so that it is easily seen by any visitor entering the Headquarters Building.

3. Work with Nurseries

In order for low-water-using plants to become easily obtainable, the plants must be stocked at local nurseries. Many nurseries stocked low-water-using plants during the 1976-77

drought; however, because a large demand for the plants did not materialize, some nurseries are now hesitant to restock plants not currently in popular demand. Many commonly used plants are drought resistant, and distributing information on these plants could encourage their use. Working with local nurseries therefore should be an integral part of a low-water-use landscape program.

Metropolitan currently furnishes literature on low-water-using landscaping to all nurseries, homeowners associations, and organizations in its service area upon request. The literature was described earlier in this chapter. Distribution of this literature could encourage the use of low-water-using plants.

4. Turfgrass Study

Metropolitan and other Southern California water purveyors funded a five-year study on turfgrasses and turf substitutes which was conducted by the University of California Riverside, Cooperative Extension, to determine the minimum amounts of water required to maintain acceptable appearance and to keep various grasses alive. Previous studies had emphasized water required for optimal appearance rather than survival rates or acceptable appearance, so minimal information of this kind was available. Much of the water used for landscape irrigation is for irrigating turfgrasses. Therefore, the information gained from this study can be used to develop low-water-using landscapes, estimate potential water use

reductions in landscape irrigation, and reduce demands during a water shortage. The final report from this study is expected to be available in early 1985. When the final results become available, brochures and other materials will be developed in order to disseminate the information to both professional organizations and homeowners.

5. Residential Landscape Water Conservation Study

Recently Metropolitan, the Los Angeles Department of Water and Power (LADWP), and the California Department of Water Resources agreed jointly to fund a two-year study concerning water use in residential landscapes. The study will be conducted by LADWP in four similar residential areas of the City of Los Angeles. Approximately 50 homes in each area will be included in the study. The purpose of the study is to evaluate potential water use reductions in existing residential landscapes, and the results of the study will be used to determine the most effective method for encouraging and promoting efficient water use in residential landscaping.

Water Saving Devices

Various State laws and building codes now require the installation of low-water-using plumbing fixtures in new construction, including low-flush toilets and low-flow shower heads. However, many older homes do not include such fixtures. Water use by these older fixtures can be reduced by "retrofitting" the fixtures. The devices to retrofit the fixtures can be packaged in "water conservation kits," which commonly contain

toilet tank displacement bags, shower flow restrictors, and dye tablets used to detect leaks between the toilet tank and bowl.

In 1977 Metropolitan distributed 50,000 such kits to its member agencies as part of its efforts to reduce demands during the 1976-77 drought. Metropolitan's member agencies distributed these kits to their customers. In 1981, Metropolitan again distributed 50,000 such kits to its member agencies which, again, distributed the kits to their customers. Through other distribution programs, kits have been distributed to about half of all the homes in Metropolitan's service area, including all homes in Ventura and Orange counties, the City of Los Angeles, and 370,000 homes in San Diego County.

Brown and Caldwell, a consulting engineering firm under contract to the U.S. Department of Housing and Urban Development, conducted a study to determine the effectiveness of installing the water conservation kits. Results of this study indicate that although the kits are not as effective as originally believed, they can be effective in reducing residential consumption.

Work With Large Water Users

In order to reduce demands of large industrial water users, it would be benefical to reach manufacturers of equipment used by these industries to encourage the manufactures to consider water use in future designs. To this end, Metropolitan has begun working with other agencies on the implementation of a program to reach such manufacturers.

Work With Other Agencies

In addition to Metropolitan, many other agencies are involved in water conservation at the State, regional, and local levels. It is important to coordinate the activities at all levels to avoid a duplication of effort and unnecessary expenditures.

1. State Agencies

The Department of Water Resources (DWR) is the primary State agency involved in water conservation. Metropolitan works closely with DWR to coordinate State, regional, and local activities.

2. Member Agencies

Each of Metropolitan's member agencies is involved in water conservation activities. In order to maximize the effectiveness of these programs, Metropolitan closely coordinates its activities with those of its member agencies. In addition, Metropolitan's Water Conservation Coordinator is available to assist its member agencies in developing or expanding their water conservation activities. The water conservation activities of Metropolitan and its member agencies are well organized and coordinated. However, the activities will be kept under review to insure continued and improved coordination of the activities in the future.

3. Other Organizations

Other organizations in Southern California have implemented programs to encourage the efficient use of water.

These organizations include both public and private electric and gas companies. Although the programs conducted by these organizations were developed to encourage more efficient use of electricity and gas, they include elements to encourage the efficient use of hot water. The elements include residential, industrial, and commercial energy audits, and rebate and low-interest loan programs for the installation of low-flow shower heads and hot water pipe insulation. Metropolitan will continue to coordinate and disseminate information regarding these programs.

4. Conferences and Forums

Metropolitan frequently participates in conferences and forums which emphasize developing and implementing water conservation programs designed to reduce water use. Organizations sponsoring these conferences and forums include the American Public Works Association, American Water Works Association, Association of California Water Agencies, and the California Landscape Contractors Association. Metropolitan also provides speakers, upon request, for these conferences and forums.

C. Distribution System Management

Undoubtedly, the most effective water conservation activity for any utility is the practice of good water management. Water management activities such as metering and water audits can substantially improve the efficient use of water. In fact, studies have indicated that metering is one of the

most effective measures for reducing demands and that leak detection and repairs can be cost effective. Other measures such as corrosion control and meter maintenance and calibration help in maintaining the accurate records necessary for good water accounting.

In 1975, Metropolitan implemented a comprehensive preventive maintenance program for its water distribution system. The program was designed to provide an optimum schedule of maintenance for all equipment requiring periodic maintenance, including valves and meters. This program has led to a reduction in expensive repairs, prolonged equipment life, provided an increase in system reliability, and resulted in a more efficient system. Metropolitan continually reviews its preventative maintenance program and will make cost-effective improvements where necessary.

Water Audit

A system-wide water audit is a detailed accounting of water uses within a delivery or distribution system. A water audit is an important first step in helping to determine such things as total sales, evaporation losses, meter error, unauthorized uses, and losses due to leaks. Metropolitan performs water audits of its system and facilities on a weekly and monthly basis. These audits include an accounting for sales, evaporation losses, seepage, local uses, construction uses, Metropolitan's uses, gains from rainfall and infiltration, changes in groundwater storage, and gains and losses in

reservoir storage. Unidentified losses range from one to three percent, and any unexplained losses are immediately investigated. Metropolitan will continue to closely audit its delivery and distribution system.

Metering

The metering of water use is a very effective water management and conservation measure. Metering of some previously unmetered areas in California has shown that water-use is substantially reduced after the installation of meters.

Metropolitan's system is completely metered. All water entering the system is metered, and all deliveries to our member agencies are metered. It is also common practice throughout Metropolitan's service area for local agencies to meter all retail water uses, including residential, industrial, commercial, and municipal uses.

Metropolitan will continue to encourage the installation of meters for wholesale and retail water sales in its service area. It is anticipated that all new developments in Metropolitan's service area will be metered.

Meter Maintenance and Calibration

Meter maintenance and calibration is an important aspect of water management and conservation. Well maintained and accurate meters are necessary in order to prepare accurate records of water deliveries and sales. Such records are necessary for performing water audits and determining water uses.

Meter maintenance is an integral part of Metropolitan's existing preventive maintenance program. Metropolitan has about 300 mechanical type meters within its system. Each of these meters is checked, lubricated and calibrated every three months, and each meter receives a complete maintenance and calibration once every 12 months. Metropolitan will continue its present meter maintenance and calibration policy.

Corrosion Control

To minimize the possibility of leakage, Metropolitan conducts an extensive corrosion control program. In this program, chemicals and materials are tested to determine their ability to inhibit or remove corrosion or to determine their resistance to corrosion. Those products found suitable are employed where appropriate in the distribution system. Another feature of the corrosion control program is cathodic protection. Under certain conditions pipes and valves may be damaged due to contact with soils which are reactive with the materials of which these facilities are made. Continuing research by Metropolitan's staff has led to measures to counteract the effects of reactive soils, and subsequently reduced corrosion and leaks on the distribution system. Information developed through the corrosion control program is routinely made available to other water purveyors.

Valve Exercising

Poorly maintained valves or valves that are not

periodically operated (exercised) can leak, malfunction, and can increase repair time and cost; therefore, it is important that valves be properly maintained and periodically operated.

Valve maintenance and exercising is another important aspect of Meropolitan's preventative maintenance program. All valves 16 inches in diameter or smaller are lubricated and exercised every six months, and all valves over 16 inches in diameter are lubricated once every 12 months. This program will be continued throughout Metropolitan's distribution system.

Leak Detection

The size of pipes within Metropolitan's delivery and distribution systems is normally very large, with most pipes being from four to twelve feet in diameter, and a few being up to 20 feet in diameter. Most of these pipelines are under high pressure. All water is metered as it enters and leaves Metropolitan's distribution system and at most of Metropolitan's facilities. Because of Metropolitan's visual inspections, metering, water accounting system, centralized control of its distribution system, and large volumes and high pressures of water, it is possible for Metropolitan to maintain a very close observation on this system. Since losses are usually less than three percent, it is therefore not necessary for Metropolitan to maintain leak-detection equipment or crews. However, on some occasions Metropolitan has hired a consultant to investigate portions of the distribution system for leakage.

This usually has been done immediately following the installation of new pipelines in order to insure proper pipe jointure. If undetected leakage is suspected in any part of Metropolitan's distribution system, consultants are hired to detect leaks and the leaks are repaired.

D. Water Management

Local Projects

Metropolitan also participates in a local projects program with its member agencies. Under this program, Metropolitan assists in financing local projects that will reduce the need for water imported by Metropolitan. Most of the local projects involve the use of reclaimed waste water. This allows an equivalent amount of potable water that would have been used in the effected local service area to be released for other parts of Metropolitan's service area. Many of these projects would not be economically feasible without Metropolitan's participation. For a detailed discussion of the local projects program see Chapter VI.

Replenishment Programs

In years when imported water supplies may be plentiful, Metropolitan operates an in-lieu replenishment program in cooperation with its member agencies. In this program, surface water that is normally used immediately by a local agency, is instead captured by a member agency and placed in underground storage for later use. The member agency then satisfies its immediate demands for water by purchasing more of its supply

from Metropolitan than would ordinarily be required. Metropolitan charges less for water sold for this purpose in order to encourage the conservation of local water supplies.

A more general groundwater and surface reservoir replenishment program is accomplished by the member agencies purchasing imported water from Metropolitan, not for immediate use as above, but for storage and for injection into seawater barriers. Member agencies not requiring supplemental supplies for immediate use can purchase water from Metropolitan at a less expensive rate, called the rate for interruptible service, and can store the water for later use. Several member agencies currently participate in this program. For a more detailed discussion of these programs see Chapter XI.

Pricing

Pricing is another area in which water savings can been effected. Metropolitan has established an interruptible water service program and under this program, those agencies which use water for agriculture, interruptible domestic purposes, or for replenishment can purchase water at a cost savings, currently amounting to $44.00 per acre-foot, as compared with sources that are not interruptible. This differential produces a financial incentive for those agencies with above-ground or subsurface storage facilities to purchase water for later use with the understanding that service may be cut off or "interrupted" in the future under certain criteria. This program allows Metropolitan to reduce demands on its

system during times of emergencies or water shortages, which permits more efficient use of existing supplies and facilities. Water pricing is discussed in detail in Chapter XI.

The estimated total annual cost for the public information programs described in this chapter is about $900,000, and the total annual cost for the distribution system management measures is about $3,500,000, for a total of about $4,500,000 or about $3.00 per acre-foot based on 1984 sales of about 1,500,000 acre-feet. This amount does not include the cost for Metropolitan's local projects or replenishment programs, nor does it include the cost of programs conducted by Metropolitan's member agencies or subagencies.

Table 5 shows a summary of the water conservation, distribution system managmenet, and water management activities currently implemented by Metropolitan.

Table 5

CURRENT WATER CONSERVATION MEASURES

Activity	Description
I Education and Public Information	
A. Elementary Schools	In-school education program for fourth and sixth grades to teach pupils to use water wisely. Other programs as requested.
B. High Schools and Colleges	Oral presentations and literature designed to promote water conservation.
C. Public Information	Nine separate activities to disseminate water conservation information.
II Promotional Measures	
A. Landscaping	
1. Literature, Films, and Speakers Bureau	Dissemination of information concerning low-water-use plants.
2. Demonstration Garden	A low-water-using demonstration garden at Metropolitan's headquarters building in Los Angeles.
3. Work with Nurseries	Distribution of literature to encourage low-water-using landscapes.
4. Residential Landscape Water Conservation Studies	Studies to provide data on potential savings in urban landscaping.
B. Water Saving Devices	Distribution of low-water-use devices to retrofit existing plumbing fixtures.
C. Work With Large Water Users	Work with large water users to encourage the use of low-water-using equipment.

Table 5 (continued)

CURRENT WATER CONSERVATION MEASURES

Activity	Description
D. Work With Other Agencies	
1. State Agencies	Work with the Department of Water Resources to develop and coordinate programs.
2. Member Agencies	Coordinate water conservation activities with those of its member agencies.
3. Other Organizations	Coordinate water conservation activities with those of other organizations.
4. Conferences and Forums	Participation in conferences and forums which promote water conservation.
III Distribution System Management	
A. Water Audit	Perform weekly and monthly detailed water audits on entire distribution system.
B. Metering	Meter all water entering and leaving distribution system.
C. Meter Maintenance and Calibration	Meters checked, lubricated and calibrated every three months; complete maintenance and calibration every 12 months.
D. Corrosion Control	Extensive on-going corrosion control program to protect facilities and test chemicals and materials to determine their resistance to corrosion.
E. Valve Exercising	Valves maintained and exercised every six or 12 months depending on size.

Table 5 (continued)

CURRENT WATER CONSERVATION MEASURES

Activity	Description
F. Leak Detection	Part of routine mainenance. Also consultants are hired periodically to detect and repair leaks throughout distribution system.
IV. Water Management	
A. Local Projects	Local projects program to assist in financing local projects to reclaim waste water.
B. Replenishment Programs	Direct and indirect replenishment program to optimize use of groundwater basins.
C. Pricing	Interruptible water service to encourage maximum use of existing supplies during shortages.

CHAPTER IV

SECTION 10631(c) and (d): ALTERNATIVE CONSERVATION MEASURES AND IMPLEMENTATION SCHEDULE

This chapter contains information required by two parts of Section 10631. The first part requires a description of the alternative conservation measures that would improve the efficiency of water use, along with an evaluation of their environmental and other significant impacts. The second part requires a schedule of implementation for the proposed alternative conservation measures. A description of alternative water conservation measures and implementation schedule is included in this chapter. A description of the environmental and other significant impacts is included in Chapter XII.

Metropolitan, its member agencies, and their subagencies have implemented many water conservation programs which complement and enhance regional water management programs. Metropolitan coordinates its programs with those of its member agencies and subagencies to assure maximum effectiveness and to help avoid duplication of effort. Table 6, at the end of the chapter, shows programs that will be evaluated and possibly implemented within the next five years. Implementation of some of the alternative conservation measures may require approval by Metropolitan's Board of Directors, and commitments to implement certain elements of this plan will be considered at a later date. A detailed description of Metropolitan's existing programs can be found in Chapter III. A description of the future programs or efforts to improve existing programs which

may be implemented follows. The costs and other significant impacts of these programs are described in Chapter XII.

A. Education and Public Information

Metropolitan's alternative education and public information programs have been designed to promote water conservation awareness and to assist the member agencies with their programs. These alternative programs include: local water conservation advisory committee, conservation literature, promotional measures, demonstration low-water-using landscapes, promotional campaign with nurseries, awards for conservation developments, device distribution, work with large water users, and information on Federal and State laws and programs.

Committees

Since 1981, Metropolitan has formed several committees, such as the Public Information Liaison Committee and Member Agency Water Conservation Committee, to offer advice to Metropolitan on developing and implementing future water conservation programs. These advisory committees include Metropolitan personnel, representatives from interested organizations including Metropolitan's member agencies, and individuals with special expertise or interests which the needs might dictate. The additional committees will be formed to offer advice on developing and implementing the programs discussed in this report.

Conservation Literature

Metropolitan will continue to publish and distribute

water conservation brochures in order to encourage a reduction in the growth of residential water use. Metropolitan's existing water conservation literature will be evaluated and updated. Additional brochures will be published as needed.

Information from Metropolitan's completed study of turfgrass and turfgrass substitutes may be included in a brochure intended for distribution to the general public, nurseries, and landscape architects. This brochure will describe the quantities of water required by different turfgrass and turfgrass substitute species under varying climatic conditions, which species are best suited for particular climates, and efficient irrigation methods. The brochure will emphasize how to reduce applied water and still maintain an attractive healthy turf or turf substitute.

A study of ornamental ground covers and shrubs may be initiated to determine the evapotranspiration rate of the ground covers and shrubs most commonly used in Southern California landscapes. The study, which is anticipated to last five years, would probably be conducted primarily by the University of California Riverside Cooperative Extension which conducted the turfgrass study. It is anticipated that other participants such as water districts and equipment suppliers may help sponsor the study. A brochure discussing the study's results, and advising on how best to irrigate the plants, would be produced.

With completion of the ornamental ground cover and

shrub study, the data gathered from it and the turfgrass studies would be assembled and analyzed to determine the best "mixes" of turf, turf substitutes, trees, and shrubs that would produce appealing landscapes while allowing for reduced water use in both existing and new landscapes. This information could be published and made available to landscape architects, nurseries, water districts, schools, other interested organizations and the general public.

To complement its conservation literature, Metropolitan established a drought-resistant demonstration garden at its Los Angeles Headquarters building in 1977. The garden is currently being upgraded and revitalized. Other drought-resistant demonstration gardens are being planned or installed at other District facilities. The F. E. Weymouth Filtration Plant in La Verne is currently converting a portion of its landscape to a drought resistant demonstration garden. Eventually, all of Metropolitan's facilities used for tours will incorporate a drought-resistant landscape. In addition, the speakers bureau will be prepared to discuss drought-resistant landscapes for interested audiences.

Promotional Measures

Metropolitan's promotional measures may include public information programs, low-water-use landscaping demonstration gardens, promotional campaigns with nurseries, an award program for nurseries, and the distribution of kits for retrofitting existing plumbing fixtures. These measures may be continued to

assist Metropolitan's member agencies in promoting water-conservation awareness.

Demonstration Low-Water-Using Landscapes

Metropolitan will continue to maintain its demonstration landscape at its Headquarters Building and is developing such gardens at other Metropolitan facilities which are commonly used in the Metropolitan tour program or are high traffic areas. Metropolitan will also review its existing landscaping at other facilities and will convert those landscapes to low-water-using landscapes when appropriate.

Promotional Campaign with Nurseries

To help gain public acceptance of low-water-using landscapes, Metropolitan will encourage the use of water-efficient plants through promotional campaigns with nurseries. These compaigns will be conducted cooperatively with Metropolitan's member agencies. Nurseries may be requested to feature and promote low-water-using landscape materials on a periodic basis and to distribute information on water-efficient landscapes. Special tags may be offered to nurseries through our member agencies which would identify and distinguish plant materials which are water efficient.

Awards for Conservation Developments

Metropolitan believes that those individuals and businesses responsible for making significant reductions in water use should be acknowledged. Therefore, Metropolitan will assist its member agencies in developing water conservation

awards programs within their service areas. Metropolitan may coordinate such programs and provide publicity and possibly contribute some type of award in addition to a certificate of accomplishment.

Device Distribution

Metropolitan also may provide in-house water conserving retrofit devices to households in portions of its service area each year. In a program conducted cooperatively with Metropolitan's member agencies, selected portions of Metropolitan's service area would be targeted each year and, for example, at subsequent five-year intervals so that at least one-fifth of our service area is supplied with new water conserving devices each year and at subsequent five year or other appropriate intervals.

In addition, requests from member agencies for devices would be evaluated and the devices furnished to them based on the availability of supplies. Devices also may be acquired from DWR's Office of Water Conservation or through other sources. For a more detailed discussion of this program, refer to Chapter XII.

Work with Large Water Users

There are many industrial and commercial organizations throughout Metropolitan's service area which use large amounts of water. Organizations such as the City of Los Angeles Department of Water and Power have developed brochures which discuss the methods these organizations can employ to reduce water use.

Through its member agencies, Metropolitan will distribute these brochures to the appropriate organizations, and Metropolitan will develop additional brochures if needed. In addition to this program, Metropolitan may assist its member agencies in developing and implementing an "awards" program to recognize organizations which have improved the efficiency of water use through the implementation of water conservation or water management programs. In addition, Metropolitan will continue its efforts to reach manufactures of equipment which use water (i.e. industrial cleaning equipment, car wash equipment, canning equipment, etc.) to encourage that water-use reduction be considered in future designs.

Information on Federal and State Laws and Programs

A clearinghouse of water conservation literature and information will be established. Here, water users will be able to obtain information on laws and regulations affecting water use in urban settings. Also included will be brochures, films, and articles by Metropolitan or others on water conservation and water management. Inquiries regarding available information could be made by calling Metropolitan on a toll-free number. In addition, the clearinghouse will include a current list of water conservation ordinances and resolutions.

B. Water Management Programs

Metropolitan's alternative water management programs include possibly retaining a leak detection consultant for use by member agencies and continuation of the local projects

(reclamation) program. If approved by Metropolitan's Board of Directors, these programs would assist the member agencies in locating leaks in their distribution system and would contribute to the development of water reclamation projects throughout Metropolitan's service area.

Leak Detection

Metropolitan may retain a leak detection consultant. The consultant would be made available to Metropolitan's member agencies to locate leaks within the agency's distribution system. However, the method of allocating the consultant's time among the member agencies has not yet been determined. Metropolitan will continue to host leak detection seminars so that member agencies can learn how to detect, repair, and prevent leaks in their systems. On request, member agencies will be provided the names of leak detection services or of suppliers of such equipment.

Reclamation Program

Metropolitan may continue its local projects program with local agencies in order to reclaim waste water throughout its service area. For a detailed discussion of possible future local projects, see Chapter VI.

C. Other Alternative Water Conservation Measures

The three remaining alternative water conservation measures are environmental impact reports and statements, work with other agencies, and a water emergency plan. A detailed discussion of the measures follows.

Environmental Impact Reports and Statements

Environmental Impact Reports and initial environmental studies prepared for Metropolitan's activities could and currently do as necessary contain a discussion of water conservation as it applies to the project under consideration. In addition, as EIR's received from other agencies are reviewed and comments prepared, a message suggesting that water conservation measures be incorporated into new developments will be included.

Work with Other Agencies

Metropolitan will continue to work with public and private organizations to encourage efficient water use. Metropolitan will develop special speaking programs, analyze and suggest possible activities to reduce water use, or participate in special programs to focus attention on water conservation and management issues. Such programs will be developed with private utilities, universities, foundations, or civic groups.

Water Emergency Plan

A water emergency plan will be developed in order to specify what constitutes an emergency water shortage and what steps Metropolitan would take to mitigate the situation. It is envisioned that the plan would be developed using a "step" approach. Under this concept, a minor emergency would trigger implementation of step one followed by step two and succeeding steps as the emergency increased or until the

situation were under control. An increase in the severity of the emergency would be the mechanism that would invoke the next higher level of emergency action. Such actions could range from media requests to control usage in step one, to full scale rationing in the most extreme case.

One example of a "step" approach is as follows. There would be a continuous program of conservation activities throughout the entire water emergency situation. When water shortages appear imminent, the public would be called upon to implement a higher-than-normal level of conservation. When water shortages reach 10 percent of the total annual supplies, Metropolitan would implement its interruptible program. When a 20 percent shortage occurs, economic incentives through the member agencies would be implemented. A 25 percent shortage would trigger the implementation of rationing programs. Finally, a 30 percent shortage would be serious enough to begin full scale rationing programs. The percentage numbers given above are illustrative only. Actual numbers would be developed through public hearings and other processes.

Table 6 shows the alternative water conservation programs, including a brief discription, that Metropolitan may implement within the next five years. Specific details of the programs are not available at this time and therefore are not included. It is anticipated that the programs will be developed with assistance from the proposed Water Conservation Advisory Committees.

Table 6

ALTERNATIVE URBAN WATER CONSERVATION MEASURES

Activity	Status	Description
I. Education and Public Information		
A. Local Water Conservation Advisory Committees and Consultant	#	Future activities evaluated by consultant and additional committees formed as appropriate.
B. Conservation Literature		
1. General Water Conservation Brochure	#	Existing brochures and methods of distribution evaluated.
2. Landscape Brochure with Plant list	+	Additional brochures prepared as information from existing and future studies becomes available.
C. Promotional Measures		
1. Demonstration Low-Water-Using Landscapes	+	Encourage development of landscapes and review Metropolitan's facilities.
2. Promotional Campaign with Nurseries	+	Increase efforts as information from existing and future studies becomes available.
3. Awards for Conservation Developments	+	Assist member agencies in developing local programs.
4. Device Distribution	+	May provide kits for retrofitting existing plumbing fixtures under annual program.
D. Work with Large Water Users	X	Will assist in developing programs to encourage efficient use by large water users such as turf-grass irrigators and industry.

Table 6 (Continued)

ALTERNATIVE URBAN WATER CONSERVATION MEASURES

Activity	Status	Description
E. Information on Federal and State Laws and Programs	+	Will be included in information made available through Metropolitan.
II. Water Management Programs		
A. Leak-Detection Program	+	May provide consultant services for member agencies.
B. Replenishment Program	+	Will continue local projects programs. Projects will be reviewed on a case-by-case basis.
III. Other Alternative Water Conservation Measures		
A. Environmental Impact Reports and Statements	+	Will include discussions and recommendations on water conservation in review of environmental documentation.
B. Work With Other Agencies	+	Will continue to encourage efficient water use.
C. Water Emergency Plan	X	Will develop a water conservation plan which could be implemented during shortages or emergencies.

Key: X = will be implemented
+ = Will increase effort
# = Evaluate current efforts

CHAPTER V

SECTION 10631(e): FREQUENCY AND MAGNITUDE OF SUPPLY DEFICIENCIES, AND ABILITY TO MEET SHORT-TERM DEFICIENCIES

Section 10631(e) of the Act requires that the urban water management plan include a description of the frequency and magnitude of supply deficiencies including conditions of drought and emergency, and the ability to meet short-term deficiencies. Since Metropolitan started delivering supplemental water to its member agencies, it has never experienced a supply deficiency and has had only one incident in which a voluntary cutback in supplemental demands was recommended. This cutback occurred to help mitigate the severe effects of the 1976-77 drought in other areas of the State.

However, the firm supply of water available to Metropolitan will not be as reliable in the future as it has been in the past, because the existing and potential additional supplies from each of the four sources of water available in Metropolitan's service area--local supply, Los Angeles Aqueducts, Colorado River, and State Water Project--are faced with uncertainty as discussed in Chapter II. It should be noted that a dependable water supply is required to support the economy and the needs of the people of Southern California. Frequent or severe shortages would cause serious problems and are not acceptable. Tables 7 and 8 show a comparison of existing and potential water supplies available within Metropolitan's service area under three hydrologic conditions. The three conditions are: (1) years of average water supply conditions, in which an

Table 7

Comparison of Existing Water Supply with Normal Projection of Demand
in million acre-feet per year

	Average Year Supply			Dependable Supply Repeat of 1928-34 Long-term Dry Period			Probable Minimum Supply Repeat of 1976-77 Short-term Drought		
	1990	1995	2000	1990	1995	2000	1990	1995	2000
Water Supply									
Local	1.11	1.11	1.12	1.11	1.11	1.12	1.11	1.11	1.12
Los Angeles Aqueducts	0.47	0.47	0.47	0.47	0.47	0.47	0.30	0.30	0.30
Colorado River*	0.39	0.42	0.45	0.45	0.45	0.45	0.45	0.45	0.45
State Project**	1.51#	1.48#	1.48#	1.08	1.03	0.99	0.65	0.64	0.59
Total	3.48	3.48	3.52	3.11	3.06	3.03	2.51	2.50	2.46
Normal Projection of Demand	3.35	3.48	3.61	3.35	3.48	3.61	3.35	3.48	3.61
Shortages	None	None	0.14	0.24	0.42	0.63	0.84	0.98	1.20
"Extra Water" Available for Exchange Agreements and Groundwater Storage	0.13	None	None	None	None	None	None	None	None

* Colorado River water supply reduced in average year supply in 1990 and 1995 to reflect water delivered under the Desert and Coachella Exchange Agreements.

** State Water Project supply includes entitlements of Desert and Coachella to be furnished under exchange agreements, as adjusted for each hydrologic condition.

\# Assumes completion of Metropolitan facilities to distribute State project water. 1.20 million acre-feet is the maximum delivery capacity without these facilities.

Table 8

Comparison of Existing and Potential Water Supply with Normal Projection of Demand
in million acre-feet per year

	Average-Year Supply			Dependable Supply Repeat of 1928-34 Long-term Dry Period			Probable Minimum Supply Repeat of 1976-77 Short-term Drought		
	Year			Year			Year		
Water Supply	1990	1995	2000	1990	1995	2000	1990	1995	2000
Existing	3.48	3.48	3.52	3.11	3.06	3.03	2.51	2.50	2.46
Potential									
Local Projects Developed within Metropolitan's Service Area	0.02	0.04	0.08	0.02	0.04	0.08	0.02	0.04	0.08
Chino Basin Groundwater Storage Program	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.07
Additional Colorado River Water	0.10	0.25	0.25	0.10	0.25	0.25	0.10	0.25	0.25
Additional State Project Water:									
Coordinated Operation Agreement	-0-	-0-	-0-	0.10	0.10	0.10	-0-	-0-	-0-
Interim CVP Water	0.20	0.15	0.10	0.20	0.15	0.10	0.20	0.15	0.10
Additional State Project Facilities in the Delta (Stage 1 and 2 for water supply, and water quality and environmental protections)	-0-	0.16	0.25*	-0-	0.16	0.25*	-0-	-0-	-0-
Total	3.80	4.12	4.10	3.53	3.76	3.76	2.83	2.94	2.91
Normal Projection of Demand**	3.35	3.48	3.61	3.35	3.48	3.61	3.35	3.48	3.61
Shortages	None	None	None	None	None	None	0.52#	0.54#	0.70#
"Extra Water" Available for Exchange Agreements, Groundwater Storage, and Colorado River Banking	0.45	0.60	0.59	0.18	0.28	0.20	None	None	None

* Up to 250,000 acre-feet depending upon which facilities are constructed and the timing of construction.

** Demands may be lower during severe droughts due to implementation of short-term water conservation measures and increased public awareness.

\# Shortages could be substantially reduced by implementation of short-term water management and water conservation measures. Short-term measures cannot be considered in long-term dependable supply.

additional supply is available on an intermittent basis; 2) years during sustained dry periods (hydrologic conditions similar to those from 1928 to 1934), in which a reduced "dependable supply" is available; and 3) years of severe drought (hydrologic conditions similar to the 1976-77 drought), in which the "probable minimum supply" is available. These three levels of supplies are compared to Metropolitan's projections of "normal" demand. Projections of normal demand include reductions in per-capita consumption due to continuation of existing and implementation of future water conservation programs. Also, demands will vary considerably depending on the weather and other variables. Table 7 shows the existing water supplies under each of these conditions, and the shortages that could occur. Table 8 shows several potential additional water supplies, and how such supplies could reduce the shortages.

Table 7 points out one very significant problem--without construction of additional facilities and implementation of additional measures, there will be water shortages in the future. The only questions are when, and how severe. In dry periods the shortages could occur fairly soon and could be severe. In average water supply years, the shortages would occur later in time and be of smaller magnitude, yet eventually would occur more frequently. Therefore, to avoid shortages, and to provide "extra" water for implementation and continuation of exchange agreements and implementation of a conjunctive

use program in the Chino Basin and a Colorado River banking program, it will be necessary to pursue the development of all of the "potential additional supplies" identified in Table 8. These additional supplies will be necessary to help offset the projections of severe shortages during dry periods as identified under "dependable supply" and during droughts as indicated under the "probable minimum supply" scenario.

As shown on Table 7, without additional facilities and measures, shortages could begin in Metropolitan's service area about 1995 under average-year conditions. However, with all of the additional facilities and measures there would be no shortages during average years until after the year 2000, and "extra" water could be made available for continuing and implementing exchange agreements and implementing the Chino Basin conjunctive use and Colorado River banking programs.

Under dependable supply conditions during sustained dry periods, shortages could begin before 1990 and would increase in severity thereafter without additional facilities and measures. However, with additional facilities and measures, shortages would not be expected until after the year 2000. "Extra" water would cease to be available shortly after the year 2000.

Under a repeat of 1976-77 drought conditions, severe shortages could be experienced even with additional facilities and measures, and use of the "extra" water stored during the average and early dependable supply years. However, it should

be noted that these shortages could be substantially reduced through implementation of various water management activities. These activities include (1) drawing upon the State project, Metropolitan, and local reservoirs in Southern California, (2) using water stored in Metropolitan's cooperative conjunctive-use program with Desert Water Agency and Coachella Valley Water District, (3) short-term mining of groundwater basins by local agencies in Metropolitan's service area, (4) reducing demands through Metropolitan's interruptible service program, and (5) implementation of extensive short-term water conservation measures by Metropolitan and its member agencies and their subagencies.

Each of the above management measures could only be used to help reduce short-term shortages. None of them could be considered as a firm supply.

The following is a discussion of each of the existing and potential supplies available for use within Metropolitan's service area, and the uncertainties of such supplies.

A. Existing Supplies

1. Local Water

Local water resources supply about one-third of the needs within Metropolitan's service area. These resources consist primarily of: (1) groundwater, (2) local surface water, and (3) reclaimed wastewater. The local groundwater and surface supplies in Metropolitan's service area have been almost fully developed. Rights to use the local supply have

been well established through adjudication and the State's water rights process. The supply available from the large groundwater basins underlying the Southern California coastal plain is by far the largest source of local water. Since most of the local supply comes from the large groundwater basins, the supply is relatively unaffected by year-to-year variations in precipitation, except that some of the basins can be mined (overpumped) to help offset short-term shortages. In many cases, when a groundwater basin is mined, additional imported supplies must be used in subsequent years to recharge the basin.

Even though the amount of water available from the groundwater basins is considered to be a firm supply, the quality of water in some areas of some of the basins has at times become unacceptable for human consumption. This is due to materials percolating through the soil and contaminating some of the water in the basins. In some areas, primarily the San Fernando and San Gabriel Valleys, some local wells have been shut down because of contamination, or additional imported water is blended with the well water to improve its quality. To the extent a local supply is lost to use, imported supplies must be increased to make up for the loss.

2. Los Angeles Aqueducts

The Los Angeles Aqueducts transport water from the Owens Valley and Mono Basin to the City of Los Angeles. This is the major source of supply for the City, normally providing approximately 80 percent of its needs. Currently, this supply

is highly dependable insofar as runoff and facilities to store and deliver the water are concerned. However, as discussed in Chapter II, unresolved legal questions exist as to the City's use of both Mono Basin surface water and Owens Valley groundwater. Also, there is the possibility that seismic activity in the Mammoth Lakes area or in areas where the aqueducts cross the San Andreas Fault could cause disruption of the supply. Should this supply be reduced for any reason, the City would turn to Metropolitan for replacement supplies. This could increase the risk or severity of shortages throughout Metropolitan's service area. In the 1976-77 drought, the water supply available to the Aqueducts was reduced from 470,000 acre-feet to 300,000 acre-feet; this reduced amount is shown on Table 7.

3. Colorado River

For more than 30 years, the Colorado River served as the only source of supplemental water available to Metropolitan. This has been a highly dependable source, and ample facilities exist to store and transport Metropolitan's Colorado River water supply under all runoff conditions. However, Metropolitan's dependable supply can be limited to less than 50 percent of the existing supply in 1986 as the Central Arizona Project is operational. Also, legal questions exist concerning Indian water rights and the impact of these rights on Metropolitan and the California agricultural agencies that use Colorado River water.

Metropolitan has entered into exchange agreements with Desert Water Agency and Coachella Valley Water District. Under these agreements Metropolitan exchanges some of its Colorado River water for an equal amount of Desert's and Coachella's entitlement to State project water. In addition, Metropolitan is delivering water in advance of established schedules for storage in the Coachella groundwater basin for later use during shortages. The advance delivery program is described in more detail later in this chapter.

4. State Water Project

When using less Colorado River water, Metropolitan will be more dependent upon the State Water Project for meeting its existing and future needs. Even though Metropolitan has the contractual right to a sufficient supply of State project water to meet its needs for many years, the dependable supply from the existing facilities is insufficient to meet the increasing demands of the State's contracting agencies, including Metropolitan. Even in years of average runoff, the project's supply, as limited by the capacity to export water from the Sacramento-San Joaquin Delta, will be insufficient to meet needs after the early 1990s. The State project contractors are facing shortages of increasing frequency and magnitude.

As shown on Table 7, the supply of water available to Metropolitan from the State project declines over time and under the three hydrologic conditions. Some of the reasons for

this decline include: 1) increased water demands in Northern California which reduce Delta inflow, 2) limited reservoir storage, 3) limited ability to transfer water across the Delta, and 4) area of origin protections.

B. Potential Additional Supplies

1. Local Water

It is anticipated that some additional local supply will become available under Metropolitan's Local Projects Program. This program is discussed in detail in Chapter VI. As discussed in that chapter, there are many constraints to the large scale use of reclaimed water.

The primary uses for reclaimed water include industrial use, landscape irrigation, and groundwater recharge, with recharge providing the largest potential for future use. Because of health concerns, reclaimed wastewater cannot be used for direct human consumption. The amount of additional reclaimed wastewater which may be used in the future is uncertain because new groundwater recharge projects are approved by the State Department of Health Services only on a case-by-case basis. This is to ensure that public health standards are fully satisfied. The results of studies of potential health effects may permit the setting of standards for such projects in the future. These standards and the treatment technology necessary to meet the standards will determine the extent of reuse for groundwater recharge. Other technological and economic constraints may affect the amount of

reclaimed water used in industry and for landscape irrigation.

Some additional development of local water resources to be operated in conjunction with the imported supplies is also being investigated. This includes a new storage reservoir in San Diego County and facilities for storing and recovering water in the Chino Groundwater Basin. It will be necessary to construct both local facilities and State project facilities in order to fully implement the Chino Basin storage program.

2. Colorado River Water

There are both short-term and long-term prospects for obtaining additional Colorado River water. Over the short-term they are: 1) surplus Colorado River water; 2) a possible change to the Hoover Dam flood control criteria; 3) water unused by Arizona and Nevada; and 4) water unused by agencies in California that use Colorado River water for agricultural purposes. Each of these projects would provide water in excess of California's 4.4 million acre-foot basic apportionment.

For the next several years, prospects are good that surplus water may be available to Metropolitan as the Colorado River reservoirs are full and the average flow exceeds demand by about 2 MAF/yr. However, the Secretary of the Interior has yet to establish criteria for declaring surpluses. The long-range outlook is for the total demand on the river to exceed the average runoff. Therefore, surplus water is only an interim supply with the chances of its being available declining to zero over time. The good prospects for obtaining surplus water in

the near future have been brought about partly by a recent change made in the criteria, established by the U.S. Army Corps of Engineers, governing operation of Hoover Dam for flood control. The change results in more frequent flood control releases, enhancing the expectation that surpluses will be declared. Because of this change, Metropolitan has proposed that the criteria be modified to allow more efficient use of the flood control releases. This may be difficult to accomplish when considering the multiple purposes for which the river system is operated.

Both Arizona and Nevada are taking less than their apportionment of Colorado River water. The Secretary of the Interior is permitted to allow a state to use any water that the other Lower Basin states do not use. However, the other basin states may argue that the water should remain in the upstream reservoirs to the extent storage space is available for future use by the other lower basin states.

In the past, California's agricultural agencies along the Colorado River have not used all of their entitlement in some years. Any water not used by them in the future would be available to Metropolitan. Metropolitan, the agricultural agencies, and the Colorado River Board are developing procedures to forecast monthly water usage by the agricultural agencies. These procedures would enable prediction of when the agricultural agencies would not use all of their entitlement so that Metropolitan could make arrangements for use of the water.

Over the long term, the prospects for obtaining additional Colorado River water are: 1) water saved by implementing conservation measures in California irrigation districts; 2) water saved from reconstructing a portion of the unlined All American Canal; 3) advance delivery of exchange water to Desert Water Agency and Coachella Valley Water District; and 4) water banking in Lake Mead. Each of these prospects would make more efficient use of California's Colorado River water supplies.

Metropolitan and the Imperial Irrigation District have each appointed negotiating teams to discuss a proposal whereby Metropolitan would pay for water conservation measures within Imperial which would reduce the amount of water needed by Imperial. Two types of conservation measures are under consideration: structural facilities--lining canals, constructing regulating reservoirs and spill interceptors, installing measuring devices, and automating the distribution system; and non-structual measures--improving the management of water flows in the distribution system and on the farms. These measures are discussed in more detail in Chapter XII. Implementation of these measures could result in reduced diversions by Imperial and make an equivalent amount of water available for diversion by Metropolitan. Similar measures to those under consideration in Imperial are under study in the Coachella Valley Water District.

Metropolitan has proposed that reconstruction of

a portion of the unlined All-American Canal be undertaken jointly with the Federal Government and the Imperial Irrigation District. Under the proposal, which would include the Bureau of Reclamation and Imperial, Metropolitan would use the water saved when its other supplies are insufficient. When not needed by Metropolitan, the Bureau would use the water to replace the brine water outflow from its Yuma Desalting Plant and possibly reduce desalting operations. Lining of the canal could make feasible a groundwater recovery program proposed for the East Mesa area along the canal. Water has seeped from the canal over a number of years. This measure is also discussed in more detail in Chapter XII.

Because of the good prospects of obtaining surplus water in the next few years, Metropolitan is delivering water in advance of presently established schedules to Desert Water Agency and Coachella Valley Water District for groundwater recharge. As discussed earlier, Metropolitan normally exchanges its supply of Colorado River water for these two agencies' State project water on a year-by-year basis. This advance delivery, up to a total of 600,000 acre-feet, will create a pool of groundwater that these two agencies can draw upon during future shortages of State project water. This will allow Metropolitan to use the Colorado River water that would otherwise be delivered to these two agencies while still using their State project water during future shortages. This effect is shown on Table 7, when in 1990 and 1995 average water supply

years Metropolitan makes deliveries of Colorado River water to the two agencies, but in drought years these deliveries are suspended. It is anticipated that this program will continue after surplus Colorado River water ceases to be available using some of the "extra" water that could be made available from the potential additional supplies shown on Table 8.

Metropolitan is considering a proposal whereby it would bank (or store) water in Lake Mead. To implement the proposal, Metropolitan would increase its delivery of State project water during years of sufficient water supply and decrease diversions of Colorado River water, storing that water in Lake Mead. Then, in years of insufficient State project supply, Metropolitan would divert the water it had previously stored in Lake Mead. The success of this proposal depends on the State project's capability to deliver sufficient water to Metropolitan, facilities in Metropolitan's system to distribute such water, the availability of empty storage space in Lake Mead to store the unused Colorado River water, and conveyance capacity in the Colorado River Aqueduct.

Once the short-term prospects cease to provide water to Metropolitan, the long-term prospects should have begun to materialize. Considering all of the prospects for additional Colorado River water, it is expected that 250,000 acre-feet per year would be made available on a fairly dependable basis. Chapter II contains a description of Metropolitan's Colorado River supply. It should be noted that even if an additional

250,000 acre-feet were to become available to Metropolitan, it would still be necessary to increase the supply of water available from the State project for Metropolitan to meet its demands.

3. State Water Project

To avoid shortages on the State Water Project, it will be necessary to implement measures and construct facilities to more efficiently transfer water from the Sacramento River in the north Delta to the export pumps in the south Delta, and to make more efficient use of existing Delta supplies. These measures and facilities include: (1) an agreement for further coordination of State Water Project-Central Valley Project (SWP-CVP) operations; (2) interim purchase of CVP water; and (3) construction of Delta facilities. Chapter XII contains a discussion of these measures and facilities, and Chapter II contains a more detailed description of the State Water Project supply.

C. Conclusions

Based on the information previously discussed, two fundamental conclusions are evident. First, Metropolitan's water supply will be less dependable in the future than it has been in the past. To overcome this problem will require a much greater degree of coordinated management of all water resources than has been necessary in the past.

Second, Metropolitan's service area will need development of new State Water Project facilities to meet its

needs for a firm water supply regardless of other measures which may be implemented. A concerted effort must be made to meet the needs of the 16 million people, along with the hundreds of thousands of acres of farmland, that are served by the State Water Project. Fortunately, California is a state with ample water resources, and development of additional State Water Project facilities will help to ensure that the people's needs for water are met.

D. MWD Water Management Objectives

In order to reduce the severity of future water shortages and ensure that the water needs of Metropolitan's member agencies are met, the following ten-point program was presented in Report No. 946, which was issued in December 1982. This program has been adopted by Metropolitan.

1. Water Conservation. Metropolitan should continue implementation of the water conservation program outlined in its Board Resolution 7867 involving a public information program and other activities urging the public to make efficient use of water and reduce demands.

2. Water Supply. Metropolitan should plan its long-term water supplies to meet the normal projection of demands to be met by Metropolitan that are identified in Report No. 946.

3. System Capacity. Metropolitan should plan its distribution system to have sufficient capacity to meet the above-normal projections of demands to be met by Metropolitan that are identified in Report No. 946.

4. Long-Term Regulatory Storage. Metropolitan should maintain a reserve supply of water in storage in its and/or the State's reservoirs in Southern California equal to the difference between the above-normal and the normal projections of demand identified in items 2 and 3 above. This would provide sufficient water to meet an increase in demands from the normal to the above-normal level for a single year.

5. Additional Storage. Metropolitan should investigate the storage of water in other reservoirs in Southern California to meet an increase in demands as set forth in item 4 above for an additional one or two years.

6. Groundwater Storage. Metropolitan should encourage the storage of water in groundwater basins under a continuation of existing programs and under new programs such as conjunctive-use storage programs and pre-delivery programs under exchange agreements.

7. Interruptible Program. Metropolitan should continue its interruptible water service program as a means of protecting the public from hardship due to a short-term shortage in water supply caused by a short-term drought or other emergency or disruption in service.

8. Local Projects. Metropolitan should continue with the local projects program to increase the local water supplies in Southern California.

9. Colorado River Water. Metropolitan should pursue programs to protect and increase its Colorado River water

supplies as set forth in Metropolitan's Report No. 947, "Future Colorado River Water Supply of the Metropolitan Water District."

10. State Water Project. Metropolitan should work with State officials and others to achieve a rapid and effective completion of the State Water Project facilities needed to meet growing demands, recognizing that the State project serves about two-thirds of the State's population.

- - -

Metropolitan's ability to avoid both short-term and long-term deficiencies will depend on the implementation of this ten-point program. The short-term measures included in the program are: (1) implementation of short-term water conservation measures; (2) purchase of interim CVP water; (3) use of surplus Colorado River water; (4) implementation of Metropolitan's interruptible program; (5) maintaining a reserve supply in local reservoirs; and (6) implementation of a conjunctive-use program in Chino Basin. The long-term measures include: (1) continued implementation of Metropolitan's long-term water conservation program; (2) completion of the State Water Project; (3) implementation of a coordinated operation agreement (which is a prerequisite to the purchase of interim CVP water); (4) agreements for use of additional Colorado River water; (5) planning Metropolitan's distribution system to meet "above-normal" projections of demand; and (6) continuation of Metropolitan's Local Projects Program. It will be necessary to pursue

implementation of each of the above measures to minimize the risk of future shortages in Metropolitan's service area.

The ten-point program and Metropolitan's projections for water supply and demand are discussed in more detail in Metropolitan reports: (1) Report No. 946, "1982 Population and Water Demand Study;" (2) Report No. 948, "Water Supply Available to Metropolitan Water District Prior to Year 2000;" and (3) Report to Metropolitan's Board of Directors dated January 4, 1985, titled "Prospects of Obtaining Additional Colorado River Water for the Metropolitan Water District."

CHAPTER VI

SECTION 10632(a): WASTE WATER RECLAMATION

This chapter contains an explanation and evaluation of the additional water supplies which could be produced from increased waste water reclamation. A substantial volume of waste water is produced in Metropolitan's service area; however, much of this water is discharged into the ocean. Data from waste water treatment agencies within Metropolitan's service area indicated that in 1981, 1,350,000 acre-feet of water passed through waste water treatment facilities in that year. Of this total, about 63,000 acre-feet, or 5 percent, was reused. Groundwater recharge accounted for approximately half the use. Landscape, agricultural, and industrial use accounted for most of the remainder. Data on these uses are shown in Table 9.

The 1981 costs per acre-foot of reclaimed water in Table 8 indicate a considerable variance. The wide range of values can be attributed to a combination of factors: degree of treatment, inclusion or deletion of debt retirement, distance and pumping needed to deliver the water to the user, and project location. As an example, water served to users within 1 mile of the reclamation plant ranges in cost to the customer from $16 to $456 per acre-foot. Projects providing water up to 10 miles away from the treatment facilities cost the customer from $77 to $523 per acre-foot.

The cost of water from many proposed reuse projects is comparable to the cost of alternative new freshwater supplies. Several studies have been completed or are under way

Table 9

1981 Reuse of Waste Water
Within Member Agency Service Areas of
The Metropolitan Water District of Southern California
(Acre-feet per year)

Member Agency	Number of Plants	Reuse Category					Cost $/ac-ft
		Land-scape	Agri.	Ground Water	Industry	Total	
Ventura County							
Calleguas	5	52	2,210	--	26	2,288	16-222
Los Angeles County							
Burbank	1	--	--	--	2,800	2,800	16
Central Basin MWD	3	537	--	25,300	--	25,837	7-82 1/
Foothill MWD	1	114	--	--	--	114	456
Glendale	1	230	--	--	230	460	77
Las Virgenes MWD	1	326	383	--	--	709	390
Long Beach	1	500	--	--	--	500	36
Los Angeles	5	1,995	21	--	1,918	3,934	16-77 3/
Three Valleys MWD	1	733	819	--	2,936	4,488	12 1/
West Basin MWD	2	298	1,435	--	--	1,733	130 3/
Orange County							
MWD of Orange Co.	6	4,055	2,762	5,600	--	12,417	350-500 3/
Riverside County							
Eastern MWD	5	--	1,708	--	--	1,708 4/	256-523 3/
Western MWD	5	298	1,435	--	--	1,733	130 3/
San Bernardino County							
Chino Basin MWD	6	1,074	1,029	258	--	2,361	2/
San Diego County							
San Diego WA	12	992	1,016			1,938	2/
TOTAL	55	11,134	12,818	31,158	7,910	63,020 4/5/	

1/ Cost to reuse customers.
2/ No cost reported.
3/ Not all plants reported costs.
4/ Excludes 269 acre-feet used for duck ponds.
5/ Excludes 675 acre-feet used for recreation.

by local agencies within Metropolitan's service area on a number of reclamation projects which could be constructed at unit costs less than the cost of water from some new SWP facilities. It should be noted however, that because this water cannot be used as a potable supply, it does not have the same value as a new potable supply. A description of the studies mentioned above follows.

A. Orange and Los Angeles Counties Water Reuse Study

In June 1978, the Orange and Los Angeles Counties Water Reuse Study (OLAC) was formally established by the signing of a joint exercise of powers agreement among six local agencies. Included were the Orange County Sanitation Districts, the Orange County Water District, the City of Los Angeles Department of Water and Power, the City of Los Angeles Bureau of Engineering, the Los Angeles County Sanitation Districts, and Metropolitan. Together, these entities are responsible for meeting the waste water treatment and freshwater supply needs of 10 million persons in Los Angeles and Orange counties in 1985.

The OLAC Study was completed and the final facilities plan was published in April 1982. The facilities plan evaluated the technical, economic, and regulatory aspects of a significant expansion in waste water reclamation in the two-county study area. The study included intensive analysis of three key areas: (1) marketing, engineering and project costs; (2) institutional factors and project financing; and (3) health criteria with

emphasis on groundwater recharge. A four-phase construction plan extending to 2010 was proposed in the study. This plan placed notable emphasis on using reclaimed waste water for groundwater replenishment (including seawater intrusion barriers) and in industrial production processes.

The OLAC Study included a major Health Effects Study to address health concerns associated with mixing treated waste water and potable water through groundwater recharge. An existing recharge program using treated waste water in Montebello was used as a model for the study.

B. Other Area Studies

A Ventura County Water Reuse Study was initiated in January 1980 to assess the feasibility of using reclaimed water as a long-term solution for alleviating groundwater overdraft, controlling seawater intrusion, and preserving agriculture. The study was sponsored and directed by the Ventura County Board of Supervisors, with the Ventura County Public Works Agency acting as the administrative head of the study.

Overdraft in the aquifers underlying the Oxnard Plain, Pleasant Valley Basin, and Las Posas Valley Basin is estimated to be 75,000 acre-feet per year. Water reclamation is identified in the Ventura County Water Quality Management Plan (208 Plan) as one of several possible long-term solutions to the county's water supply problems. Reclaimed water is the largest untapped water resource in the county. Treatment

plants in the county currently produce about 58,000 acre-feet per year and are projected to produce 77,000 acre-feet per year by 2000. Within Metropolitan's service area of Ventura County, the production is 38,000 acre-feet and 51,000 acre-feet per year, respectively.

In San Diego County, an Areawide Water Quality Management Plan (208) was adopted by the Comprehensive Planning Organization (CPO) on June 19, 1978, and 20 water reclamation projects were recommended to be implemented in the San Diego region. As a result of this plan, the San Diego City/County Water Reuse Study was formed and funded under Section 201 of the Federal Water Pollution Control Act. The purpose of the study was to investigate the feasibility of developing cost-effective water reclamation projects in the San Diego region.

As a result of work done in these studies, certain findings have been reached.

1. There is a large water resource potentially available in Southern California, but the projects examined to date would not be able to make use of the total resources. Substantial amounts of waste water will continue to need to be discharged to the sea.

2. From a technical point of view, it would be possible to construct reclamation projects (which would include treatment facilities, pipelines, and pumping plants) so as to put a substantial volume of reclaimed water to use.

3. From a financial or economic point of view, only a

limited number of projects are feasible. This is due to the restrictions on the use of reclaimed waste water for non-potable uses only. These uses are widely scattered, which requires long distribution pipelines to deliver relatively small quantities of water to separate users. In general, it is the high cost of distribution, including pumping, which makes many reclamation projects unfeasible.

4. Concern over protecting public health provides another limitation on reuse projects. The use which would consume the greatest volume of water would be to recharge the groundwater basins. However, there is increasing concern over the effects of a wide variety of chemicals and toxic wastes that have been found in groundwater supplies, with wells in some areas having been ordered shut down by public health officials. A special study was made of this issue in the OLAC study, and it was recommended not to increase groundwater recharge with reclaimed waste water beyond present levels at this time.

C. Metropolitan's Local Projects Program

The OLAC study was made only for Los Angeles and Orange County; however, Metropolitan serves areas in Ventura, Riverside, San Bernardino and San Diego Counties as well. In order to encourage the construction of a greater number of reuse projects, Metropolitan in 1982 initiated a demonstration program entitled the "Local Projects Program" for joint-funding of the construction and operation of new waste water reclamation projects. As indicated below, because of fiscal uncertainties,

no new funding is being provided at this time. Under this program, Metropolitan provides a portion of the capital local agencies require to finance a project. In return for its contribution, Metropolitan acquires ownership of the water supply yield of the project and can sell the water to one of its member agencies. For this purpose, Metropolitan charges a reclaimed water rate to the agency in the same manner as is charged for the delivery of freshwater. In order to encourage the use of reclaimed water, and because of its more limited use, the rate for reclaimed water is lower than the rate charged for potable water. The current reclaimed rate is $84 per acre-foot, as compared to $229 per acre-foot for treated water sold for noninterruptible uses.

Having established the criteria, Metropolitan then contacted its member agencies and invited them to submit projects for consideration in Metropolitan's program. Many proposals were received. After a review of these proposals, they were divided into three phases based on technical development, cost, and project yield. The Phase I projects are those in which the unit cost to Metropolitan is less than $300 per acre-foot, the current or near-term water use is greater than 100 acre-feet per year, and technical development is complete. The Phase II projects are those that do not meet one or more of the above three criteria. The Phase III projects are those that require development of a special policy or a non-typical financing arrangement. When initiated in 1982, there were

25 Phase I projects, 14 Phase II projects, and 6 Phase III projects. The Phase I projects as submitted by the local agencies in 1982 are described below.

D. Phase I Projects

The 25 Phase I projects have a total estimated annual yield of 42,000 acre-feet and a cost in 1982 dollars to Metropolitan of $50 million. These projects primarily serve landscape irrigation. Included, however, are two groundwater desalination projects, one groundwater mining project, and one industrial reuse demonstration project. Metropolitan's Phase I Projects as identified in 1982 are listed in Table 10 in alphabetical order. However, due to Metropolitan's revenue shortage situation in 1983, and to the uncertainty in 1984 of the Jarvis Initiative, the local projects program was deferred, and Metropolitan has not committed itself to participate in the individual projects except to the extent indicated below.

Arlington Basin Desalter

Santa Ana Watershed Project Authority proposes to extract groundwater of 1,100 MG/l TDS from the Arlington Subbasin southwest of the City of Riverside within the Western Municipal Water District service area. The water would be pumped to a desalting facility to be treated and blended with freshwater to provide water of 400 MG/l TDS as a product water.

Metropolitan signed a Letter of Intent to participate in this project in December 1982. Under the Letter of Intent, Metropolitan would purchase the water for a period of 20 years

Table 10

METROPOLITAN'S LOCAL PROJECTS PROGRAM

Project Name	Phase I Proposed Project Yield (AF/Yr)	MWD Capital Contribution (1,000 $) (1982)	Total Capital Cost (1,000 $) (1982)
Arlington Basin Desalter	5,600	0[1/]	7,202
Bellflower Greenbelt	173	331	661
Cerritos Greenbelt	2,800	4,002	4,600
Gafner Greenbelt	520	404	807
Glendale Greenbelt	1,760	3,700	3,700
Green Acres	3,950	5,724	7,632
Hyperion/Chevron Industrial Demo.	1,130	654	654
Irvine Greenbelt	3,670	0[1/]	4,400
Laguna Niguel Greenbelt	852	1,830	1,830
Las Virgenes Greenbelt (Phase I & II)	2,700	6,192	7,740
Los Robles/Conejo Creek Groundwater	235	300	400
Los Serranos Greenbelt	650	563	563
Lux Canyon Greenbelt	165	192	192
Meadowlark Greenbelt	1,680	990	990
Pico Rivera Greenbelt	130	243	243
Pomerado Greenbelt	830	2,036	2,036
Rubidoux Greenbelt	500	650	750
San Juan Desalination	4,000	545	2,726
Santa Margarita Greenbelt	2,000	5,100	6,000
Sepulveda/Forest Lawn Greenbelt	1,050	1,362	1,678
Shadowridge Greenbelt	1,036	669	933
Simi Valley Greenbelt	3,300	6,200	6,200
South Laguna Greenbelt	859	2,555	7,130
Southeast Long Beach Greenbelt	130	330	330
Walnut Valley Greenbelt	2,000	2,376	8,371
Total	41,720	46,948	77,768

[1/] Water Purchase Only.

at a price which would be subject to annual escalation.

Bellflower Greenbelt

The City of Bellflower, within Central Basin Municipal Water District, proposed to expand the City's existing reclaimed water system using filtered secondary effluent from Los Coyotes Water Reclamation Plant. This project, which will be operated in cooperation with Los Angeles County Sanitation Districts, will require about 5.5 miles of pipeline and two pumps. The expanded system would be used to irrigate parks, schools, a golf course, and freeway landscaping. This project is being independently constructed by the city. Facility planning is completed and construction is scheduled for completion by the end of 1986.

Cerritos Greenbelt

The City of Cerritos, within Central Basin Municipal Water District, would provide tertiary-treated effluent to landscape irrigation customers including parks, schools, greenbelts, freeway landscaping, nurseries, and a cemetery. The project would serve users within the Cities of Cerritos and Artesia, and could also supply the Lakewood and Norwalk Greenbelt Projects which were submitted as individual proposals. About 12 miles of pipeline and five pumps would be required. This project is being independently constructed by the City.

Gafner Greenbelt

The Leucadia County Water District, within the San Diego County Water Authority, proposed to convey tertiary-

treated effluent from the Gafner Reclamation Plant in Leucadia to an adjacent golf course. Previous use of secondary effluent on the golf course has been discontinued. The project would require advance filtration facilities, about 330 feet of pipeline, eight pumps, and a storage tank. The environmental impact report and facilities plan are completed.

Glendale Greenbelt

The City of Glendale proposed to distribute tertiary-treated effluent from the Los Angeles/Glendale Reclamation Plant for the irrigation of parks, greenbelts, freeway landscaping, cemetery, and several industrial users. The City of Los Angeles would be involved due to a shared customer (Forest Lawn Memorial Park) and the joint ownership of the Los Angeles/Glendale Reclamation Plant. This project would require 5.5 miles of pipeline, four pumps, one reservoir, and additional chlorination facilities.

Green Acres

The Orange County Water District proposed a project to supply tertiary-treated effluent for irrigation of golf courses, parks, schools, and industrial users within the Municipal Water District of Orange County and Coastal Municipal Water District service areas. The reuse sites will be within a 5-mile radius of Orange County Water District's Water Factory 21. The project would require about 22 miles of pipeline, four pumps, and additional treatment facilities. The environmental impact report and facilities plan are completed.

Hyperion/Chevron Industrial Demonstration

The West Basin Municipal Water District proposed, in conjunction with the City of Los Angeles, to demonstrate the feasibility of using secondary-treated effluent from the City of Los Angeles' Hyperion Treatment Plant for cooling tower use at the Standard Oil Company's Chevron Refinery in El Segundo. This project would require 1.7 miles of pipeline, four pumps plus miscellaneous smaller pumps, a reservoir, and additional treatment facilities. In January 1984, the California State Department of Health Services turned down a request for permission to implement this water reuse demonstration project.

Irvine Greenbelt

The Irvine Ranch Water District within the Municipal Water District of Orange County, proposed to expand its tertiary-treated waste water system from the Michelson Water Reclamation Plant for irrigating parks, golf courses, and housing developments. The project would serve users within the Irvine Ranch Water District service area. The project would require about 10.4 miles of pipeline and two pumps. Metropolitan would purchase the water at a rate that would escalate over time to reflect local O&M costs.

Laguna Niguel Greenbelt

The Moulton Niguel Water District, a member agency of the Municipal Water District of Orange County, proposed to convey tertiary-treated effluent from the Aliso Water Management Agency's Regional Treatment Plant to two parks and

a golf course near the City of Laguna Niguel. This project would require 1.3 miles of pipeline, two pumps, one reservoir, and additional treatment facilities.

Las Virgenes Greenbelt

Under this project the Las Virgenes Municipal Water District delivers tertiary-treated effluent from the Tapia Water Reclamation Facility for irrigating parks, greenbelts, playgrounds, a golf course, cemetery, and a landfill in western Los Angeles County and other areas. The project consists of 10.4 miles of pipeline, a 2.3-million-gallon reservoir and a 950-horsepower pump station. Metropolitan approved this project for funding in March 1983. Construction is expected to be completed by 1986.

Los Robles/Conejo Creek Ground Water

The City of Thousand Oaks proposed to pump high TDS groundwater (in excess of 1,000 mg/1) and convey it through a separate distribution system for irrigation of greenbelt areas and a park. The project would allow the use of nonpotable quality groundwater for irrigation. Facility plans are completed.

Los Serranos Greenbelt

The Chino Basin Municipal Water District proposed to supply tertiary-treated effluent from its Regional Plant No. 2. The water would be used to irrigate a golf course southwest of the City of Corona. This project would require 2.9 miles of pipeline, two pumps, and modification of chlorination facilities

to accommodate the proposed project. The facilities plan is completed.

Lux Canyon Greenbelt

The Cardiff Sanitation District proposed to furnish tertiary-treated effluent from the Lux Canyon Water Reclamation Plant (a solar aquaculture waste water reclamation plant) to be used for maintaining water levels in a lagoon, and landscape and agricultural irrigation. The Olivenhain Municipal Water District, a member agency of the San Diego County Water Authority, would distribute the treated effluent. However, modifications to the Water Quality Control Plan, San Diego Region, are required before the water can be used for these purposes. This project would require about 1 mile of pipeline, one pump, and a small reservoir.

Meadowlark Greenbelt

The San Marcos County Water District, a member agency of San Diego County Water Authority, proposed to convey tertiary-treated effluent from the Meadowlark Reclamation Facility for irrigating a golf course and a park. This project would require about 6 miles of pipeline, a reservoir, four pumps, and additional treatment facilities.

Pico Rivera Greenbelt

The City of Pico Rivera, a member agency of Central Basin Municipal Water District, proposed to deliver tertiary-treated effluent from the Los Angeles County Sanitation District's San Jose Creek Water Treatment Plant to irrigate a

park. This project would involve pumping the reclaimed water from the treatment plant, across the face of Whittier Narrows Dam, to the customer. The project would require 0.3-mile of pipeline and one large pump.

Pomerado Greenbelt

The City of Poway, a member agency of San Diego County Water Authority, proposed to convey tertiary-treated effluent from the Pomerado County Water District Treatment Plant. The water would be used to irrigate a golf course and for use in a sand and gravel operation. For the latter use, water would be used for washing sand and gravel and then discharged into a nearby dry river. This project would require 7.4 miles of pipeline, two pumps, and additional filtration facilities. Facility planning is completed.

Rubidoux Greenbelt

The Rubidoux Community Services District, a member agency of Western Municipal Water District of Riverside County, proposed to deliver filtered effluent from the Rubidoux Community Services District's Wastewater Reclamation Plant. The filtered effluent would be used to irrigate a golf course. The project would require 1.2 miles of pipeline, two pumps, and modification of an existing treatment station.

San Juan Desalination

The San Juan Basin Authority, representing a number of local water agencies within Coastal Municipal Water District and the Municipal Water District of Orange County, proposed to

pump low quality groundwater (1,100 mg/1 TDS) and demineralize it through a reverse osmosis process for general municipal and industrial use. The project would require two miles of pipeline, 10 pumps, and a 200,000-gallon reservoir, in addition to the reverse osmosis plant.

Santa Margarita Greenbelt

The Santa Margarita Water District, a member agency of the Municipal Water District of Orange County, proposed an expansion of the Oso Creek Water Reclamation Plant. The tertiary-treated waste water would be used to irrigate parks and greenbelt areas within the community of Mission Viejo. The District has already constructed a 3,900 acre-foot seasonal storage reservoir as part of the reclamation system.

Sepulveda/Forest Lawn Greenbelt

The Los Angeles Department of Water and Power proposed to convey secondary effluent from the Sepulveda Water Reclamation Plant for irrigating two cemeteries and a golf course. Effluent would be conveyed from the plant to the area of use via the Los Angeles River and impounded behind an inflatable rubber dam. From this location, water would be pumped to the customers. This project consists of 2.1 miles of pipeline, the dam, and two pumps. This project was originally identified in the OLAC Study and is being pursued independently by the Department of Water and Power.

Shadowridge Greenbelt

The Vista Irrigation District, a member agency of

the San Diego County Water Authority, proposed to distribute tertiary-treated effluent to golf courses, parks, greenbelts, and schools for irrigating landscapes. This project, which would be operating in cooperation with the Buena Sanitation District, would require six miles of pipeline, one reservoir, and six pumps. Final design is completed.

Simi Valley Greenbelt

The Simi Valley County Sanitation District, within Calleguas Municipal Water District, proposed to convey tertiary-treated effluent from the Simi Valley County Water District No. 8 throughout the City of Simi Valley for park and greenbelt irrigation. The project would require about 13 miles of pipeline, three reservoirs, and three pump stations. A facility plan and environmental report are completed.

South Laguna Greenbelt

The South Coast County Water District, within Coastal Municipal Water District, proposed to deliver tertiary-treated effluent from the Aliso Water Management Agency's Coastal Treatment Plant to parks, a golf course, and greenbelt areas in and adjacent to the City of South Laguna in Orange County. The project also calls for construction of tertiary-treatment facilities to treat the effluent from two existing plants. The project would require about six miles of pipeline, three pumps, a new tertiary-treatment plant, and a reservoir. Metropolitan approved this project for funding in December 1982. Construction was completed in June 1984, and deliveries of reclaimed water have begun.

Southeast Long Beach Greenbelt

The City of Long Beach Water Department proposed an expansion of their existing reclamation facilities to serve a golf course, lagoon, and park. An existing pipeline, originally constructed for supplying reclaimed water to an offshore island for oil well injection, would be used as part of the needed distribution system. The tertiary-treated effluent would be conveyed by one new pump through 1.3 miles of new pipeline. Design is completed.

Walnut Valley Greenbelt

The Walnut Valley Water District, a member agency of Three Valleys Municipal Water District, proposed to convey tertiary-treated water from the Pomona Water Reclamation Plant in the City of Pomona to parks, schools, golf courses, and greenbelt areas in the Cities of Walnut, Industry, and Rowland Heights. This project would require 26.6 miles of pipeline, one storage tank, and five pumps. Project design has been completed.

Chapter VII

SECTION 10632(b): EXCHANGES OR TRANSFERS OF WATER

This section of the Act requires water suppliers to explain and evaluate their plans for future exchanges or transfer of water on a short-term or long-term basis.

A. Past and Current Exchanges

Presently, Metropolitan has several active exchange agreements and also has been involved with temporary exchanges in the past, including some carried out during the 1976-77 drought period. The primary exchange agreements are discussed below in detail.

Desert and Coachella Valley

In 1967, Metropolitan entered into water exchange agreements with the Desert Water Agency serving the northern end of the Coachella Valley, and the Coachella Valley Water District serving the southern portion of the valley. Both of these agencies, as well as Metropolitan, have contracts for water from the State Water Project. Because of the high cost of building facilities to deliver water from the California Aqueduct to Desert and Coachella, the two agencies asked Metropolitan to exchange their amounts of State project water for Colorado River water. Under the exchange agreements, Metropolitan exchanges equal quantities of Colorado River water, delivered from the Colorado River Aqueduct to the groundwater basin serving the Coachella Valley service area, in exchange for State project water, delivered to Metropolitan

from the East Branch of the California Aqueduct. The benefit to Desert and Coachella from this agreement is the ability to defer an expenditure on the order of $100 million for water delivery facilities. The benefits to Metropolitan are the power savings and receipt of water of better mineral quality.

These contracts originally were to expire on January 1, 1990, but have been extended by contract amendment to 2035. In connection with the amendment, a new provision was added to permit the advance delivery, or pre-delivery, of Colorado River water. When conditions allow, primarily before Metropolitan's entitlement to Colorado River water is reduced, additional Colorado River water will be delivered by Metropolitan and stored in groundwater basins serving Desert and Coachella. Under this pre-delivery concept, in later years, when Metropolitan's supply of Colorado River water is reduced and all available Colorado River water is needed by Metropolitan, the two agencies will use the pre-delivered water. At the same time an equivalent amount of Desert's and Coachella's State project water would be delivered to Metropolitan. One benefit from this program is the ability to make use of surplus Colorado River water when it is available.

San Gabriel Valley Municipal Water District

Prior to 1975, a groundwater overdraft condition existed throughout the main San Gabriel Basin including the western portion of the basin known as the "Alhambra Pumping

Hole." This general overdraft condition resulted in a lawsuit that adjudicated the water rights of the Main San Gabriel Basin. Six of the seven producers extracting water from the "Alhambra Pumping Hole" are members of Upper San Gabriel Valley Municipal Water District, a member agency of Metropolitan; whereas, the other producer is the City of Alhambra, a member agency of the San Gabriel Valley Municipal Water District, which has a contract with the State for water from the State Water Project. In connection with the adjudication and to help reduce the overdraft of the basin, it was agreed that Metropolitan would serve approximately 3,000 acre-feet of water annually to the City of Alhambra through the Upper San Gabriel Valley Municipal Water District. In return, the City of Alhambra would reduce its pumping by 3,000 acre-feet, thereby helping to reduce the overdraft.

In exchange for providing the 3,000 acre-feet, Metropolitan received the right to unused capacity in San Gabriel Valley Municipal Water District's Devil Canyon-Azusa pipeline. This helps augment the capacity of Metropolitan's distribution system to deliver water from the East Branch of the California Aqueduct. The pipeline has a capacity of 55 cubic feet per second, and can be operated to complement Metropolitan's Rialto Pipeline, which parallels it, and which has a capacity of 600 cfs. The agreement can be terminated only by mutual agreement of the contracting parties.

Tijuana, Mexico

In 1972, the United States Bureau of Reclamation, Metropolitan, the International Boundary and Water Commission, and certain other agencies entered into an agreement providing for delivery of up to 10,000 acre-feet a year of Colorado River water to the City of Tijuana. This is water that Mexico is entitled to receive under the 1944 Treaty between the United States and Mexico regarding the waters of the Colorado and Rio Grande Rivers. The water is transported through Metropolitan's Colorado River Aqueduct and water conveyance systems in San Diego County. This agreement, was terminated on August 13, 1983. With completion of Mexico's own aqueduct system to Tijuana, further supplies through Metropolitan's facilities should not be required.

Drought-Emergency Exchanges

Two emergency exchanges occurred during the 1976-77 drought period that illustrate the value of independent multiple water supply developments.

In 1976, a water service exchange agreement provided for delivery of up to 10,500 acre-feet of Metropolitan's 1976 annual entitlement to State project water to the Dudley Ridge Water District in Central California. In exchange, Dudley Ridge paid Metropolitan the cost of importing an equivalent quantity of Colorado River water, plus an amount equal to the Delta Water Charge paid by Metropolitan for that quantity of State water, plus the difference between the price charged by

Metropolitan for State project water and Colorado River water. The water delivered to Dudley Ridge was used to irrigate crops in the Central Valley that probably would have been lost during the drought.

In 1977, with the drought continuing, Metropolitan entered into an agreement with the Department of Water Resources which provided that Metropolitan release between 300,000 to 400,000 acre-feet of its 1977 entitlement to State project water on an exchange basis. This agreement was signed on February 10, 1977, by Metropolitan, the Department, the United States Bureau of Reclamation, the State Water Resources Control Board, East Bay Municipal Water District, Contra Costa County Water District, and Marin Municipal Water District. A portion of Metropolitan's entitlement to State project water was used to serve areas in Northern and Central California. The agreement provided that Metropolitan would be reimbursed for any expenses it would incur to import an equivalent amount of Colorado River water and that any energy transfers would be the responsibility of DWR.

San Luis Dam Emergency Exchange

On September 14, 1981, an embankment slippage at San Luis Reservoir significantly affected the water supply available to certain water service contractors during the summer of 1982. To help mitigate this emergency condition, it was agreed that Metropolitan would release up to 250,000 acre-feet of its 1982 State project water entitlement for use by the affected

contractors of both the federal and State systems. To offset the reduction in Metropolitan's State water deliveries, Metropolitan pumped an equivalent amount of water from the Colorado River. Metropolitan was reimbursed for expenses incurred while importing the Colorado River water. Energy transfers were the responsibility of DWR.

Kern River Intertie

In 1983 during extreme flooding in the Tulare Lake Basin due to excess flows in the Kern River, Metropolitan participated in two agreements to take delivery of excess flood flow through the Kern River Intertie into the California Aqueduct and eventually into Castaic Lake. The agreements were made with the Department of Water Resources, Tulare Lake Basin Water Storage District, Delta Lands Reclamation District No. 770, Southern California Edison Company, and Los Angeles Department of Water and Power. By participating in the agreements, Metropolitan helped alleviate flooding in the Tulare Lake Basin by taking delivery of approximately 87,000 acre-feet of water at no increased cost. The utilities participated by obtaining additional energy made available to them from Colorado River power plants because of Metropolitan's reduced use of that energy. While not actually a water exchange program, the Kern River Intertie Agreement is another example of how Metropolitan participates in water management programs that benefit not only Southern California, but also other areas of the State.

San Bernardino Valley Municipal Water District

The San Bernardino County Board of Supervisors requested that Metropolitan and the San Bernardino Valley Municipal Water District (SBVMWD) negotiate and enter into a water exchange agreement. Under this agreement, Metropolitan provides a firm water supply of 150 acre-feet of Colorado River water per year to the Havasu Landing area on the Colorado River in San Bernardino County. In exchange, Metropolitan receives an equivalent amount of SBVMWD's State project water supply at the Devil Canyon Power Plant. Havasu Landing has no water rights to water from the Colorado River and recent recreation growth has caused demands to exceed the limited local supply.

B. Proposed Exchanges

Metropolitan is considering several proposals for future exchange agreements. Six proposals are discussed below as well as some legal barriers and limiting factors which apply to the exchanges.

San Gorgonio Pass Water Agency

Because of the high cost of extending distribution facilities from the California Aqueduct to its service area, the San Gorgonio Pass Water Agency has agreed to a proposed water exchange with Metropolitan. Under the agreement Metropolitan would take delivery of San Gorgonio's State project water at the Devil Canyon Power Plant in exchange for Colorado River Aqueduct water delivered at a point near San Gorgonio's eastern boundary.

Agreement for Interim Water Supply for the City of Needles

In December 1984 Metropolitan, the Coachella Valley Water District, and the City of Needles entered into an agreement whereby Metropolitan agreed to divert from the Colorado River up to 10,000 acre-feet of surplus Colorado River water for storage and later use by the City of Needles. Needles does not have sufficient rights to Colorado River water. This surplus water will be stored in the Coachella Valley Groundwater Basin for eventual use by the City of Needles. Whenever its water supplies are deficient, the City of Needles may use up to 1,000 acre-feet of stored water per year by exchange. This agreement terminates in 1990, before which time the City of Needles will work to develop a long-term supplemental water supply.

Los Angeles County and San Gabriel Valley

Under terms of an agreement signed October 11, 1977, between Metropolitan, Los Angeles County Flood Control District, and San Gabriel Valley Protective Association, the Flood Control District has agreed to assume ownership and operation of Morris Dam and Reservoir now owned by Metropolitan. The facility is located on the San Gabriel River and is operated for water conservation and flood control purposes for the benefit of downstream water users. The actual transfer of ownership to the Flood Control District will become effective after certain requirements specified in the agreement are completed.

When the transfer of ownership is completed, Metropolitan will assign to the San Gabriel Valley Protective Association its 175 acre-foot water rights permits for diversion or use of local water in the Main San Gabriel Basin. Metropolitan will retain the right to store at least 2,000 acre-feet of imported water in the reservoir as part of its operation of the proposed Middle Reach of the Foothill Feeder. In addition, Metropolitan may use any water in the reservoir as a source of supply in the event of an outage in its distribution system.

City of Los Angeles

As a contingency plan for emergency situations, Metropolitan and the City of Los Angeles Department of Water and Power (LADWP) have established an intertie between LADWP's first Los Angeles Aqueduct and Metropolitan's Magazine Canyon facility on the Foothill Feeder. With this connection, LADWP can deliver water into Metropolitan's system and Metropolitan can deliver State project water into LADWP's system through a service connection located south of the Jensen Filtration Plant. The interconnection at Magazine Canyon will allow Metropolitan to take up to 400 cfs of Owens-Mono water from the City, if available. The City of Los Angeles has also constructed a 250 cfs interconnection with the East Branch of the State Water Project. This provides flexibility to deliver water from LADWP for use along the East Branch as well as exchange deliveries to Metropolitan.

Colorado River Banking Plan

The Colorado River Banking Plan is a means of creating an additional supply of Colorado River water for an interim period by making use of surplus flows of Northern California water at the Delta. The interim period could extend beyond 2010. The plan is based on the possibilities that unused storage capacity in Lake Mead will be available, beginning in the mid 1990s, after the Central Arizona Project has been placed in operation, and that additional State Water Project facilities will be constructed.

Under the plan, Metropolitan would adjust its Colorado River deliveries in accordance with the availability of water from the State project. In years when State project water supplies from Northern California are plentiful and the State could provide Metropolitan with greater amounts of water to satisfy its needs, Metropolitan would take more State project water and correspondingly less of its Colorado River water. An amount of water equal to the difference between Metropolitan's apportionment and actual deliveries from the Colorado River would remain in Lake Mead and be credited to Metropolitan. Any water lost by spills and by incremental evaporation and seepage losses resulting from additional stored water would be deducted. During dry periods in Northern California when the delivery capability of the State project is reduced, Metropolitan would draw on its accumulated net water credits in Lake Mead up to its Colorado River Aqueduct

capacity, in place of taking State project water.

The banking plan would depend on several factors: (1) construction of additional State Water Project facilities, (2) availability of water in the Delta, (3) availability of storage space in Lake Mead, (4) excess capacity in the California and Colorado River Aqueducts, (5) flexibility in Metropolitan's distribution system, (6) agreement among the participating agencies and certain Colorado River Basin states, and (7) legal acceptability. These and other factors affecting the plan are the subject of a current study by Metropolitan, the Colorado River Board, and the Department of Water Resources to examine the engineering and institutional considerations, including cost allocation, as well as legal and operational constraints.

The potential yield of the Colorado River Banking Plan would range between 80,000 and 370,000 acre-feet per year. It relates directly to the factors listed above and the incremental evaporation and seepage losses incurred at Lake Mead. Without additional State and Metropolitan facilities, the plan would not yield as much water.

Transfers from Imperial Irrigation District

Another possible alternative source of water for the future is some of the Colorado River water presently being diverted by the Imperial Irrigation District (IID). In its draft water conservation plan issued in January 1985, IID estimated that it could salvage up to 325,000 acre-feet of

water annually by implementing a series of conservation measures. Conservation measures that could be taken within the IID include: (1) matching water deliveries more closely to water demands, (2) constructing regulating reservoirs to reduce spillage, (3) providing spill-interceptor systems, (4) lining canals and laterals where seepage losses are excessive, and (5) implementing conservation measures by individual farmers.

Metropolitan will soon have its Colorado River water apportionment reduced from its present level of use. Under existing Colorado River contracts, Metropolitan could increase its Colorado River water diversions to the extent IID's water conservation programs reduce Imperial's Colorado River diversions. Those contracts provide a first priority of 3.850 million acre-feet a year for agricultural water uses by the IID and other agricultural agencies in the Southern California desert. In years when those agencies use less than 3.850 million acre-feet of Colorado River, that reduction therefore becomes available to Metropolitan. However, the other California agricultural agencies would have to agree to honor any Metropolitan-IID water conservation agreement.

Limiting Factors on Availability of Conserved Water

The IID could undertake conservation measures that might save up to 325,000 acre-feet. A number of factors make transfer of all of this water to Metropolitan unlikely:

1. Implementation of the conservation measures may produce less water than estimated.

2. Coachella Valley Water District has a higher priority to Colorado River water than Metropolitan. However, Coachella may not need additional water.

3. A recently developed plan for controlling the salinity of the Colorado River may not be as efficient as hoped. If the salinity increases, more water may be needed to flush the additional salts from the land.

4. Imperial and any other participating agricultural agencies would probably want to retain an option to use the conserved water under certain circumstances.

Most of the conservation measures that have been identified are practical and some appear to be within the financial capability of the IID and farming operators. One exception would be lining the All American Canal. The cost of water in IID is about $9.00 per acre-foot, and a preliminary estimate of the cost to conserve about 87,000 acre-feet of seepage water annually lost through portions of the All American Canal is $184 per acre-foot. This cost would probably be too expensive for agriculture in the Imperial Valley. Considering all the constraints discussed above, Metropolitan has included an additional 250,000 acre-feet of water by the year 2000 in its estimates of supply available from the Colorado River.

With its multiple water supply sources and extensive water transportation and distribution systems, Metropolitan can enter into water transfers of additional water when they are either necessary or mutually advantageous. The impact of some

transfers reach outside Metropolitan's boundaries.

When a transfer includes using water from either the Colorado River or the SWP, and the place of use is outside Metropolitan's service area, the transfer can become complex, involving several regulatory agencies in addition to the contracting parties.

Interties are possible because Metropolitan does not exclusively serve all the area within its boundaries. For example, the City of Los Angeles Department of Water and Power has developed imported and local water supplies. A water system such as this provides flexibility to Metropolitan's service area in times of emergency.

CHAPTER VIII

SECTION 10632(c): MANAGEMENT OF WATER SYSTEM PRESSURE AND PEAK DEMANDS

Part C of Section 10632 of the Act requires an explanation and evaluation of the management of water system pressures and peak demands. These are two distinct subjects, and relate to two different aspects of the design of Metropolitan's distribution system. Pressure is one of the factors considered in determing the location of where to construct new distribution facilities, while peaking is considered when determining the size of the facility. Each of these topics is discussed separately below.

A. System Pressure

Metropolitan's Colorado River Aqueduct and the State Water Project both enter Southern California at elevations high enough so that most of Metropolitan's service area can be furnished water by gravity. In the design of the distribution system, routes were selected so that the high hydraulic elevation advantage would be preserved. In many areas this involves pipelines with high pressures. The water delivered to Metropolitan's member agencies from these high-pressure lines can be delivered by the agencies to customers with a minimum of pumping. This concept of system design is called conservative since it conserves energy, or minimizes the use of energy, in distributing water in local areas. To help achieve this objective, Metropolitan maintains adequate pressure in its distribution system to meet the water needs

of the member agencies. A secondary objective is to maintain continuous positive pressure in all segments of its potable water system so as to prevent infiltration of groundwater that might contaminate Metropolitan's potable water supply.

In some areas it is necessary to reduce the pressure in Metropolitan's system from a high-pressure zone to a lower-pressure zone. Pressure reduction is controlled through the use of a system of pressure reducing and pressure sustaining valves. Many of these valves are hydraulically operated and automatically maintain pressures within predetermined limits through the use of pilot valves. Other valves are remotely operated through one of Metropolitan's five area control centers. These control centers are linked, through an extensive telemetry system, with key pressure control and flow control valves. At the control centers, necessary adjustments are made to maintain proper pressure and flow in the distribution system on a 24-hour-per-day basis. One of the area control centers, Eagle Rock, has been designated the system Operations Control Center, and personnel at this center coordinate, advise, and oversee the actions of the other control centers.

Deliveries from Metropolitan to its member agencies must be scheduled at least 24 hours in advance so that delivery patterns which could result in inadequate flow and/or pressure at a delivery point are avoided. It is the function of the Eagle Rock Control Center to schedule deliveries and to

communicate with member agencies to insure that deliveries are made and pressures are maintained.

In some instances, after the delivery of water by Metropolitan, the receiving agency boosts the pressure in its own system with pumping plants to maintain adequate pressure within the agency's system. However, within Metropolitan's distribution system, pressure is maintained under normal flow patterns without the use of such plants.

Metropolitan utilizes automatic protective devices to insure that overpressurization of its pipelines does not occur. These devices include hydraulically operated pressure relief valves, rejection weirs, and spillways.

Recently some hydroelectric generating plants have been installed at some of Metropolitan's pressure control structures. These units capture energy that was formerly dissipated in pressure reduction. To insure that proper water service is maintained, each of the hydroelectric units has associated with it an automatic flow transfer feature that transfers flow back to the original pressure reducing facilities, and maintains pressures and flows in the event of an outage of a hydroelectric unit.

Metropolitan has a comprehensive preventative maintenance program staffed by well-trained personnel who ensure that all the devices and features previously described are regularly maintained, tested, and repaired and kept in proper working order at all times. Similarly, the operators

responsible for maintaing flows and pressures are experienced, competent, and trained to respond to emergency or unusual conditions.

B. Peak Demands

Water demands by individual customers, and in turn by local water agencies, are subject to wide fluctuations from day to day and throughout the year. In the design of Metropolitan's water distribution system, a major policy decision was made at the outset: As a supplier of supplemental water to its member agencies, Metropolitan would design its system to meet seasonal variations in demand, but it would be the responsibility of the member agency, or of a subsidiary local water purveyor, to meet daily variations in demand. That is, Metropolitan would provide for seasonal peaking, and the local agency would provide for daily peaking. The criterion adopted for the design of Metropolitan's distribution system was that it would have sufficent capacity so that in the peak summer months, water could be delivered at an average rate of 130 percent of the average annual rate of flow. This is referred to as the 130 percent peaking allowance.

As a supplemental water supplier, Metropolitan has recognized that fluctuations in retail demands and fluctuations in the availability of local water supplies will necessarily lead to large fluctuations in demand on Metropolitan's system Metropolitan's system has been designed to recognize the inherent variability of water demands. Large storage reservoirs

are included in the system, and these reservoirs are managed to minimize the fluctuations in flow on major conveyance facilities upstream of the reservoirs. For example, the Colorado River Aqueduct can be operated on a continuous flow basis throughout the year, and the 130 percent peaking can be achieved by delivering water from the terminal reservoirs, such as Lake Mathews. Smaller distribution reservoirs are also included in the system to meet some day-to-day variations in demands.

In operating its system Metropolitan requires that major changes in flow through service connections on its system be scheduled 12 hours in advance, and also requires that member agencies taking deliveries from Metropolitan must operate their systems to buffer Metropolitan's system from hour-to-hour fluctuations in retail demands. Metropolitan also has developed a pricing structure that encourages local agencies to develop storage to meet long term fluctuations in demand. Metropolitan's rates are lower for water that may be delivered at Metropolitan's convenience when water and system capacity are available if these deliveries can be interrupted during periods when water supply and delivery capacity may temporarily be inadequate to meet peak demands. Metropolitan also offers price discounts on water used for direct or indirect replenishment of groundwater basins. This pricing structure encourages member agencies to store water during periods of adequate supply. As part of the program and in accordance with existing provisions, Metropolitan reserves the right to order a member agency to withdraw the

water from storage and thereby reduce its demands on Metropolitan's system during periods in which Metropolitan might otherwise be unable to meet all demands. The net effect of this pricing program is to encourage use of Metropolitan's water when retail demands are low, and to encourage the use of local water supplies when retail demands are high, thus minimizing peaking on Metropolitan's system. These pricing programs are discussed in detail in Chapter XI.

CHAPTER IX

SECTION 10632(d): INCENTIVES TO ALTER WATER USE PRACTICES

Section 10632(d) requires a discussion of incentives to alter water use practices, including fixture and appliance retrofit programs. As a wholesale water agency, Metropolitan does not normally work directly with retail water users. However, its promotional programs have included providing information to its member agencies and directly to the public on ways in which conservation can be achieved. The five principal methods which Metropolitan has used in order to alter water use practices include providing retrofit kits, distributing water conservation literature, establishing a speakers bureau, utilizing advertising, and by adopting price incentives through a special water rate structure.

In the past, Metropolitan has supplied to its member agencies free residential water conservation kits which include devices that can be installed in existing plumbing fixtures to reduce water usage. Through programs conducted by DWR, DWP, and Metropolitan, these kits have been distributed to approximately half the residences in Metropolitan's service area. The water conservation literature and educational materials are also provided to the member agencies at no charge or at a nominal fee for large quantities. Speakers from Metropolitan's speakers bureau are provided to member agencies at no cost, and assistance from Metropolitan's education coordinator is provided for in-school water conservation education programs. Advertising is done

occasionally on a regional basis and includes TV, radio, newspaper, and billboard advertisements.

Metropolitan also assists its member agencies by providing data on water management, and by holding forums for explaining information on methods to increase system efficiency. Metropolitan participated in a leak detection seminar for Southern California water purveyors that was sponsored by DWR. This seminar was held to disseminate information on new leak detection programs and devices. Metropolitan has modern corrosion laboratories and provides advanced data on corrosion control to its member agencies and other water purveyors. Metropolitan also supplies data on other water management activities such as replenishment of groundwater basins, water reclamation, and industrial water conservation and reuse.

The final program, and the one that has had the greatest impact in terms of Metropolitan's activities, is the adoption of an interruptible water service program and pricing structure. This program is described in Chapter XI.

As a wholesale supplemental water supplier, Metropolitan normally does not work directly with individual consumers. Activities designed to reach retail customers are most effective at the local level where the implementation of water conservation plans must be accomplished. Although the conservation and efficient use of urban water supplies are of statewide concern, the planning for that

use and the implementation of plans can best be accomplished by the agencies that deal most directly with the public.

CHAPTER X

SECTION 10632(e): PUBLIC INFORMATION AND EDUCATIONAL PROGRAMS

Section 10632(e) of the Act requires a discussion of the public information and educational programs currently implemented and designed to promote water conservation awareness. Metropolitan has developed and implemented a broad range of public information and educational water conservation programs in its service area which are discussed briefly in this chapter. However, these programs are discussed in more detail in Chapter III.

A. Public Information Programs

One of the most widely practiced and effective water conservation activities is the dissemination of public information. These activities can be effective in reducing demands, especially if the public perceives a real and present need to conserve. Although it is very difficult to estimate how much water is saved as a result of public information activities, and therefore very difficult to estimate cost effectiveness, formal public information programs are an important part of Metropolitan's programs to maximize the efficient use of water in its service area. The following public information activities are conducted by Metropolitan as a part of its effort to encourage efficient use of water:

1. Literature
2. Publications
3. Films
4. Exhibits and related programs at fairs and expositions
5. Speakers Bureau
6. Advertising
7. News Releases
8. Tours
9. Committees

1. Literature

Metropolitan currently distributes about 500,000 pieces of literature each year free of charge or at a nominal expense for large quantities to its member agencies, schools, libraries, industries, other organizations, and individuals. The available literature includes:

"25 Ways To Do A Good Turn And Save Water". This brochure discusses 25 ways water can be saved in residential use, both inside and outside of the home.

"How Saving Water Saves Energy". This brochure discusses the relationship between power and water as well as several ways water can be saved in residential use, both inside and outside the home.

"How To Have A Green Garden In A Dry State". This full-color brochure discusses water-efficient landscaping, and includes pictures and a listing of low-water-using plants. It also contains the design and layout of three model residential low-water-using landscapes.

"Wa'ter". This brochure discusses the importation of water to Southern California and interesting facts regarding its use.

"The Guzzler Gang". This comic book is written for elementary school age children and discusses excess water use both inside and outside the home.

"A Journey Down The Colorado River Aqueduct". This illustrated brochure is designed for young children, and

discusses the importation of water by Metropolitan from the Colorado River and how water is used in the home.

"Reclaimed Water". This brochure discusses the sources, uses, and methods of treating reclaimed water. It was designed to increase public awareness and acceptance of the use of reclaimed water.

"Questions And Answers About Water Reuse In Orange and Los Angeles Counties". This brochure, produced as part of the Orange and Los Angeles Counties Water Reuse Study, is designed to increase public awareness and acceptance of the use of reclaimed water.

"For Summer-Dry California--Water Saving Planting Ideas". A 12 page article reprinted from Sunset Magazine with suggestions concerning drought tolerant plants for residential gardens.

"Drip--Its Time Has Come". This is another reprint of a Sunset Magazine article which discusses how to install drip irrigation systems.

"Other Literature". Other literature includes items such as bill stuffers, bumper stickers and book markers. Metropolitan will continue to distribute literature and information to any interested organization or individual and will publicize the availability of such information.

2. Publications

Metropolitan currently publishes one full color magazine titled Aqueduct, one newsletter titled Focus On

Water, and one magazine titled People. All of these publications contain articles on water conservation.

3. Films

Metropolitan furnishes films promoting water awareness and conservation to its member agencies, libraries, and schools free of charge, and loans films to any interested organization or individual free of charge. The films are also used in Metropolitan's speakers bureau programs. The following films are dedicated to water conservation.

"The Guzzler Gang". This animated film, a companion to the Guzzler Gang comic book, is designed for young children and discusses how to reduce residential water use.

"Water Follies: A Soak Opera". This humourous animated film is used primarily for young children. It exaggerates abuses in residential water use.

"Noah-Water to Waste". A six minute, humorous film featuring television personality Richard Simmons promoting water conservation.

"Gardening California Style". This film discusses ways to conserve water in residential landscaping.

"Without Water". This humorous film discusses how water is taken for granted by removing water-using consumer goods from a home.

"Wasting Not". This film is an adaptation of a slide show produced to demonstrate industrial water conservation in Southern California.

"The California Drought: 1976-77". This film discusses the causes and effects of the 1976-77 drought.

4. Exhibits and Related Programs at Fairs and Expositions

It is possible to reach thousands of people relatively inexpensively at county and state fairs. Metropolitan, therefore, participates in local fairs each year, including the Del Mar Fair in San Diego County, Orange County Fair, Hemet Farmers Fair, Los Angeles County Fair, and the Ventura County Fair. Periodically Metropolitan participates in the State Fair in Sacramento.

At large county fairs, a live show is presented. Through the use of props and audience participation, the relationship between water and energy is demonstrated, and water awareness and conservation are promoted.

Metropolitan maintains approximately 70 exhibits which are used to display water awareness plus water and energy conservation. The exhibits are placed in high-traffic areas such as banks, shopping malls, fairs, water agency lobbies, and in other areas deemed appropriate. Metropolitan also maintains a display at the Museum of Science and Industry in Los Angeles. This display is designed to produce an awareness that much of the water used locally is imported. Metropolitan will continue to encourage the efficient use of water through such programs.

5. Speakers Bureau.

Metropolitan's speakers bureau is staffed by employee volunteers. There are currently about 40 active members, and

most speeches include a water conservation message.

Metropolitan actively seeks presentations for its speakers. Periodically, Metropolitan mails letters to more than 4,000 service clubs, associations, and other organizations to advise them of the availability of speakers and the topics available for discussion. There is no charge for any speaker furnished by Metropolitan. News releases are furnished by Metropolitan to all local newspapers, and advertisements are placed in other publications to further advertise the speakers program.

6. Advertising

In 1977, 1981, 1982, and 1983 Metropolitan conducted advertising programs. These programs were major public information campaigns emphasizing water conservation. The campaigns included paid television, radio, billboard, and newspaper advertising plus public service announcements, news releases, and other activities designed to capture public attention.

7. News Releases

Metropolitan issues many news releases and features each year to more than 250 major and local newspapers. During fiscal year 1983-84, more than 200 news releases were issued, many of these containing a water conservation message. Metropolitan will continue to periodically issue news releases and features specifically addressing water conservation.

8. Tours

Metropolitan offers various tours of its facilities to interested groups, organizations, or individuals. Most tours include a discussion of water conservation.

9. Committees

A committee was formed to offer advice on the development and implementation of Metropolitan's elementary school program. That committee was made up primarily of members with an expertise in water and/or education, including administrators and teachers.

Metropolitan currently has a Member Agency Water Conservation Advisory Committee made up of representatives from its member agencies. This committee offers advice and assistance to Metropolitan on matters relating to Metropolitan's water conservation activities. The committee also offers a forum where ideas and experiences can be shared by our member agencies.

B. Education

In-school education programs could provide long-term water savings by teaching better water-use habits and by making people aware of the importance of water and of using this resource wisely. Like public information programs, water savings resulting from in-school education programs are difficult to measure. However, long-term savings could be expected by improving water-use habits. Metropolitan has developed educational programs which emphasize local water conditions and address the relationship between water and energy. The programs are described below.

Elementary Schools

Metropolitan, upon request, furnishes speakers to any elementary school within its service area free of charge. Topics discussed by its speakers include the hydrologic cycle, where water in Southern California comes from, methods for reducing water use, why conserving is important, and general water-use information. Presentations are prepared to address all elementary grade levels.

Literature is distributed to each student at the presentations, including 25 Ways To Do A Good Turn And Save Water, The Guzzler Gang, A Journey Down The Colorado River Aqueduct, and other appropriate brochures. The films "Guzzler Gang", "Water Follies", and "Water for Southern California" are also shown.

A new comprehensive in-school educational program has been implemented for the fourth and sixth grades. The program for the fourth grade is titled "Admiral Splash", and the sixth grade program is titled "Water for Ursa." The program includes teacher-training workshops, a planned curriculum with educational materials for the teacher and pupil, and audiovisual aides. The program is designed so that the students participate in 10 lessons, each approximately 30- to 45-minutes long. The lessons emphasize where water comes from, why it is important to conserve water, and how to use water wisely. Metropolitan provides the program and related services to all public and private schools within its service

area, free of charge. Materials needed in order to maintain the program are furnished by Metropolitan each year.

High Schools and Colleges

Metropolitan, upon request, will furnish a speaker to any high school or college in its service area free of charge. Topics discussed at these levels include hydraulics, design, hydroelectric generation, water conservation, and water supply and demand.

Adult Programs

An adult conservation education program was sponsored by Metropolitan, Southern California Edison Company, Southern California Gas Company, and Atlantic Richfield Company, with Metropolitan acting as lead agency. Each program included a free four-hour class at which representatives from each company discussed in detail how to conserve the resources provided by their respective organizations.

Public participation in the pilot program was less than expected so Metropolitan and the other sponsors discontinued their participation. Metropolitan may seek other forums such as homeowners associations at which the program could be presented.

Landscaping

Increasing the use of low-water-using vegetation within Metropolitan's service area could reduce residential, industrial, and commercial water demand, and may help to reduce landscape irrigation during peak summer demands. Another

important aspect of low-water-using landscapes is that they normally require less maintenance and fertilizers and are therefore less costly and time consuming to maintain.

The public generally perceives a low-water-using landscape as one made up of cactus and rock, and therefore is hesitant to use low-water-using plant materials. It is important to disseminate information to the public in order to dispel this myth. A detailed description of the literature and films that include a discussion of low-water-using landscapes was included in Chapter III.

Demonstration Gardens

The public may be more likely to accept low-water-using landscapes if colorful examples of the landscapes are available for public viewing. Metropolitan maintains a demonstration low-water-using garden at the main entrance to its Headquarters Building in Los Angeles. The garden includes signs identifying the plant materials, examples of drip irrigation systems, and porous paving materials.

Metropolitan also promotes the installation of other demonstration gardens in its service area. Metropolitan will continue to maintain its demonstration landscape at its Headquarters Building and is developing such gardens at other Metropolitan facilities which are commonly used in the Metropollitan tour program or are high traffic areas. Metropolitan will also review its existing landscaping at other facilities and will convert those landscapes to low-water-using landscapes when appropriate.

Metropolitan currently furnishes literature on low-water-using landscaping to nurseries, homeowner associations, and other related organization in its service area upon request. A detailed description of this literature is included in Chapter III.

Research

Metropolitan and other Southern California water purveyors funded a five-year study on turfgrasses and turfgrass substitutes to determine the minimum amounts of water required to maintain acceptable appearance and to keep various grasses alive. Previous studies had emphasized water required for optimal appearance, so minimal information of this kind was available. The information gained from this study can be used to develop low-water-using landscapes, estimate potential water use reductions in landscape irrigation, reduce demands during a water shortage, and to develop additional programs to encourage low-water-using landscaping.

Residential Landscape Water Conservation Study

In 1984 Metropolitan, the Los Angeles Department of Water and Power, and the California Department of Water Resources agreed to jointly fund a two-year study on water use in residential landscapes. This study will be conducted in four similar residential neighborhoods in the City of Los Angeles in order to evaluate potential water use reduction in existing landscapes. The results of the study will be used by Metropolitan to encourage and promote efficient water use in residential landscapes.

CHAPTER XI

SECTION 10632(f): CHANGES IN PRICING; RATE STRUCTURES, AND REGULATIONS

The major topic of this chapter concerns Metropolitan's water rate structures and how the application of these structures have encouraged the efficient use of water. Metropolitan's current rate structures and future water rate structures that will be affected by recent legislation are presented herein.

A. Rate Structures

In discussing Metropolitan's water rates, it is necessary to put them in context with the other elements of Metropolitan's income. As a public agency, Metropolitan does not operate to earn a profit. Also, it is exempt from many types of taxes. However, it has certain costs that must be paid each year, and consequently it must receive sufficient income to cover its costs. Metropolitan's primary source of income is revenue from the sale of water. Other sources include property taxes, annexation charges, power revenues, interest earnings, and miscellaneous income such as rent for land.

Water revenues and tax revenues are the two most important sources of income. Currently Metropolitan's water rates and tax rates are based on a "proportionate-use forumla" that was adopted in 1979. The purpose of this formula is to provide an equitable method of allocating capital costs between water users and taxpayers. The basic concept of the proportionate-use formula is that funds collected through water rates cover all delivery costs, operations and maintenance, and

a portion of capital costs representing the "used" capacity of Metropolitan's delivery system. Funds collected through tax levies cover the remaining capital costs which represent the "unused" capacity of the delivery system. The proportionate-use formula will remain in effect until fiscal year 1990-91 when a new rate structure will become effective as a result of an action taken by the Board in 1984 because of actions taken by the Legislature.

In September 1983, the California Legislature passed and the Governor approved Statute 1983, Chapter 1324. It added Section 97.6 to the Revenue and Taxation Code requiring Metropolitan to submit a report to the Legislature detailing its plans and recommendations for reducing its reliance on property taxes. The statute also provided that Metropolitan could not impose a property tax rate for voter-approved indebtedness for fiscal years 1984-85 and 1985-86 that exceeded the rate for fiscal year 1982-83 unless at least 80 percent of Metropolitan's Board of Directors found that a fiscal emergency existed that required an increase.

In March 1984, Metropolitan submitted a report to the California Legislature in response to the requirements of Revenue and Taxation Code, Section 97.6. In this report, a two-year exemption from the above tax limitations was requested while Metropolitan's staff, Board of Directors, and outside consultants analyzed Metropolitan's financial conditions and prepared recommendations to reduce Metropolitan's reliance on taxes.

In April 1984, Metropolitan's Board of Directors proposed an amendment to the MWD Act in response to the Revenue and Taxation Code, Section 97.6. This amendment was intended to establish Metropolitan's future taxation policy. SB 1455 was approved by the Legislature as Statute 1984, Chapter 271 and signed by the Governor in June 1984. It included the addition of Section 124.5 to the Metropolitan Water District Act. Section 124.5 provides that, beginning with fiscal year 1990-91, Metropolitan's ad valorem property taxes shall not exceed (1) the amount required to pay debt service on general obligation bonds, and (2) the portion of Metropolitan's payment obligation to the State under the State water service contract which is reasonably allocable to the State's payment of debt service on existing Burns-Porter bonds. These limitations may be exceeded if Metropolitan's Board finds after hearing that a tax in excess of the limitations is essential to Metropolitan's fiscal integrity after the Speaker of the Assembly and President Pro Tem of the Senate are given at least 10 days written notice of the hearing.

Implementation of Section 124.5 will cause a gradual increase in water rates as a greater portion of Metropolitan's capital costs will be collected through water rates rather than property taxes. By the year 2024, when the bonds have been fully paid, it is projected that Metropolitan will no longer levy an ad valorem property tax.

As to water rates themselves, Metropolitan has a

special interruptible water service plan and water pricing structure that was adopted in 1981. Under that plan, separate rates are established for noninterruptible, interruptible, and emergency service. As a separate matter, under the local projects program Metropolitan established a rate for reclaimed water in 1983.

The new water rate and tax rate pricing structure will affect each of these water rates. As the rates for water service continue to increase, member agencies will most likely be forced to increase local water rates. The specific effect on a member agency depends on how much water an agency purchases from Metropolitan and how each agency plans to handle any price increases. Table 11 shows the water rates for fiscal year 1985-86. It is estimated that these rates may increase substantially by 1995. However, after considering the effect of the projected rate of inflation, the actual increase in constant dollars will not be as great. This is discussed in more detail later in this chapter under "Price Elasticity."

Noninterruptible service refers to water that is used for domestic and municipal purposes which is not subject to an interruption or reduction in demands except as a last resort during shortages. This service is generally not used for groundwater replenishment, local reservoir storage, agricultural use, or injection into seawater barrier projects.

Interruptible service is water that is made available for storage in groundwater basins or held in local surface

reservoirs and is held until a shortage in supplies necessitates its use. Because water deliveries by Metropolitan for these purposes can be "interrupted" during shortages, the wholesale price to the member agencies is less than the noninterruptible rate. A detailed discussion of the interruptible service program is included later in this chapter.

Reclaimed water is water which has been treated within a water reclamation plant and is suitable only for selected nonpotable uses.

Table 11

Adopted Water Rates for Fiscal Year 1985-86
(Dollars per acre-foot)

NONINTERRUPTIBLE		INTERRUPTIBLE		EMERGENCY		RECLAIMED
Untreated	Treated	Untreated	Treated	Untreated	Treated	
192	224	148	180	586	618	84

B. Interruptible Water Service Program

The supply of water to Metropolitan in the future will be less reliable than it has been historically. To encourage better utilization of existing local supplies, Metropolitan adopted an Interruptible Water Service Program, which became effective in July 1981. The program changed Metropolitan's water rates and the classification of water service. Previously, types of service were classified as domestic and municipal, groundwater replenishment, and

agricultural. Under the new program, types of services are noninterruptible, interruptible, and emergency.

Noninterruptible water service consists of water delivered for domestic and municipal purposes that requires continuity of service. Interruptible service includes water delivered for agricultural purposes and the portion of water delivered for domestic and municipal purposes that could be interrupted or reduced for a short term, such as some of that for groundwater replenishment, in-lieu replenishment, surface storage, or seawater barrier projects. Emergency service is available only in the event a member agency cannot sustain the interruption which it had agreed to sustain and thus requires uninterrupted water deliveries to see it through the emergency.

The interruptible service program provides water at discounted rates for that portion of an agency's supplemental water demands which could be interrupted from Metropolitan's system during a temporary shortage of Metropolitan's supplies or if unusual operating conditions precluded making such deliveries. Water is sold for agricultural purposes at interruptible rates and is provided only if supplies are not required for municipal and industrial uses. Additionally, agencies that maintain the capability to use water from storage in substitution for the use of Metropolitan's supplies may purchase a portion of their supplemental water needs in interruptible service. Agencies purchasing water in

interruptible service sustain a potential obligation to reduce demands for service from Metropolitan during any of the three succeeding fiscal years by an amount equal to that purchased in interruptible service. By discounting interruptible service Metropolitan encourages member agencies to store water in either a surface reservoir or groundwater basin and maintain the capability to interrupt deliveries from Metropolitan without affecting retail supplies for municipal and industrial purposes. The interruptible service program encourages integration of the capabilities of the member agencies to store water with Metropolitan's capabilities and insures the adequacy of Metropolitan's supplies to meet the supplemental water needs for which alternative supplies do not exist.

The established order of priority for interruption of service is:

1. Groundwater replenishment by spreading;
2. Groundwater replenishment by in-lieu pumping;
3. Reservoir storage;
4. Injection into seawater barrier projects;
5. Agricultural water for annual crops;
6. Agricultural water for permanent crops; and
7. Agricultural water for livestock and poultry.

It should be noted that Metropolitan is a wholesale water agency. As such, it has no retail customers, and therefore, no retail water rates. Metropolitan has no authority, nor does it have the ability, to establish retail water rates

in its service area. Any discussion of retail rates such as increasing block, lifeline, etc., would best be included in plans prepared by local agencies. In fact, Water Code Section 10610.2(b) states that "The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level."

C. Price Elasticity

Price elasticity of demand is defined as the ratio of the percentage change in the quantity demanded to the percentage change in price. In other words, the lower the price charged for a commodity or service, the larger will be the quantity demanded, other things being equal. Conversely, the higher the price charged the smaller will be the quantity demanded. A commodity is considered to be elastic if an increase in price would cause a reduction in demand. Whereas, a commodity is considered to be inelastic if an increase in price would only cause a mimimum reduction in demand.

According to a recently completed study[1/], the relationship between the wholesale price of water and demand for water for domestic and municipal uses is inelastic in Metropolitan's service area; that is, as the wholesale price of water increases, the decrease in demand would be minimal.

1/ The Metropolitan Water District of Southern California, The Relationship Between Urban Water Demand and the Price of Water. February 1984.

The basic reason for this inelasticity is that the present cost of water for domestic and municipal use is relatively inexpensive, and future retail water rates are expected to increase only by a very small amount more than the projected rate of inflation based on the Consumer Price Index. However, additional studies are needed to fully understand the complete relationship between price elasticity and water demands.

Between 1970 and 1983, Metropolitan's average wholesale rate for all water sold increased from $37 per acre-foot to $112 per acre-foot. This is equivalent to an 8.9 percent average annual rate of increase. During this same period, the Consumer Price Index increased at a 7.6 percent average annual rate. Thus, in terms of constant dollars, Metropolitan's wholesale water rates increased 1.3 percent per year on the average. During this same period, per capita consumption has fluctuated substantially because of weather conditions and other variables. With regard to retail rates in Metropolitan's service area, most increases have historically lagged behind increases in the Consumer Price Index.

In the future, Metropolitan's average water rate is projected to increase to over $400 per acre-foot by the year 2000. This projected increase assumes that certain additional facilities will be constructed and that operation, maintenance, and construction costs will escalate at 6 percent annually. This represents an 8.3 percent average annual rate of increase in the wholesale price of water, which is less than the rate of historical increases.

As shown on Table 2 in Chapter II, Metropolitan's water supplies account for about 45 percent of the total water used within its service area. The remainder comes from local groundwater and other supplies, including the supply from the Los Angeles Aqueducts. These supplies are less expensive than Metropolitan's water and therefore lower the cost of the total supply of water available to retail water purveyors. On the other hand, retail water purveyors have constructed, maintained, and operated extensive distribution systems in addition to developing their own supplies and purchasing water from Metropolitan. The costs of these systems tend to boost overall retail water rates above Metropolitan's wholesale rate.

While retail water rates are generally higher than wholesale rates, they are also less subject to price escalation. Local water supplies in Metropolitan's service area are almost fully developed and future capital expenditures for new projects will be limited. The additions to the existing local distribution systems in most cases will be small increments added to the large, existing systems. For these reasons, it is anticipated that retail water rates will increase less rapidly than Metropolitan's wholesale rates. Consequently, urban water demands are not expected to be significantly affected by future price increases.

CHAPTER XII

SECTION 10633: EVALUATION AND COST COMPARISON OF ALTERNATIVE WATER MANAGEMENT PRACTICES

Section 10633 of the Act requires an evaluation of the "alternative water management practices" identified in this report. The evaluation takes into account economic as well as noneconomic factors including environmental, social, health, customer, and technological impacts. Environmental factors are discussed in general. A more accurate analysis of the impacts of implementing the practices will be made at the time environmental documentation is prepared on specific projects. In the discussion, social factors refer to impacts on the populace in general in Metropolitan's service area, customer impacts relate primarily to Metropolitan's member agencies, health factors are those which could affect the public health of the populace within Metropolitan's service area, and the technological factors refer to any constraints or limitations due to technology which could hinder implementation or reduce the efficiency of the program.

Two principal forms of alternative water management practices are discussed in this chapter. The first form includes nonstructural activities designed to reduce water demands in Metropolitan's service area. These activities include: (1) local water conservation advisory committees, (2) conservation literature, (3) promotional measures, (4) work with large water users, (5) information on federal and State laws and programs, (6) water loss reduction techniques,

(7) studies, (8) environmental impact reports and statements, (9) work with other agencies, and (10) a water emergency plan. Environmental, social, health, customer, and technical impacts are discussed; however, cost comparisons or estimates of water savings for the nonstuructural activities are not included because data are not available at this time to accurately predict the cost of, or water savings from, each individual proposed program. It is not yet possible to accurately predict the cost and savings because of the many variables associated with water demand, such as weather patterns, number of consecutive hot days, humidity, industrial activity, types of urban development, and effects of implementing other programs. Although it is not possible at this time to make a cost comparison with the structural programs, the nonstructural programs discussed above are considered to be beneficial because of increased public awareness alone. Relative cost and efficiency will be examined over time as experience is gained.

The details of each program will be developed with assistance from advisory committees. A general discussion of each program is included at this time, until the specific details are worked out with the committee. The advisory committees will include representatives from Metropolitan's member agencies and others with special expertise or interest in water conservation.

The second form of alternative water management practices are structural measures designed to reduce water

demands or to improve the efficiency of existing water supplies. The possible structural measures identified to date are as follows: (1) local projects, (2) retrofit kits, (3) agricultural water conservation measures in the Imperial Valley, and (4) All American Canal lining.

Also included in the discussion of structural measures is a description of two major programs which could be implemented by others, including the State and Federal Governments. These programs include an agreement for further coordination of the State Water Project and the Federal Central Valley Project (CVP) and the use of interim CVP water. An explanation of these two measures is included in this chapter, but no evaluation is presented because the programs must be implemented by others.

A. Nonstructural Alternative Water Management Practices

Implementation of the nonstructural programs would have some economic impact; however, most of the additional costs would probably be absorbed by Metropolitan. It is anticipated that there would be minimal environmental, social, health, customer, and technological impacts due to implementation of these programs. Each of the proposed nonstructural programs, including an evaluation of the factors described above, is discussed below.

Local Water Conservation Advisory Committees

These committees would be comprised of representatives from Metropolitan, its member agencies, and other individuals

with special expertise or interest. The committees would meet periodically to discuss topics and offer advice to Metropolitan on specific programs. Implementation of this program could have a beneficial social impact because information regarding updated and improved water conservation methods could be more quickly disseminated throughout Metropolitan's service area. There would be little economic, environmental, health, customer, or technological impacts.

Conservation Literature

Metropolitan will continue to publish and distribute brochures concerning water conservation, low-water-using plants, and water management practices for specific water users. The information in these brochures will primarily be for retail water users; consequently, the principal effect would be social. As the brochures become more available to the public, the general populace becomes better informed about the various methods to conserve water. There would be little economic, environmental, health, customer, or technological impacts.

Promotional Measures

Metropolitan's promotional measures will include public information programs, public speaking presentations, low-water-use landscaping demonstration gardens, promotional campaigns with nurseries, an awards program for nurseries, and the distribution of kits for retrofitting existing plumbing fixtures. The principal effects of these measures are social.

As more people are contacted through the various promotional measures, the greater the public awareness becomes of methods to reduce water use. And, as measures to reduce water use are implemented, especially the installation of retrofit kits, there could be less flow of waste water to sewer treatment plants. There will be little economic, environmental, health, customer, or technological impacts.

Work With Large Water Users

There are many industrial and commercial organizations throughout Metropolitan's service area which use large amounts of water. The City of Los Angeles Department of Water and Power and other organizations have developed brochures which discuss specific methods which can be implemented by certain industrial and commercial organizations to reduce water use. In addition, Los Angeles and others have worked with these large users on conservation programs, with the result that substantial reductions in use have already been accomplished. In the future, through cooperative programs with its member agencies, Metropolitan will distribute these brochures to the appropriate organizations. Metropolitan will develop additional brochures if needed. In addition to this program, Metropolitan may work directly with its member agencies and individual industries in its service area to offer advice on ways to reduce water use, and may assist its member agencies in developing and implementing an "awards" program to recognize organizations or individuals which have improved the efficiency of water use

through the implementation of water conservation or water management programs. Economic impacts of implementing the programs would have to be considered on a case-by-case basis. Also, implementation of the programs could reduce sewer flows. Minimal social, environmental, health, or technological impacts are expected.

Information on Federal and State Laws and Programs

As federal and State laws and programs become established, Metropolitan will continue to appropriately modify its water management programs. Metropolitan will disseminate information on new laws and on any changes to this Regional Urban Water Management Plan to its member agencies and other interested organizations and individuals. The dissemination of information on federal and State laws and programs will have little economic, environmental, health, customer, or technological impacts.

Water Loss Reduction Techniques

Metropolitan will continue its program to prevent, locate, and repair leaks throughout its distribution system. This water loss reduction program includes system-wide water audits, leak detection, metering of existing customers, meter calibration and replacement, corrosion control, valve exercising, and other preventive maintenance measures.

Moreover, Metropolitan may provide a consultant to be used by its member agencies or subagencies to detect leaks in their distribution systems. This program would have little

environmental, social, health, customer or technological impacts. However, locating and repairing leaks would have a beneficial economic impact.

Water Conservation Studies

Metropolitan will continue to participate in studies to develop data on the need for, and effectiveness of, water conservation programs. The data from these studies will be made available to Metropolitan's member agencies and the public, and will provide a basis for ongoing review and adjustment of the overall effort. There will be no impact on the six factors from implementing this program, except that available technology may be improved.

Environmental Impact Reports and Statements

Metropolitan is required to review environmental impact reports prepared for projects in its service area in which it will be a responsible agency. In its review of these reports, Metropolitan will inccorporate a discussion of methods which could be used to reduce water use in the projects, such as low-water-use landscaping and installation of low-flow plumbing fixtures. There will be little impact on the six factors from implementing this program.

Work With Other Agencies

Metropolitan will continue to work with other public and private agencies and organizations to encourage efficient water use. There will be little impact on the six factors from implementing this program.

Emergency Water Conservation Plan

Metropolitan will develop a staged contingency plan to reduce demands on its system during water shortages or emergencies. Each of the six factors could be impacted should it become necessary to implement an emergency water conservation plan. Severity of the impacts would depend on the length and severity of the shortage.

B. Structural Alternative Water Management Practices

This section presents a discussion and a cost comparison among the structural alternative water management practices. The alternative water management practices evaluated here which might be implemented include: (1) water reclamation (local projects), (2) retrofit kit installation, (3) agricultural water conservation measures in the Imperial Valley, and (4) All American Canal lining. Additional alternative water management practices which would be implemented by others include: (1) CVP-State Water Project Coordinated Operation Agreement, and (2) use of interim CVP water.

As indicated in Chapter V, for Metropolitan to meet the water demands of its member agencies, it will be necessary to increase the dependable supplies available to Metropolitan, while at the same time exploring the feasibility of all of the other alternative water management practices discussed in this report. AB 797 requires that this report "...include a comparison of the estimated cost of alternative water management practices with the incremental costs of expanded or additional

water supplies...." It should be noted that, even though the Act refers to water conservation and water management activities as "alternative water management practices," these activities are not an alternative to increasing the dependable supply of water available to Metropolitan.

The assumptions used to calculate costs for the various alternative water management practices are as follows:

1. Construction costs are based on a 9% interest rate for a 30-year bond repayment period.

2. Capital costs for the projects were escalated at 6% per year from the base year to 1985.

It is anticipated that it will be possible to transfer, or interchange, power for pumping between Colorado River and State project sources in the future. Therefore, the incremental cost per kilowatt-hour for pumping would be the same for both projects. For comparison purposes it is estimated that it will require 2,000 kilowatt-hours per acre-foot to pump Colorado River water and 2,600 kilowatt-hours per acre-foot to pump State project water. Actual costs for pumping in the future may vary significantly depending upon the actual cost of power.

Additional State Project Supplies

One of the first steps necessary for increasing the supply of water available to Metropolitan from the State Water Project is to construct facilities necessary to more efficiently transfer water from the Sacramento River to the export pumps in the south Sacramento-San Joaquin Delta. For comparison purposes,

it is assumed that four additional export pumps will be installed and the Delta facilities would include: (1) facilities to eliminate restrictions in the north and south Delta by widening and deepening channels and constructing a new channel in the north Delta, (2) facilities in the western Delta to provide water supplies to the islands more efficiently, and (3) facilities and other measures necessary to mitigate environmental impacts from these projects. It is expected that these facilities would yield approximately 250,000 acre-feet per year to Metropolitan. The estimated incremental capital cost of water from these facilities is $64 per acre-foot. This estimate is very preliminary and is subject to change depending upon which facilities are constructed, and the timing of construction.

Local Projects

As explained in Chapter VI, in 1982 Metropolitan began its Local Projects Program. Under this program, Metropolitan agreed to join together with its member agencies under joint exercise of powers' agreements to develop new local water supplies that are primarily reclaimed water. One of the projects is now under construction and one has been completed and its now operating. However, this program is currently being reviewed and additional future projects will be considered on a case-by-case basis. It should be noted that many of these projects are very expensive with total costs to Metropolitan and the local agency ranging from about $180 per acre-foot to

over $900 per acre-foot in 1985 dollars. These costs do not include the cost for energy or operation and maintenance. Many of the least-cost projects would produce water entirely or primarily for agricultural purposes. Metropolitan is only authorized by the MWD Act to sell water for agricultural purposes on an interruptible basis. It is the opinion of Metropolitan's General Counsel that this restriction in the Act prevents Metropolitan from funding local projects which are entirely or primarily intended to produce water for agricultural purposes.

It should also be noted that the water produced by reuse projects cannot be used for potable purposes, and incurs special field operating costs at the point of use. Therefore the water is of lesser value than freshwater, especially for urban use, and must be sold at substantially reduced rates to encourage its use. The following table includes a list of the Phase 1 projects identified in early appraisal-level studies. Additional study of most of the projects is still needed, and some of the projects may no longer be feasible. However, the list is included here for comparison purposes. Even though final estimates of yield from potential reclamation projects are not yet known, Metropolitan has included an additional 80,000 acre-feet of local water in its estimates of future supply by year 2000.

A detailed discussion of Metropolitan's local projects program is presented in Chapter VI. The three factors primarily

Table 12

PROJECT COST SUMMARY FOR PHASE 1 PROJECTS***
(1985 Dollars)

Project Name	Estimated Projected Yield (AF/yr)	Unit Cost		
		Total Unit Cost ($/AF)	Local Unit Cost ($/AF)	MWD Unit Cost ($/AF)
Bellflower Greenbelt	173	628	362	267
Cerritos Greenbelt	2,800	265	65	200
East Long Beach Greenbelt	175	368	40	327
Gafner Greenbelt	520	290	182	108
Glendale Greenbelt	1,760	352	58	294
Green Acres	3,950	349	108	240
Hyperion/Chevron Industrial Demonstration	1,130	340	167	174
Irvine Greenbelt	3,670	583	296	287
LA/Burbank Greenbelt	1,100	211	-0-	211
Laguna Niguel Greenbelt	852	483	183	300
Las Virgenes Greenbelt*	2,700		207	269
Los Robles/Conejo Creek Groundwater	235	370	192	179
Los Serranos Greenbelt	650	177	56	121
Lux Canyon Greenbelt	165	314	151	163
Meadowlark Greenbelt	1,680	307	125	182
Pico Rivera Greenbelt	130	343	-0-	343
Pomerado Greenbelt	830	430	87	343
Rubidoux Greenbelt	500	281	99	182
San Juan Desalination	4,000	407	107	300
Santa Margarita Greenbelt	1,280	319	100	219
SAWPA Desalination	5,600	383	105	278
Shadowridge Greenbelt	1,036	211	120	90
Simi Valley Greenbelt	3,300	327	64	263
South Laguna Greenbelt**	859	927	627	300
Walnut Valley Greenbelt	2,000	646	490	156

* Project under construction.
** Construction completed.
*** Based on 1982 survey; project data has changed in a number of cases.

affected by this program will be the economic, health, and technological factors. The effect on each of the factors will be different from project to project. Health and technological constraints are described in Chapter VI.

Retrofit Kits

Over the past several years, about half of the homes in Metropolitan's service area were furnished kits to retrofit existing plumbing fixtures. Metropolitan could implement a program to distribute similar kits to the remaining households in its service area. For example, selected portions of Metropolitan's service area could be targeted each year and at subsequent five-year or other appropriate intervals, so that at least one-fifth of its service area would be supplied with new retrofit kits each year. These kits, which have a five-year life expectancy, contain shower flow restrictors, toilet tank displacement bags, dye tablets used to detect toilet tank leaks, and literature with instructions as well as water conservation tips. There will be little environmental, social, health, customer, or technological impacts due to the distribution of retrofit kits. Implementation of this program could reduce sewer flows.

The following estimated savings from the retrofit program are based on a United States Department of Housing and Urban Development study.[1/] This study of 14 communities in

---

1/ "Residential Water Conservation Projects," Summary Report, U.S. Department of Housing and Urban Development, June 1984

different areas of the United States indicated that 38 percent of the toilet devices which were distributed, and 20 percent of the flow restrictors, were actually installed and remained in use.

The annual cost of distributing the retrofit kits to one-fifth of the households in Metropolitan's service area is approximately $1.4 million in 1985 dollars. Under this program, it would take three years to distribute kits to the remaining homeowners in Metropolitan's service area, which have not yet received kits, at a total cost of $4.2 million for the three years. This estimate includes overhead, a companion public information program, and literature included in the kits. At the end of the first three-year period when the retrofit kits have been distributed to the remaining households in the service area, the water savings from this program would be about 30,000 acre-feet per year at a cost of $140 per acre-foot. If the 30,000 acre-foot rate were to remain constant, the incremental unit cost for continuing the program would be approximately $45 per acre-foot in 1985 dollars. This rate represents an annual cost of $1.4 million to maintain a reduced residential demand of approximately 30,000 acre-feet per year.

Agricultural Water Conservation Measures in Imperial Valley

In 1978 the United States Bureau of Reclamation (Bureau) issued an appraisal-level report on water conservation opportunities in 17 western states. Included in this report were preliminary estimates of potential savings for the

Imperial Irrigation District (IID) which indicated that up to 350,000 acre-feet of water could be conserved through construction of various facilities and implementation of various measures within IID. This report concluded that "...legal and institutional factors are considered to be significant...." and that "...additional studies should be made...to determine how much water can be conserved, and the cost and effects of its conservation."

Subsequent to completion of the above report, the Bureau issued a July 1984 special report entitled "Water Conservation Opportunities, Imperial Irrigation District, California." Data on savings and cost included in Metropolitan's water management plan were obtained from this later Bureau report because it contains more detailed information on estimated water savings and costs. However, it should be noted that the estimates are still preliminary and additional study is being conducted. Consequently, the estimates presented in this report are preliminary and subject to change. Final negotiations with IID will determine the potential water savings and costs.

The IID also issued a draft report in January 1985 entitled "Water Conservation Plan, Draft." Preliminary estimates contained in this report also indicated that substantial amounts of water could be conserved. However, detailed information on savings for specific facilities and measures were not included in the draft report.

In order to help verify the potential savings and costs, the Bureau is now conducting another study entitled "Imperial Irrigation District Canal Lining and System Improvements." This report will provide additional information on the water conservation mesures warranting further study included in the July 1984 report discussed above.

Based on the prospects of obtaining additional Colorado River water, as described in the above reports and subject to the constraints discussed in Chapter V, 250,000 acre-feet of additional Colorado River water is included in Metropolitan's estimate of water supply from the Colorado River by the year 1995.

The two factors primarily affected by this program include the economic and environmental factors. Environmental impacts such as a possible loss of wetlands or riparian habitat and a reduction in the amount of drainage water flowing to the Salton Sea could occur. The full impact on environmental and the other factors will not be known until the appropriate environmental documents have been prepared. There could also be social impacts from implementing the measures discussed.

Proposed Measures

1. Canal Lining

This improvement would consist of lining 340 miles of IID distribution system canals in areas where a high degree of seepage occurs. "Lining" actually refers to the construction of new lined canals to replace the old unlined canals.

Preliminary estimates indicate that constructing new lined canals could yield approximately 104,000 acre-feet of water per year.

2. Automated Gate System

This improvement would consist of installing an automated system to control the gates between the East Highline Canal and its laterals. The primary purpose of this system is to reduce system spills and provide operational flexibility. This feature is expected to yield approximately 25,000 acre-feet of water per year.

3. Regulating Reservoir

This improvement would consist of constructing an 8,000 acre-foot capacity, clay-lined regulating reservoir adjacent to the All American Canal. This reservoir would allow for the storage of some water presently being spilled from existing irrigation canals. The reservoir could save about 20,000 acre-feet per year.

4. Spill Interceptor System

This improvement would consist of constructing a spill-interceptor system. This system would consist of three collector canal units which would salvage about 70,000 acre-feet per year of canal and lateral spills that occur when farmers stop accepting water deliveries before scheduled shutoff times.

All American Canal Relocation

Currently, an estimated 109,500 acre-feet of water are lost annually from the 30 miles of the unlined All American

Canal between Pilot Knob and Drop No. 4. Most of these losses result from seepage into the ground, and a substantial amount of water could be saved by constructing a new lined canal parallel to the present canal. It is estimated that this project could save about 87,000 acre-feet of water per year.

It should be noted that implementation of some of these projects could reduce the amount of savings estimated for other projects discussed.

The total capital cost of the facilities is estimated to be about $ 300,000,000, for an estimated capital cost of $117 per acre-foot. This estimate is very preliminary and is subject to change depending on which facilities are constructed, the final cost of facilities, and the timing of construction.

Coordination of State Water Project and CVP

One of the earliest measures that can be taken to increase the dependable supply of State project water to Metropolitan, prior to construction of additional facilities, is further coordination between State Water Project and Federal CVP operations. Both the State project and the federally-operated CVP divert water from the Delta. It is estimated that 200,000 acre-feet a year of dependable supply could be made available to the State project through further coordination between State project and CVP operations. Of the 200,000 acre-feet per year, Metropolitan's share would be about 100,000 acre-feet per year during long-term dry periods. Costs and environmental impacts associated with this measure have not yet

been determined. The projects are currently being operated under temporary agreements. However long-term implementation of this measure will require approval by Congress of the complex agreement between the State and Federal Governments.

Use of Interim CVP Water

At the present time, existing CVP facilities provide a firm supply greater than can be used by the project's customers. This excess supply is called "interim CVP water." It is estimated that interim CVP water could be made available to the State project for at least the next 20 years. The annual amount could be as much as 500,000 acre-feet per year initially, of which about half would be available to Metropolitan. However, it is estimated that this amount would decline to 400,000 acre-feet per year in 1990, about 200,000 acre-feet for Metropolitan, and to zero sometime after the year 2000 as CVP customers require it for their use. The estimated costs and environmental impacts of this measure have not been determined at this time. Implementation of this measure will require continued negotiation and completion of a complex contract between the State and Federal Governments.

If agreements are reached for further coordination between State project and CVP operations, and for the use of interim CVP water, an additional 300,000 acre-feet of water per year by 1990 could be made available during long-term dry periods for Metropolitan, although this amount would decline steadily each year as less interim CVP water becomes available.

If the yield of these two measures were combined with the Delta facilities previously discussed in this chapter, the firm yield from these additional facilities and agreements for Metropolitan would be approximately 410,000 acre-feet per year in 1995, increasing to 450,000 acre-feet by year 2000 as additional State project facilities are constructed. Estimates of additional supply from the State project are included in Chapter V, Table 8.

Comparison of Additional State Project Supplies and Metropolitan Alternative Water Management Practices

The total capital cost of the alternative water management practices identified in this report and for which very preliminary estimates are available is slightly more than $300 million in 1985 dollars. The estimated firm annual yield and reduced demand from the projects is 280,000 acre-feet per year--250,000 acre-feet of additional Colorado River water (hypothetically from IID improvements and All American Canal lining), and 30,000 acre-feet of reduced demand from implementation of the retrofit program. The total capital unit cost for the alternative water management practices discussed is approximately $109 per acre-foot. This estimate is based on preliminary data and is therefore subject to substantial change. This estimate does not include the 80,000 acre-feet of additional yield from local reclamation projects because sufficient data regarding yield and costs of individual projects is not yet available.

Metropolitan's share of the capital cost for the Delta facilities previously discussed is $166.5 million in 1985 dollars. The annual firm yield from the facilities is about 250,000 acre-feet by year 2000, and the total capital unit cost would be approximately $64 per acre-foot.

By the year 2000, Metropolitan will need an additional 630,000 acre-feet per year to meet its "normal" projection of demands. The two principal reasons for the additional need are: (1) the reduction in Metropolitan's dependable entitlement to divert water from the Colorado River once the Central Arizona Project commences operation and (2) increases in population and water demand within Metropolitan's service area. Should Metropolitan's projection of demand exceed this "normal" projection, additional water supplies will be required. Estimates indicate that completing the Delta facilities, coordinating State Water Project and Central Valley Project operations, using interim CVP water and implementing the alternative water management programs previously discussed would yield an additional 780,000 acre-feet of water per year, and reduce demands on Metropolitan's system by 30,000 acre-feet per year, for a total of 810,000 acre-feet. "Extra" water which could be made available through the implementation of the programs discussed would be used to continue and implement exchange agreements, and implement a conjunctive use program in the Chino Basin and a Colorado River banking program. These programs will be necessary to help offset potential severe

shortages during droughts as indicated under the "probable minimum supply" scenario on Table 8 in Chapter V. Since it may not be possible to implement all of these alternative water management measures to the fullest extent discussed in this report, it will therefore be necessary for Metropolitan to explore the feasibility of implementing all of the alternative water management practices discussed in this report and to increase its dependable supplies of water. Construction of additional facilities will be staged to the extent considered to be feasible and prudent in order to assure a dependable supply of water to serve the needs of Metropolitan's service area.

APPENDIX A

Written Comments Received at Public Hearing Held on June 13, 1985, and During Public Review Period Which Ended on June 17, 1985; and Responses Thereto

APPENDIX A

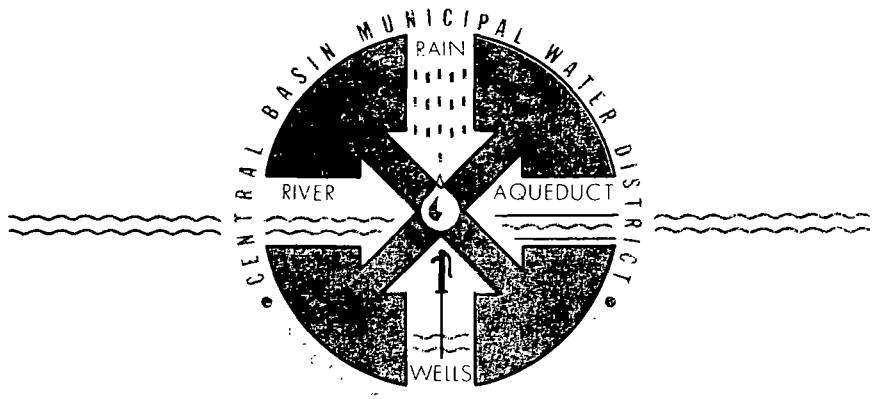
Table of Contents

Table of Contents

APPENDIX A

At the Public Hearing held on this plan on June 13, 1985, no significant comments were received in addition to those included in the written comments that are included in the plan. Those written comments follow, as well as a transcript of oral comments by Mrs. Marilyn Stout, representing the Northridge Civic Association.

A-2



April 9, 1985

Mr. Carl Boronkay, General Manager
The Metropolitan Water District
of Southern California
P. O. Box 54153
Los Angeles, Ca., 90054

RE: Comments on Metropolitan's Regional Urban Water Management Plan

Attention: Mr. Edward J. Thornhill

Thank you for the opportunity of reviewing your District's draft copy of the Water Management Plan. We would appreciate the opportunity of reviewing Chapter 12 of the plan when it becomes available.

We hare prepared comments on behalf of the Central and West Basin Municipal Water Districts on your draft water management plan as follows:

ON CHAPTER II-12 Member Agency Local Supplies

The Member Agencies obtain water supplies from Metropolitan and from local sources. Suggested change many Member Agencies - Central and West Basin Municipal Water Districts do not own or operate local water sources but the water retailers they serve do own and operate such facilities.

11-2 Ground Water

In certain areas water also enters a basin from an adjacent basin, i.e. - underflow from the San Gabriel basin enters Central Basin at Whittier Narrows. The annual amount of this flow varies from 25,000-30,000 acre feet or more. In the West Coast Basin underflow occurs in the Dominguez Gap area where water flows from the Central to the West Coast Basin. This flow varies annually and has been estimated to be as much as 30,000 acre feet in the past. Perhaps the best way to note this is to state: "Certain groundwater basins have historically received water from upstream basins", without noting which basins specifically. Also ground water is not a common supply to all in areas where adjudication has taken place but is apportioned among those who have historically used the supply.

7439 EAST FLORENCE AVENUE • DOWNEY, CALIFORNIA 90240-3699 • PHONE (213) 927-2611 • (213) 773-5790

11-13 The total ground water supply in Metropolitan's service area has been fully developed. . . . . Comment: Beverly Hills is no longer using its ground water supply so the sentence should read "Most of the ground water supply.....

CHAPTER VI VI-1 first paragraph refers to table 10 as that showing data on water reuse in 1981 should be Table 9. Central Basin Municipal Water District should be footnoted to show water purchased by Central and West Basin Water Replenishment District. There was some incidental use of reclaimed water originating at the Pomona Reclamation Plant and later flow into the Central Basin. We are unable to identify West Basin Municipal Water District landscape and agricultural use of 1733 acre feet in 1981 (see Table 9).

VI-9 Tabulation showing Metropolitan's Local Projects Program includes the Bellflower and Cerritos proposals which have been dropped due to the expense of participating as well as the limited amount of water acutally committed to reuse at the time of investigation.

XI-7 9th line sp. moreover should be corrected.

Both Central and West Basin Municipal plan to complete an area wide water management plan and include in an appendix copies of all retailer sub-agencies plans who are required to file such a plan under AB 797. These will be forwarded to you later this summer following a public hearing thereon.

John G. Joham, Jr.
General Manager

JGJ/bb

CC: West Basin Municipal Water District

1. Central Basin Municipal Water District and West Basin Municipal Water District

Comments noted and changes made in text to reflect comments.

Howard A. Hicks
General Manager

Donald L. Harriger
Assistant General Manager

David W. Hansen
Chief Engineer

Kenneth P. Weel
Controller

Western Municipal Water District

of Riverside County

6377 RIVERSIDE AVENUE · P.O. BOX 2038 · RIVERSIDE, CALIFORNIA 92516 · 714/686-4510

June 10, 1985

Board of Directors
Metropolitan Water District
of Southern California
P.O. Box 54153
Los Angeles, CA. 90054

REGIONAL URBAN WATER QUALITY MANAGEMENT PLAN

By this letter I convey Western's support of the Regional Urban Water Quality Management Plan prepared by the Metropolitan Water District for a hearing set on June 13th.

Western would like to express its appreciation to MET for the fine job in preparing this report which we and many other member agencies plan to utilize as a core document in the preparation of our respective AB 797 compliance documents. Our documents will incorporate by reference Metropolitan's plan in order to minimize unnecessary duplication; our subagencies will incorporate this combination in their efforts to also comply with the mandated program.

We encourage Metropolitan's adoption of this plan and appreciate the cooperative spirit in which it was prepared.

HOWARD A. HICKS
General Manager

HAH/DWH/pb

2. Western Municipal Water District of Riverside County

Comments noted, no response necessary.

COMMENTS OF CENTRAL AND WEST BASIN MUNICIPAL WATER DISTRICTS ON METROPOLITAN'S URBAN WATER CONSERVATION PLAN

We have received and reviewed a draft copy of the Regional Urban Water Management Plan for the Metropolitan Water District of Southern California dated May 1985 and have been invited to this public meeting thereon.

We have reviewed your past, present, and projected imported water use and find it reasonable within the quantities shown for Central and West Basin Municipal Water Districts.

We concur that it is important to conserve water and that effort should be made throughout the community to make the public aware of this most important fact. We commend your effort through visual aids, films, pictures, etc. to try and get this important message across to the public.

We support Metropolitan's Interruptible Water Rate as a measure to continue to expedite effective ground water management and conjunctive use of imported and local water resources.

We support Metropolitan's ground water storage programs including long term spreading and injection, conjunctive use storage and cyclic storage programs as a means of maintaining and improving local water resource reserves.

We support the many other programs Metropolitan has initiated to provide long term water storage through various water exchange agreements.

We support and commend Metropolitan's effort in negotiating with other agencies for additional supplies of Colorado River Water and we look to the interim use of Central Valley Project (CVP) water as a means of meeting future water needs.

Central and West Basin Municipal Water Districts recognize that conservation is a continuing effort and pledge cooperation and support to Metropolitan Water District to ensure the success of this effort.

Presented at Public Hearing of Metropolitan
Water District's Water Problems Committee
June 13, 1985

3. Central Basin Municipal Water District and West Basin Municipal Water District

Comments noted, no response necessary.

June 13, 1985

TO: Ed Thornhill, MWD

FROM: Diane Eaton, LVMWD

SUBJECT: Water Management Plan

Only one small comment--Chapter VI--Waste Water Reclamation--top of Page VI-13 "...effluent from the Tapia Water Reclamation Facility for irrigating parks, greenbelts, playgrounds, a golf course, cemetery and the Landfill located in western Los Angeles County. The project..."

Thank you for your help.

4. Las Virgenes Municipal Water District

Comment noted and change made in text to reflect comment.

P.O. BOX 15229 • 1950 EAST 17TH STREET, SUITE 150 • SANTA ANA, CALIFORNIA 92705-0229 • (714) 973-1023

METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA
Attn: Mr. Glenn P. Allen, Chairman
Water Hearing Committee
Urban Water Management Plan
1111 Sunset Boulevard
Los Angeles, CA. 90054

13 June 1985

Dear Mr. Allen,

Municipal Water District of Orange County (MWDOC) would like to offer several comments on the draft Urban Water Management Plan (Plan) prepared by Metropolitan Water District.

Overall, Metropolitan's draft Plan is very well done. The topics required by the Urban Water Management Planning Act of 1983 are presented in a clear and concise manner. However, the discussion presented in Chapter Four concerning Metropolitan's water emergency plan is not detailed enough for efficient long range water planning activities within MWDOC's boundaries.

The discussion on pages IV-9 through IV-11 of the draft Plan which refers to the development of a water shortage plan using a "step" approach appears adequate for discussion purposes. It is hoped, however, that specific guidelines and a well defined time frame will be developed during the implementation phase of Metropolitan's Plan.

MWDOC believes that a conceptual framework defining a series of water shortage scenarios should be considered by Metropolitan, utilizing current information concerning probable yields from the State Water Project (SWP), anticipated water demands, and anticipated allocations in the event of short-term and/or chronic shortages.

The Committee is already well aware of the below average water years experienced by California the past two years. Continuation of this pattern in the near future, coupled with inadequate facilities, potential system failures, legal restraints, and unexpected changes in area of origin water supply conditions clearly illustrate the need for developing a timely water shortage plan.

The preparation of an Urban Water Management Plan by Metropolitan is, in our opinion, potentially saving millions of dollars in agency staff time and production costs. The Plan is a very good example of how Metropolitan can best serve its member agencies by promoting cost-effective water conservation programs and practices within the southern California water community.

We look forward to working closely with your staff in the implementation of the final Plan to be submitted by Metropolitan to the California Department of Water Resources (DWR).

Sincerely yours,

Stanley E. Sprague
General Manager

5. Municipal Water District of Orange County (MWDOC)

Comments noted. In response to the comments regarding development by Metropolitan of a "water shortage plan," it is expected that the plan will be developed with assistance from Metropolitan's member agencies and other interested organizations and individuals. Since important policy matters are involved, the plan would have to be presented to Metropolitan's Board of Directors for approval. MWDOC would be invited to participate in discussions of the plan, and it is anticipated that the comments submitted would be addressed in detail at that time.

NORTHRIDGE CIVIC ASSOCIATION

June 13, 1985

Good Morning
How are you?
Are you ready for this?

A. 1. inch pipe — Residential users L.A. pay $300 - $500 an acre foot.

2. 6" inch pipe industrial users - like Anheuser Busch - Union Oil pay ~~$0.57~~ $249.63

3. Big pipe like this - Arvin -
$4.64 an acre foot
$7.50 " " "
$9.09 " " "

4. You might say - Water prices are irrational —
You'd be right.
Water prices do not ration ration water very well either.
There's a hole in the water bucket
Money pocket -

B. Best authorities on subject - authors Hirshleifer DeHaven Milliman
Water Supply Economics, Technology + Policy -

Stressed that improved pricing — would be best conservation measure.

6. Northridge Civic Association

Comments noted. The outline included herewith was supplemented by oral comments at the public hearing. The main emphasis of the comments was that retail water pricing policies throughout the State are "irrational" and that "improved water pricing would be the best conservation measure." It should be noted that Metropolitan is a wholesale water agency and as such does not establish nor has any authority to establish retail water rates or policies. Retail rates and policies will be included in water management plans prepared by retail water agencies.

Even though Metropolitan has no retail rates, its interruptible water pricing policy is intended among other things to promote the conservation of local water supplies by retail water agencies. Furthermore, Metropolitan will consider adoption of other economic incentives on a regional basis to encourage additional water conservation in the future. Any program involving economic incentives would be developed in cooperation with Metropolitan's member agencies.

STETSON ENGINEERS INC.

CIVIL AND CONSULTING ENGINEERS

3104 East Garvey Avenue
West Covina, California 91791
(818) 967-6202

34700 Coast Hwy.
Suite 202
Capistrano Beach, California 92624
(714) 240-7767

2171-K E. Francisco Blvd.
San Rafael, California 94901
(415) 457-0701

REPLY TO: CAPISTRANO BEACH

June 13, 1985

Mr. Edward J. Thornhill
Water Conservation Coordinator
The Metropolitan Water District of
Southern California
P. O. Box 54153
Los Angeles, CA. 90054

Re: Comments on the May 1985 Draft Regional Urban Water Management Plan for The Metropolitan Water District of Southern California

Dear Mr. Thornhill:

Stetson Engineers Inc. was requested by Upper San Gabriel Valley Municipal Water District to review the draft report entitled, "The Regional Urban Water Management Plan" prepared by your District. After reading this draft report we wish to submit the following comments.

Table 1, page II-8, indicates local water supplies to Upper San Gabriel Valley Municipal Water District averaged 121,603 acre-feet per year over the 10-year period presented. Our records indicate that it should be about 150,000 acre-feet per year over that period.

On page VII-3, the report discusses the Cooperative Water Exchange Agreement involving the City of Alhambra. Some of the information presented is misleading. I would suggest the following language:

"Prior to 1975, a ground-water overdraft condition existed throughout the Main San Gabriel Basin, including the western portion of the Basin referred to as the "Alhambra Pumping Hole." This general overdraft condition resulted in a lawsuit that adjudicated the water rights of the Main San Gabriel Basin (Upper San Gabriel Valley Municipal Water District v. City of Alhambra, et al, Los Angeles County Superior Court Case No. 924128, Judgment entered January 4, 1973). Six of the seven producers extracting ground water from the "Alhambra Pumping Hole" in the western portion of the Basin are members of ..."

In the second paragraph on page VII-3 it should be noted that the Devil Canyon-Azusa pipeline has a design capacity of 55 cfs, not 40 cfs.

On page VII-9 the report reviews MWD's adjudicated right in the Main San Gabriel Basin. Under the Judgment MWD is designated as an Intergrated Producer and the correct amount of its water right is 9.59 acre-feet of diversion component and 165 acre-feet of prescriptive pumping right, not 72 acre-feet as stated in the draft.

Although not affecting Upper San Gabriel Valley Municipal Water District, it is noted that the storage capacity of Lake Henshaw, shown in Table 3, page II-15, is significantly overstated. To improve its safety, Henshaw Dam was modified and the spillway lowered during 1980 and 1981 and its current storage capacity is about 53,000 acre-feet. Also, Table 3 does not include any of the storage reservoirs of the City of Los Angeles.

This report will be very useful to the Upper San Gabriel Valley Municipal Water District and its subagencies and we appreciate the opportunity of reviewing it. If you have any questions on our comments, please call me.

Sincerely,

Thomas M. Stetson
Stetson Engineers Inc.

cc: Upper San Gabriel Valley
Municipal Water District

7. Upper San Gabriel Valley Municipal Water District (Stetson Engineers Inc.)

Comments noted and changes made in text to reflect comments.

Department of Water and Power the City of Los Angeles

TOM BRADLEY
Mayor

Commission
JACK W. LEENEY, *President*
WALTER A. ZELMAN, *Vice President*
RICK J. CARUSO
ANGEL M. ECHEVARRIA
CAROL WHEELER
JUDITH K. DAVISON, *Secretary*

PAUL H. LANE, *General Manager and Chief Engineer*
NORMAN E. NICHOLS, *Assistant General Manager - Power*
DUANE L. GEORGESON, *Assistant General Manager - Water*
NORMAN J. POWERS, *Chief Financial Officer*

June 17, 1985

Mr. Edward J. Thornhill
Water Conservation Coordinator
Metropolitan Water District
of Southern California
P.O. Box 54153
Los Angeles, California 90054

Dear Mr. Thornhill:

MWD Regional Urban Water Management Plan

This is to provide comment on the Draft Regional Urban Water Management Plan prepared by the Metropolitan Water District of Southern California.

The Los Angeles Department of Water and Power (DWP) commends the past efforts of Metropolitan to promote wise and efficient use of California's water resources. Metropolitan's water conservation activities have appropriately focused on those programs that are most efficiently accomplished at the regional level, rather than individually by the local agencies. We are pleased that the Draft Regional Plan calls for Metropolitan to continue and in many instances to increase these regional efforts.

Certainly one of the most important water management efforts Metropolitan has undertaken has been the Local Projects Program to provide funding and financing to local agencies for water reclamation and other alternative water supply projects. These projects are usually economically unsound at the local level when compared to the melded cost of supplemental water available to a local agency from Metropolitan. In certain instances, however, they may be economically sound at the regional level when compared to the marginal cost of developing new conventional water supplies. Continued support by Metropolitan for this program will ensure that these projects are developed where justified.

Metropolitan's water management activities in the field of landscape water conservation are exemplified by its work in coordinating the recently completed Turfgrass Study, which has provided important, previously unavailable information that will allow for the conservation of water through more efficient irrigation of turf grasses. Metropolitan is now continuing important work in this field with its coordination of the Turf Substitute Study, and through its funding support of the Residential Irrigation Pilot Project now being conducted by DWP. Studies such as these benefit the entire south coastal plain and in many instances the entire state, but are often beyond the funding capability of any one local agency. The Department of Water and Power looks forward to continuing efforts by Metropolitan to coordinate beneficial research projects such as these.

In the field of public information and school education, materials developed by Metropolitan are now in use by local agencies throughout the Metropolitan service area. Here again, the development of quality materials is often beyond the resources of most local agencies. Metropolitan's continuing efforts in this field will be of benefit to all the local water agencies. Also in this field, Metropolitan's water awareness media advertising campaigns, such as "Water Watch", can effectively utilize a south coastal media network that is generally far too expansive to be effectively utilized by any local agency. Here too, the Department of Water and Power looks forward to continuing efforts by Metropolitan.

The Draft Regional Plan prepared by Metropolitan appears to us to be a comprehensive presentation of Metropolitan's current and future water management activities. The Regional Plan will be of great assistance to us in preparing a required Plan for the City of Los Angeles, and we appreciate the initiative of Metropolitan in voluntarily preparing the Regional Plan.

Thank you for this opportunity to comment. If you have any questions, please contact Mr. Henry Venegas of my staff at (213) 481-6157.

Sincerely,

DUANE L. GEORGESON
Assistant General Manager - Water

cc: Mr. Henry Venegas

8. Department of Water and Power, The City of Los Angeles

Comments noted. No response necessary.

Oral Comments from Marilyn Stout
of the Northridge Civic Association
Presented at the Public Hearing on the
Draft Regional Urban Water Management Plan

Los Angeles, California
June 13, 1985

Good morning. How are you this morning? I went through your Table of Contents and found a hole immediately. You don't have enough information on pricing reform.

In the City of Los Angeles, a person who gets their water through a 1-inch pipe pays $300 to $500 an acre-foot for the water. A person who gets their water like Union Oil or Anhauser Busch who gets their water through a 6-inch pipe pays $249 or $257 an acre-foot for water. Up in the Central Valley, people get their water through big pipes, pay $4.64 an acre-foot, $7.50 an acre-foot, and $9.09 an acre-foot. Now, you're going to say that's very irrational--that perfectly good water should have so many different prices, and you would be absolutely right. That is irrational; and not only is it irrational, but it does not ration water very well. There is a hole in the bucket; and there is a hole in the money pocket; and where do you put your patch.

Now, the big authorities in the field--Hirshleifer, Dehaven, and Milliman--who wrote the book, called, "Water Supply: Economics, Technology, and Policy," recommended some changes and...they said that if we have an irrational water pricing policy the worse thing that can happen to us is that we can create a water shortage. And so they said the first reform we have to have is improved water pricing; and they say industrial users pay less than cost.

In Los Angeles and other large cities, large users of water are charged less than the cost of procuring and delivering a unit of water to them. Large water-using industries are not motivated by this low price to install water treating and recirculating equipment that would permit large reductions in their water use. As examples, depending on price, a steel mill may demand 1,400 or

---

Transcribed from Public Hearing tapes. Punctuation added.

65,000 gallons of water to produce a ton of finished steel. A steam power plant may use 1.3 to 170 gallons to produce a kilowatt-hour of electrical energy. They say irrigation water users pay less than cost. Irrigation agriculture typically pays low prices for water and uses huge quantities. In California, irrigators use 80% of the water and they pay such low prices.

In an arid region where water is costly to provide, a subsidy from taxpayers or from miscalculated water pricing encourages the big users to be wasteful and unconcerned with possible economies. A likely and unfortunate result is development of more water-intensive low-tax-base industries like irrigation agriculture. And they said that more economic analysis of proposed water projects is important.

When total water use begins to approach system capacity, public administrators should think of better ways to use existing supplies as an alternative to building expensive dams, ditches, aqueducts, and canals. Economic analysis of water projects should not be improved--too often intangible, secondary, or imaginary benefits chargeable to the taxpayer enter into benefit cost analysis. Water seems short because it's handled like a free commodity. The pricing is so irrational so they have this big emphasis on water pricing as the means for bringing about conservation. And then the next thing they said was purposeful reclamation of sewage water, stopping water loss by transpiration, stopping water loss by evaporation using the underground aquifers, and they said seawater conversion is over blown. It would be better to tow icebergs and desalt those.

But the truth of the matter is that the big emphasis is on water pricing to bring about conservation and under the circumstances--then when I looked at your report--I would like to commend you for doing it, especially since you were not suppose to do it; you did'nt have to. When I went down your Table of Contents and saw no emphasis on improved pricing and that, in fact, in that one little section where you mentioned pricing all you talked about was interruptible service which is just sort of an euphemism for really reducing prices more than is intelligent. That's all that is in there. So it makes

your report look a little bit like a bucket of smoke, considering that the big authorities in the field think that pricing improvement is the most important thing to do. And I would like to leave this with you, and suggest that you add some more things on water pricing its importance of it for all the member agencies to consider it. Thank you very much.

APPENDIX B

Water Code Chapter 1009, Statute 1983

(Assembly Bill 797)

Assembly Bill No. 797

CHAPTER 1009

An act to add and repeal Part 2.6 (commencing with Section 10610) to Division 6 of the Water Code, relating to water conservation.

[Approved by Governor September 21, 1983. Filed with Secretary of State September 22, 1983.]

LEGISLATIVE COUNSEL'S DIGEST

AB 797, Klehs. Water: management planning.

(1) Under existing law, local water suppliers may, but are not required to, adopt and enforce water conservation plans.

This bill would require 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 to prepare and adopt, in accordance with prescribed requirements, an urban water management plan containing prescribed elements. The bill would require the plan to be filed with the Department of Water Resources, and would require the department to annually prepare and submit to the Legislature a report summarizing the status of the plans. The bill would require each supplier to periodically review its plan in accordance with prescribed requirements, would specify requirements for actions or proceedings arising under the bill, and would specify related matters.

The bill would make legislative findings and declarations in this connection.

The provisions of the bill would remain in effect only until January 1, 1991.

(2) Article XIII B of the California Constitution and Sections 2231 and 2234 of the Revenue and Taxation Code require the state to reimburse local agencies and school districts for certain costs mandated by the state. Other provisions require the Department of Finance to review statutes disclaiming these costs and provide, in certain cases, for making claims to the State Board of Control for reimbursement.

This bill would impose a state-mandated local program as its requirements would be applicable to local public agencies.

However, the bill would provide that no appropriation is made and no reimbursement is required by this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. Part 2.6 (commencing with Section 10610) is added to Division 6 of the Water Code, to read:

PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. The Legislature finds and declares as follows:

(a) The waters of the state are a limited and renewable resource subject to ever increasing demands.

(b) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The conservation and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Conservation" means those measures that limit the amount of water used only to that which is reasonably necessary for the beneficial use to be served.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate reasonable and practical efficient uses and conservation activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for

implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 7 (commencing with Section 4010) of Part 1 of Division 5 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620. (a) Every urban water supplier serving water directly to customers shall, not later than December 31, 1985, prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier after December 31, 1984, shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water to customers may adopt an urban water management plan or participate in areawide, regional, watershed, or basinwide urban water management planning; provided, however, an urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

10621. Each urban water supplier shall periodically review its plan at least once every five years. After the review, it shall make any amendments or changes to its plan which are indicated by the review. Amendments or changes in its plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall include all of the following elements:

(a) Contain an estimate of past, current, and projected water use and, to the extent records are available, segregate those uses between residential, industrial, commercial, and governmental uses.

(b) Identify conservation measures currently adopted and being practiced.

(c) Describe alternative conservation measures, if any, which would improve the efficiency of water use with an evaluation of their costs and their environmental and other significant impacts.

(d) Provide a schedule of implementation for proposed actions as indicated by the plan.

(e) Describe the frequency and magnitude of supply deficiencies, including conditions of drought and emergency, and the ability to meet short-term deficiencies.

10632. In addition to the elements required pursuant to Section 10631, a plan projecting a future use which indicates a need for expanded or additional water supplies shall contain an evaluation of the following:

(a) Waste water reclamation.

(b) Exchanges or transfer of water on a short-term or long-term basis.

(c) Management of water system pressures and peak demands.

(d) Incentives to alter water use practices, including fixture and appliance retrofit programs.

(e) Public information and educational programs to promote wise use and eliminate waste.

(f) Changes in pricing, rate structures, and regulations.

10633. The plan shall contain an evaluation of the alternative water management practices identified in Sections 10631 and 10632, taking into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

Evaluation of the elements in Section 10632 shall include a comparison of the estimated cost of alternative water management practices with the incremental costs of expanded or additional water supplies, and in the course of the evaluation first consideration shall be given to water management practices, or combination of practices, which offer lower incremental costs than expanded or additional water supplies, considering all the preceding evaluation factors.

Article 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. (a) An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water conservation and management methods and techniques.

(b) In order to assist urban water suppliers in obtaining needed expertise as provided for in subdivision (a), the department, upon request of an urban water supplier, shall provide the supplier with a list of persons or agencies having expertise or experience in the development of water management plans.

10642. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. An urban water supplier shall file with the department a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department within 30 days after adoption.

The department shall annually prepare and submit to the Legislature a report summarizing the status of the plans adopted pursuant to this part.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part, or within 18 months after commencement of urban water service by a supplier commencing that service after January 1, 1984.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be

commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans prepared and adopted under this part. Nothing in this part shall be interpreted as exempting projects for implementation of the plan or for expanded or additional water supplies from the provisions of the California Environmental Quality Act.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board in obtaining that information. The requirements of this part shall be satisfied by any water conservation plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing water management or conservation plan which includes the contents of a plan required under this part.

10654. All costs incurred by an urban water supplier in developing or implementing its plan shall be borne by it unless otherwise provided for by statute.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. This part shall remain in effect only until January 1, 1991, and as of that date is repealed, unless a later enacted statute, which is chaptered before January 1, 1991, deletes or extends that date.

SEC. 2. No appropriation is made and no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution or Section 2231 or 2234 of the Revenue and Taxation Code because the local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act.

O