THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

REGIONAL URBAN WATER MANAGEMENT PLAN

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DWR Checklist

Coordination with Appropriate Agencies
(Water Code § 10620 (d)(1)(2))

Participated in area, regional, watershed or basin wide plan

See Section II, especially pages II-1 to II-3

Describe the coordination of the plan preparation and anticipated benefits.

See Section II, especially pages II-1 to II-3

Describe resource maximization / import minimization plan
(Water Code §10620 (f))

Describe how water management tools / options maximize resources & minimize need to import water

The IRP discussion in Section II provides an overview of this approach. See pages II-1 through II-5. Further details are provided in Sections III-2 (conservation, pages III-7 through III-24) and III-3 (recycling, groundwater recovery and desalination, pages III-25 through III-39)

City and County Notification and Participation
(Water Code § 10621(b))

Notify any city or county within service area of UWMP of plan review & revision

Consult and obtain comments from cities and counties within service area

Page A.4-2 and beginning on page II-33.

Service Area Information
(Water Code § 10631 (a))

Include current and projected population

Population analysis discussed in Appendix 1, page A.1-3. Projections are on page A.1-10, Table A.1-2.

Population projections were based on data from state, regional or local agency

See footnote Table A.1-2, page A.1-10

Describe climate characteristics that affect water management

Page I-13 through I-15

Describe other demographic factors affecting water management

Page I-12

Water Sources
(Water Code § 10631 (b))

Identify existing and planned water supply sources

Provide current water supply quantities

Provide planned water supply quantities

Historic and current water supplies are described in Appendix A.2. Planned water supplies are discussed in Section II, and details are provided in Appendix A.3, and particulary inTable 3-7, pages A.3-40 through A.3-54

If Groundwater identified as existing or planned source
(Water Code §10631 (b)(1-4))

Metropolitan does not supply groundwater. However, Metropolitan does use groundwater basins for groundwater banking. See Chapter III-4 for a discussion of issues related to groundwater basins.

Reliability of Supply
(Water Code §10631 (c) (1-3)

Describes the reliability of the water supply and vulnerability to seasonal or climatic shortage

Section II, pages II-11 though II-15 and the "Issues" discussions of Sections III-5 and III-7.

Basis of Water Year data

Section II, pages II-11 though II-15

Water Sources Not Available on a Consistent Basis
(Water Code §10631 (c))

Describe the reliability of the water supply due to seasonal or climatic shortages

Describe the vulnerability of the water supply to seasonal or climatic shortages

Section II and the "Issues" discussion at the beginning of Sections III-5 and III-7.

Describe plans to supplement or replace inconsistent sources with alternative sources or DMMs

Sections II and III.

Transfer or Exchange Opportunities
(Water Code §10631 (d))

Describe short term and long term exchange or transfer opportunities

Section III-4 (pages III-40 through III-46) describes plans for banking, exchange and transfer opportunities within the local region.

Section III-5 (pages III-47 through III-57) describes plans for banking, exchange and transfer opportunities within the State Water Project.

Section III-6 (pages III-58 through III-62) describes plans for banking, exchange and transfer opportunities within the Central Valley.

Section III-7 (pages III-63 through III-68) describes plans for banking, exchange and transfer opportunities along the Colorado River and Aqueduct.

Further details including dry year supply projections are provided in Appendix 3, particularly Table A.3.7 on pages A.3-42 through A.3-56.

Water Use Provisions
(Water Code §10631 (e)(1)(2))

Quantify past water use by sector

Quantify current water use by sector

Project future water use by sector

Past, current and future water uses are shown in Table A.1-14 on page A.1-16. Water uses by sector and county are shown in Tables A.1-6 through A.1-11 on pages a.1-12 through A.1-14.

Identify and quantify sales to other agencies

Historic sales are presented in Table A.2-2 on page A.2-3. Metropolitan does not project sales by individual agency. However, total projected sales to other agencies are shown in Section II.

2005 Urban Water Management Plan "Review of DMMs for Completeness" Form
(Water Code §10631 (f)

See CUWCC filings in Attached Documents

Planned Water Supply Projects and Programs, including non-implemented DMMs
(Water Code §10631 (g))

See discussion on the conservation credits program (page III-9) and implementation approach, pages III-7 through III-18.

Planned Water Supply Projects and Programs
(Water Code §10631 (h))

Detailed description of expected future supply projects & programs
Timeline for each proposed project
Quantification of each projects normal yield (AFY)
Quantification of each projects single dry-year yield (AFY)
Quantification of each projects multiple dry-year yield (AFY)

Section III-4 (pages III-40 through III-46) describes plans for future supply projects and programs within the local region.

Section III-5 (pages III-47 through III-57) describes plans for future supply projects and programs within the State Water Project.

Section III-6 (pages III-58 through III-62) describes plans for future supply projects and programs within the Central Valley.

Section III-7 (pages III-63 through III-68) describes plans for future supply projects and programs along the Colorado River and Aqueduct.

Further details including normal, single dry year and multiple dry year supply projections are provided in Appendix 3, particularly Table A.3.7 on pages A.3-42 through A.3-56.

Opportunities for development of desalinated water
(Water Code §10631 (i))

Describes opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply

See pages III-33 and III-34

District is a CUWCC signatory
(Water Code § 10631 (j))

Agency is a CUWCC member
2003-04 annual updates are attached to plan
Both annual updates are considered completed by CUWCC website

See Section III.2 and attached documents

If Supplier receives or projects receiving water from a wholesale supplier
(Water Code § 10631 (k))

Provided written water availability projections, by source, to member agencies

See pages II-33 & II-34 plus Appendix A.3-43 through A.3-57

Water Shortage Contingency Plan Section
(Water Code § 10632)
Stages of Action
(Water Code § 10632 (a))

Provide stages of action
Provide the water supply conditions for each stage
Includes plan for 50 percent supply shortage

See Section II, pages II-15 through II-17

Three-Year Minimum Water Supply
(Water Code §10632 (b))

Identifies driest 3-year period

Minimum water supply available by source for the next three years

See Table A.3-8. Metropolitan has also projected multiple dry year periods for years ending in "0" or "5". Its planning for multiple dry years is based on the three years of shortest supplies (1990-1992 hydrology).

Preparation for catastrophic water supply interruption
(Water Code §10632 (c))

Provided catastrophic supply interruption plan

Regional power outage

Earthquake

Delta levee failure

Aqueduct failure

See Section II, pages II-11 through II-21

Prohibitions
(Water Code § 10632 (d))

List the mandatory prohibitions against specific water use practices during water shortages

Not applicable

Consumption Reduction Methods
(Water Code § 10632 (e))

List the consumption reduction methods the water supplier will use to reduce water use in the most restrictive stages with up to a 50% reduction.

See Section II, especially page II-18

Penalties
(Water Code § 10632 (f))

List excessive use penalties or charges for excessive use

See Section II, pages II-17 through II-20.

Revenue and Expenditure Impacts
(Water Code § 10632 (g))

Describe how actions and conditions impact revenues

Describe how actions and conditions impact expenditures

Describe measures to overcome the revenue and expenditure impacts

See Section II, page II-25.

Water Shortage Contingency Ordinance/Resolution
(Water Code § 10632 (h))

Attach a copy of the draft water shortage contingency resolution or ordinance.

Not applicable to Metropolitan. The WSDM plan adopted to deal with shortages is discussed in Section II, pages II-15 and II-16

Reduction Measuring Mechanism
(Water Code § 10632 (i))

Provided mechanisms for determining actual reductions

Metropolitan's water sales are metered (Section II)

Recycling Plan Agency Coordination

Water Code § 10633

Describe the coordination of the recycling plan preparation information to the extent available..

See Section III-3, pages III-25 through III-39.

Wastewater System Description

(Water Code § 10633 (a))

Describe the wastewater collection and treatment systems in the supplier's service area

Quantify the volume of wastewater collected and treated

Page III-26

Wastewater Disposal and Recycled Water Uses

(Water Code § 10633 (a - d))

Describes methods of wastewater disposal

Page III-26

Describe the current type, place and use of recycled water

Page III-28

Describe and quantify potential uses of recycled water

Page III-28

Determination of technical and economic feasibility of serving the potential uses

Pages III-29 through III-32

Projected Uses of Recycled Water

(Water Code § 10633 (e))

Projected use of recycled water, 20 years

Table III-12, page III-25.

Compare UWMP 2000 projections with UWMP 2005 actual

See Issues, page III-26

Plan to Optimize Use of Recycled Water

(Water Code § 10633 (f))

Describe actions that might be taken to encourage recycled water uses

Describe projected results of these actions in terms of acre-feet of recycled water used per year

Provide a recycled water use optimization plan which includes actions to facilitate the use of recycled water (dual distribution systems, promote recirculating uses)

See Section III-3, Recycling, Groundwater Recovery and Desalination, particularly pages 34 through 39.

Water quality impacts on availability of supply

(Water Code §10634)

Discusses water quality impacts (by source) upon water management strategies and supply reliability

See Section IV, Water Quality, pages IV-1 through IV-17

Supply and Demand Comparison to 20 Years

(Water Code § 10635 (a))

Compare the projected normal water supply to projected normal water use over the next 20 years, in 5-year increments.

See Section II and Table A.3-7 in Appendix A.3 (pages A.3-42 through A.3-56).

Supply and Demand Comparison: Single-dry Year Scenario

(Water Code § 10635 (a))

Compare the projected single-dry year water supply to projected single-dry year water use over the next 20 years, in 5-year increments.

See Section II and Table A.3-7 in Appendix A.3 (pages A.3-42 through A.3-56).

Supply and Demand Comparison: Multiple-dry Year Scenario

(Water Code § 10635 (a))

Project a multiple-dry year period occurring between 2006-2010 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2011-2015 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2016-2020 and compare projected supply and demand during those years

Project a multiple-dry year period occurring between 2021-2025 and compare projected supply and demand during those years

Metropolitan has projected multiple dry year periods for years ending in "0" or "5". Its planning for multiple dry years is based on the three years of shortest supplies (1990-1992 hydrology). The results presented in Section II for multiple dry years are for an average of three years with this extreme hydrology. Thus the results presented for 2010 can be considered representative of results for 2008, 2009 and 2010. See Table A.3-7 on p. A.3-42 through A.3-56, and particularly Table A.3-8 on p. A.3-57.

Review of implementation of 2000 UWMP

(Water Code § 10643)

Metropolitan has conducted a review of its planning progress through the IRP Update, discussed in Section II. In addition, in each section Metropolitan has included a "Progress to Date" that discusses progress towards its planning goals, and "Issues" section that discusses potential problems with continued implementation of the plan.

DMM Programs

Metropolitan is a member of CUWCC, and has submitted its recent DMM reports to the CUWCC to comply with the UWMP requirements. In addition, Metropolitan has discussed its conservation plan and approach in Section III-2. Individual conservation programs are discussed on pp. III-7 through III-18.

I. INTRODUCTION TO THIS DOCUMENT AND THE AGENCY

1.1 Introduction To This Document

Urban Water Management Planning Act

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

- Detailed evaluation of the supplies necessary to meet demands over at least a 20-year period in a single year and multi-year drought and average year conditions,
- Documentation of the stages of actions it would undertake to address up to 50% reduction in its water supplies,
- Description of the actions to be undertaken in the event of a catastrophic interruption in water supplies, and
- Evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

Changes in the Act Since 2000

Since its passage in 1983, several amendments have been added to the Act, the most recent coming in 2004**.** Some of the amendments provided for additional emphasis on metering, drought contingency planning, and water recycling. The following is a summary of the significant changes in the Act that have occurred from 2000 to the present:

- New legislative findings concerning water quality (Water Code § 10610.2, subds. (a)(4) – (a)(9), (b));
- A new requirement to describe water management tools that maximize local resources and minimize imported water supplies (§ 10620, subd. (f));
- A new requirement to notify all cities and counties within the service area where a plan or plan amendment is being prepared (§ 10620, subd. (b));
- A new requirement for additional information on groundwater where groundwater is identified as an existing or planned water source (§ 10631, subd. (b));
- Revised listing of water demand management measures to be described (CUWCC members may still elect to submit their conservation annual reports to meet this requirement) (§ 10631, subd. (f)(1));

- A new requirement to describe specific water supply projects and implementation schedules to meet projected demands over the 20-year planning horizon (§ 10631, subd. (h));
- A new requirement for data sharing between contracting water suppliers (i.e., wholesale, intermediate, and retail agencies) and a provision allowing suppliers to rely on information provided by a wholesale agency (§ 10631, subd. (j));
- A new provision allowing DWR to consider a water supplier's achievements and implementation plans for water conservation when evaluating applications for grants and loans (§ 10631.5);
- A new requirement to describe quantities of recycled water (§ 10633, subds. (b), (g));
- A new requirement to describe water quality over the 20-year planning horizon (§ 10634);
- A new requirement to notify all cities and counties within the service area of the time and place of the public hearing on plan adoption (§ 10642);
- A new requirement to file the plan or plan amendment with all cities and counties within the service area (§ 10644, subd. (a));
- For a water supplier that does not comply with the Act, a new requirement that DWR make that supplier ineligible to receive Prop 204 or Prop 13 funding (§ 10656); and
- A new provision allowing DWR to consider a water supplier's compliance with the plan requirements in determining the eligibility of receiving any funds from DWR-administered programs (§ 10657).

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

Senate Bills 610 and 221 of 2001

In addition to the changes to the Act, the state legislature passed two bills in 2001 that amended state law to require that counties and cities consider information relating to the availability of water to supply certain new large proposed development. For these development projects to receive public approval, this water supply information must be included in the administrative record. SB 610 affects projects that are subject to the California Environmental Quality Act, and it requires that water agencies provide specific information to local governments for use in environmental documents. SB 221 requires that city or county approval of certain residential subdivisions include written verification that sufficient water supply is available to serve that subdivision.

Both SB 610 and 221 identify adopted Urban Water Management Plans (UWMP) as a source document that may be used to fulfill these legislative requirements. To assist local agencies in meeting these requirements, Metropolitan has extended its planning timeframe for its Regional Urban Water Management Plan (RUWMP) out through 2030. This change ensures that the Metropolitan's 2005 RUWMP may be used as a source document for meeting the requirements of SB 610 and 221 until the next scheduled update is completed in 2010. In addition, the RUWMP includes a "Justification For Supplies" appendix that details the planning, legal, financial, and regulatory basis for including each source of supply in the plan. The full text of

these bills can be found at
http://www.groundwater.water.ca.gov/water_laws/index.cfm#otherleg.

Metropolitan's Responsibilities Under This Legislation

As with Metropolitan's previous plans, this plan does not explicitly discuss specific activities undertaken by member agencies unless they relate to one of Metropolitan's water demand or supply management programs. Presumably, each member agency will discuss these activities in its Urban Water Management Plan. Information from this Plan will likely be used by many of the local water suppliers in the preparation of their own plans, but elements of this Plan do not necessarily have to be adopted by the urban water suppliers or the public agencies directly providing retail water because participation in any regional planning activity is voluntary (pursuant to Water Code Section 10620). By law, an urban water supplier that provides water *indirectly* (such as Metropolitan) may not include planning elements in its water management plan that would be applicable to agencies that provide water *directly,* without the consent of those agencies.

DWR Guidance

DWR has provided guidance materials to aid water districts in developing their 2005 urban water management plans. These materials simultaneously help water districts comply with the law and help DWR staff review submitted plans for regulatory compliance. The guidance materials consist of a series of worksheets detailing acceptable responses to the requirements set forth in the Urban Water Management Planning Act. DWR also provides a checklist for cross-referencing sections of the respondent water agency's Plan with the relevant sections of the water code to be sure that it addresses all relevant provisions of the Urban Water Management Planning Act. DWR provides two versions of the checklist, one organized by water code section and the other by subject. Metropolitan has used these materials in the development of this plan; the checklist, organized by water code section, appears after the List of Tables at the beginning of this document.

Organization of this Document

This document contains five sections. The first section is this Introduction. The second describes the planning efforts that Metropolitan has undertaken to ensure appropriate management of the region's water supplies. The third describes the actions Metropolitan has taken to implement these plans. The fourth addresses the issue of water quality. The fifth section contains appendices, including the justifications for supply projections.

I.2 The Metropolitan Water District Of Southern California

Formation and Purpose

The Metropolitan Water District of Southern California (Metropolitan) is a public agency organized in 1928 by a vote of the electorates of 13 Southern California cities. The agency was enabled by the adoption of the original Metropolitan Water District Act (Metropolitan Act) by the California Legislature "for the purpose of developing, storing, and distributing water" to the residents of Southern California. The Metropolitan Act also allows Metropolitan to sell additional water, if available, for other beneficial uses. In 1992, the Metropolitan Board of Directors adopted the following mission statement: "to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way."

The first function of Metropolitan was building the Colorado River Aqueduct to convey water from the Colorado River. Deliveries through the aqueduct began in the early 1940s and supplemented the local water supplies of the original Southern California member cities. In 1960, to meet growing water demands in its service area, Metropolitan contracted for additional water supplies from the State Water Project (SWP) via the California Aqueduct, which is owned and operated by the State of California Department of Water Resources (DWR). SWP deliveries began in 1972. Metropolitan currently receives imported water from both of these sources: (1) the Colorado River water via the Colorado River Aqueduct and (2) the State Water Project

Service Area

Metropolitan's service area covers the Southern California coastal plain. It extends about 200 miles along the Pacific Ocean from the city of Oxnard on the north to the international boundary with Mexico border on the south, and it reaches as far as 70 miles inland from the coast (Figure I-1). The total area served is nearly 5,200 square miles, and it includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Table I-1 shows that although only 13 percent of the land area of the 6 Southern California counties is within Metropolitan's service area, nearly 90 percent of the populations of those counties reside within Metropolitan's boundaries.

Member Agencies

Metropolitan is currently composed of 26 member agencies, including 14 cities, 11 municipal water districts, and one county water authority. Metropolitan's member agencies serve residents in 152 cities and 89 unincorporated communities. Table 1-2 shows the member agencies of Metropolitan, as well as the cities and communities served by those member agencies. Figure I-1 also shows the geographical area served by the member agencies.

Currently, member agencies receive water from Metropolitan at various delivery points, and they pay for service through a rate structure made up of multiple components. The majority of these components consist of uniform volumetric rates, and the majority of the revenue is collected through a tiered volumetric supply charge. The second tier of this rate is set at the cost of developing new supplies.

Table I-1
January 1, 2005 Area And Population In The
Six Counties Of Metropolitan's Service Area

County	Total County	In MWD Service Area	*Percent In MWD*
Land Area (Square Miles)			
Los Angeles	4,061	*1,408*	*35*
Orange	789	*699*	*89*
Riverside	7,208	*1,057*	*15*
San Bernardino	20,052	*242*	*1*
San Diego	4,200	*1,420*	*33*
Ventura	1,845	*365*	*20*
Total	**38,155**	***5,178***	***13***
Population (Thousands)			
Los Angeles	10,227	*9,392*	*92*
Orange	3,057	*3,057*	*100*
Riverside	1,887	*1,358*	*72*
San Bernardino	1,946	*797*	*41*
San Diego	3,051	*2,951*	*97*
Ventura	813	*588*	*72*
Total	**20,971**	***18,143***	***87***

Source: California Department of Finance, California Statistical Abstract, and Metropolitan-developed statistics.

To aid in planning future water needs, member agencies advise the Chief Executive Officer/ General Manager annually (in April of each year) of how much water they anticipate they will need during the next five years. In addition, Metropolitan works with its member agencies to forecast future water demands.

Metropolitan is a water wholesaler with no retail customers. It provides treated and untreated water directly to its member agencies. Metropolitan's 26 member agencies deliver to their customers a combination of local groundwater, local surface water, recycled water, and imported water purchased from Metropolitan. For some member agencies, Metropolitan supplies all the water used within that agency's service area, while others obtain varying amounts of water from Metropolitan to supplement local supplies. The district has provided between 45 and 60 percent of the municipal, industrial, and agricultural water used in its service area.

TABLE I-2
Member Agencies

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Municipal Water Districts (11)		Member Cities (14)			County Water Authorities (1)
Calleguas	Orange County	Anaheim	Glendale	San Marino	San Diego
Central Basin	Three Valleys	Beverly Hills	Long Beach	Santa Ana	
Foothill	Upper San Gabriel Valley	Burbank	Los Angeles	Santa Monica	
Inland Empire	West Basin	Compton	Pasadena	Torrance	
Eastern	Western	Fullerton	San Fernando		
Las Virgenes					

Cities Within Member Agencies

Calleguas MWD
- Camarillo
- Camarillo Heights*
- Fairview*
- Las Posas Valley*
- Moorpark
- Oak Park*
- Oxnard
- Port Hueneme (annexed)
- Santa Rosa Valley*
- Simi Valley
- Thousand Oaks

Central Basin MWD
- Artesia
- Bell
- Bellflower
- Cerritos
- Commerce
- Cudahy
- Downey
- East Compton*
- East La Mirada*
- East Los Angeles*
- Florence*
- Graham*
- Hawaiian Gardens
- Huntington Gardens*
- Huntington Park
- La Habra Heights
- Lakewood
- Los Nietos*
- La Mirada
- Lynwood
- Maywood
- Montebello
- Norwalk
- Paramount
- Pico Rivera
- Santa Fe Springs
- Signal Hill
- South Gate
- South Whittier*
- Vernon
- Walnut Park*
- West Compton*
- West Whittier*
- Whittier
- Willowbrook*

Foothill MWD
- Altadena*
- La Canada-Flintridge
- La Crescenta*
- Montrose*

Inland Empire
- Chino
- Chino Hills
- Fontana
- Monclair
- Ontario
- Rancho Cucamonga
- Upland

Eastern MWD
- East Hemet*
- Good Hope*
- Hemet
- Homeland*
- Lakeview-Nuevo*
- Mead Valley*
- Moreno Valley
- Murrieta Hot Springs*
- Perris
- Quail Valley*
- Romoland*
- San Jacinto
- Sun City*
- Sunnymead*
- Temecula
- Valle Vista*
- Winchester*

Las Virgenes MWD
- Agoura Hills
- Calabasas
- Chatsworth Lake Manor*
- Hidden Hills
- Malibu Lake*
- Monte Nido*
- Westlake Village

MWD of Orange County
- Aliso Viejo
- Brea
- Buena Park
- Capistrano Beach*
- Corona del Mar*
- Costa Mesa
- Cypress
- Dana Point
- El Toro*
- Fountain Valley
- Garden Grove
- Huntington Beach
- Irvine
- Lake Forest
- Laguna Beach
- Laguna Hills
- Laguna Niguel
- Laguna Woods
- La Habra
- La Palma
- Los Alamitos
- Mission Viejo
- Newport Beach
- Orange
- Placentia
- Rancho Santa Margarita
- Rossmoor*
- San Clemente
- San Juan Capistrano
- Seal Beach
- South Laguna*
- Stanton
- Tustin
- Tustin Foothills*
- Villa Park
- Westminster
- Yorba Linda

Three Valleys MWD
- Charter Oak*
- Claremont
- Covina Knolls*
- Diamond Bar
- Glendora
- Industry
- La Verne
- Pomona
- Rowland Heights*
- San Dimas
- So. San Jose Hills*
- Walnut

Upper San Gabriel Valley MWD
- Arcadia
- Avocado Heights*
- Baldwin Park
- Bradbury
- Citrus*
- Covina
- Duarte
- El Monte
- Hacienda Heights*
- Irwindale
- La Puente
- Mayflower Village*
- Monrovia
- Rosemead
- San Gabriel*
- South El Monte
- South Pasadena
- San Gabriel
- Temple City
- Valinda*
- West Covina
- West Puente Village*

West Basin MWD
- Alondra Park*
- Angeles Mesa*
- Carson
- Culver City
- Del Aire*
- El Nido-Clifton*
- El Segundo
- Gardena
- Hawthorne
- Hermosa Beach
- Inglewood
- Ladera Heights*
- Lawndale
- Lennox*
- Lomita
- Malibu
- Manhattan Beach
- Marina del Rey*
- Palos Verdes Estates
- Point Dume*
- Rancho Palos Verdes
- Redondo Beach
- Rolling Hills

West Basin MWD (cont.)
- Rolling Hills Estates
- Ross Sexton*
- Topanga Canyon*
- Victor*
- View Park*
- West Athens*
- West Carson*
- West Hollywood
- Westmost*
- Windsor Hills*
- National Military Home*
- Wiseburn*

Western MWD of Riverside County
- Bedford Heights*
- Corona
- Eagle Valley*
- El Sobrante*
- Green River*
- Lake Elsinore
- March AFB*
- Murrieta
- Norco
- Riverside
- Temescal
- Woodcrest*

San Diego CWA
- Alpine*
- Bonita*
- Camp Pendleton*
- Carlsbad
- Casa De Oro*
- Castle Park*
- Chula Vista
- Del Mar
- El Cajon
- Encinitas
- Escondido
- Fallbrook*
- Imperial Beach
- Lakeside*
- La Mesa
- Lemon Grove
- Mount Helix*
- National City
- Oceanside
- Otay*
- Poway
- Rainbow*
- Ramona*
- Rancho Santa Fe*
- San Diego
- San Marcos
- Santee
- Solana Beach
- Spring Valley*
- Valley Center*
- Vista

* Denotes unincorporated areas

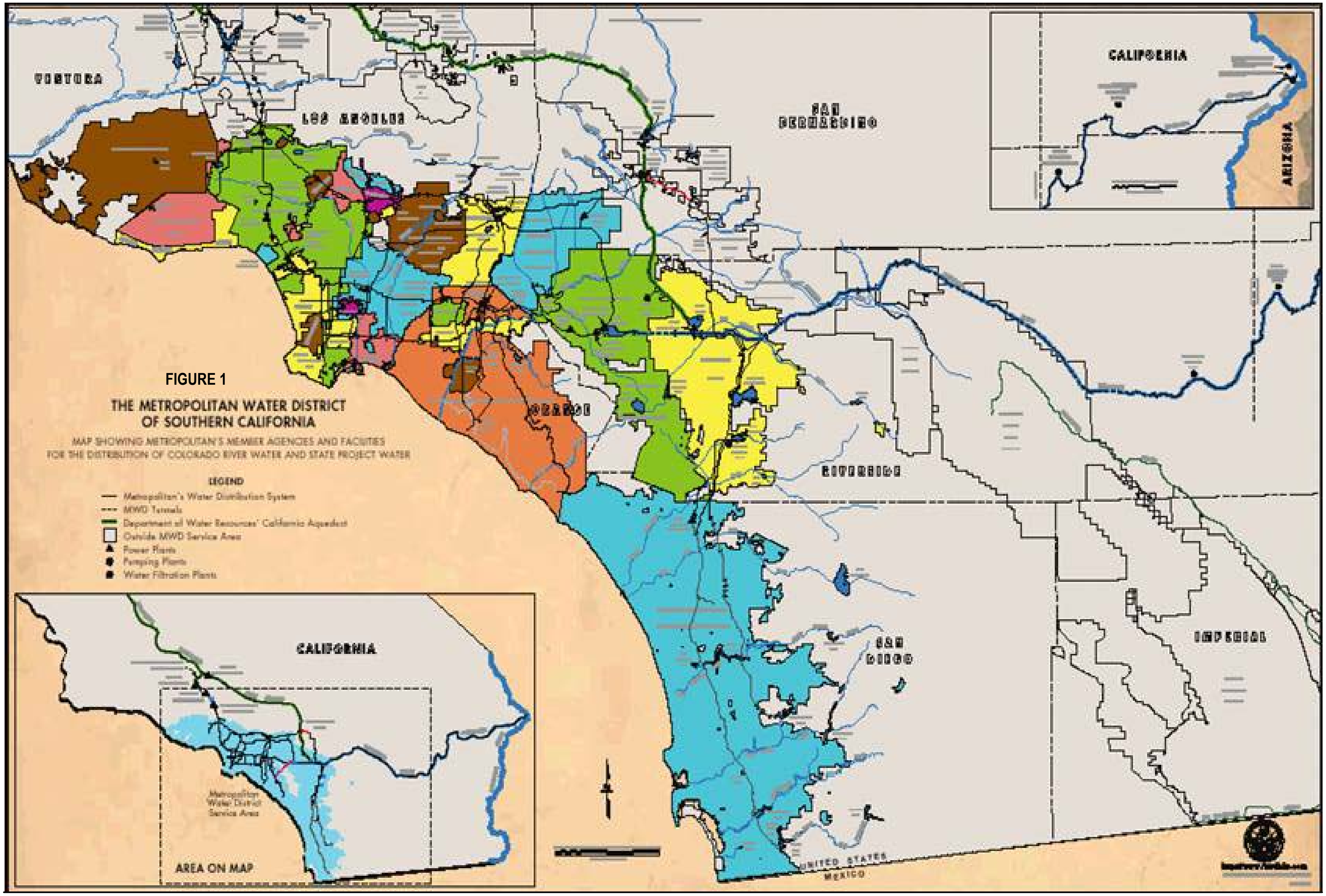


FIGURE 1

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

The remaining water supply comes from local wells, local surface water, recycling, and from the city of Los Angeles' aqueduct from the eastern Sierra Nevada. In 2003, the San Diego County Water Authority began receiving of water transfers from the Imperial Irrigation District that are delivered by an exchange of water supplies with Metropolitan.

Some member agencies provide retail water service, while others provide water to the local area as wholesalers. As shown in Table I-3, 15 member agencies provide retail service to customers, 9 provide only wholesale service, and 2 provide a combination of both. Throughout Metropolitan's service area, approximately 250 retail water supply agencies directly serve the population.

Board of Directors and Management Team

Metropolitan's Board of Directors currently consists of 37 directors. The Board consists of at least one representative from each member agency, with each agency's assessed valuation determining its additional representation and voting rights. Metropolitan does not compensate directors for their service.

The Board administers its policies through the Metropolitan Water District Administrative Code (Administrative Code), which the Board adopted in 1977. Periodically, the Board amends the Administrative Code to reflect new policies or changes in existing policies. The policies established by the Board are subject to all applicable laws and regulations. The management of Metropolitan is under the direction of its Chief Executive Officer/General Manager, who serves at the discretion of the Board, as do Metropolitan's General Auditor, General Counsel and Ethics Officer.

Table I-3
Type Of Water Service Provided
By Metropolitan's Member Agencies

Member Agency	Retail or Wholesale
Los Angeles County	
Beverly Hills	Retail
Burbank	Retail
Central Basin MWD	Wholesale
Compton	Retail
Foothill MWD	Wholesale
Glendale	Retail
Las Virgenes MWD	Retail
Long Beach	Retail
Los Angeles	Retail
Pasadena	Retail
San Fernando	Retail
San Marino	Retail
Santa Monica	Retail
Three Valleys MWD	Wholesale
Torrance	Retail
Upper San Gabriel MWD	Wholesale
West Basin MWD	Wholesale
Orange County	
Anaheim	Retail
Fullerton	Retail
MWD of Orange County	Wholesale
Santa Ana	Retail
Riverside	
Eastern MWD	Retail & Wholesale
Western MWD	Retail & Wholesale
San Bernardino County	
Inland Empire Utilities Agency	Wholesale
Ventura County	
Calleguas MWD	Wholesale
San Diego County	
San Diego County Water Authority	Wholesale

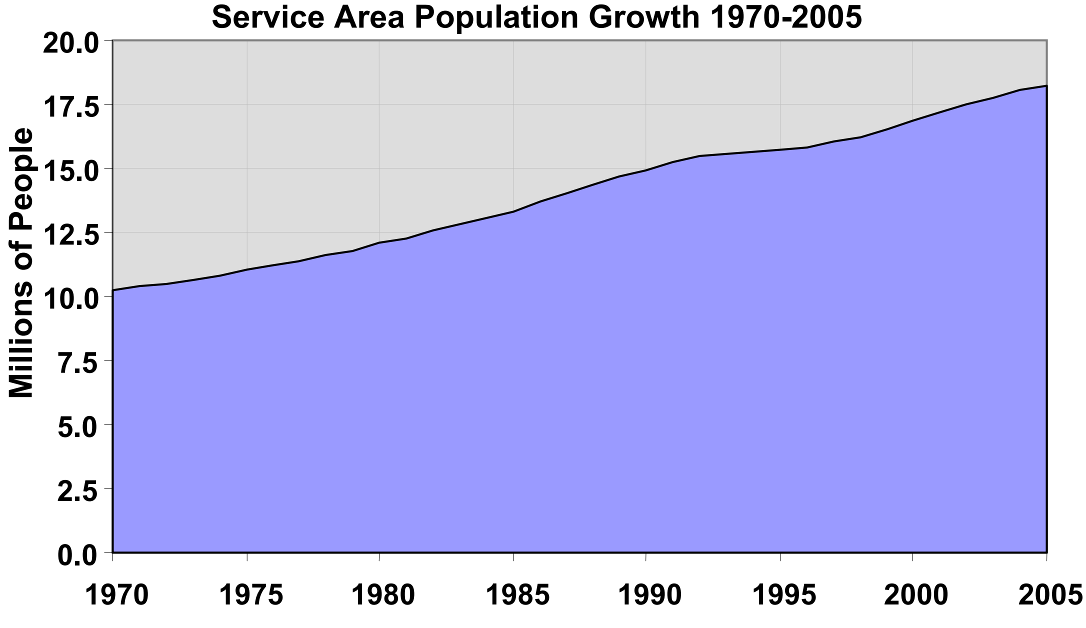
I.3 Regional Historical Information

Population

In 1990, the population of Metropolitan's service area was approximately 14.8 million people. By 2005, it had grown to 18.1 million, which represents about 50 percent of the state's population. In the past, annual growth has varied from about 200,000 annually in the 1970s and early-to-mid-1980s to more than 300,000 annually in the late 1980s. Population growth slowed during the early 1990s to just over 50,000 in 1995, before again rising to more than 300,000 per year in the period 1999 through 2002. Growth has continued at just under 300,000 since that time. Figure I-2 shows the current, historic and projected changes in population.

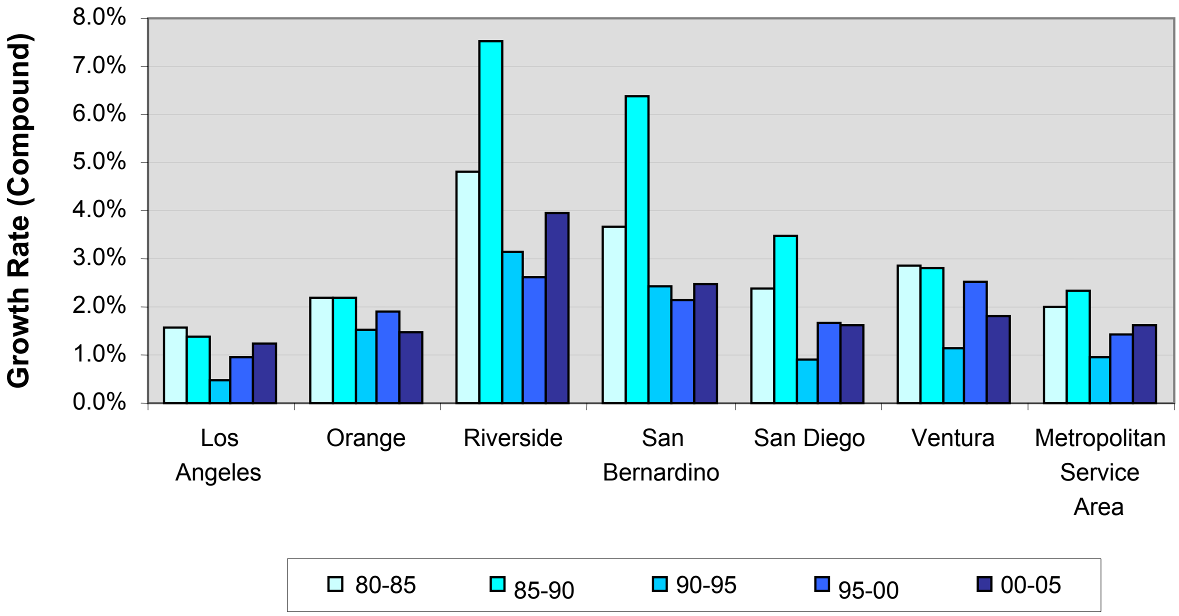
The most populated cities within Metropolitan's service area are Los Angeles (largest city in the state), San Diego (second largest in the state), Long Beach, Anaheim, Santa Ana and Riverside. Between 2000 and 2003 the largest population increases occurred in the city of Los Angeles and in the service area of the San Diego County Water Authority. However, the over-563,000-person increase in population estimated for Los Angeles County over the most recent five-year time period only represents a 1.6% average annual population growth rate, as shown in Figure I-3. In Riverside County, the average annual population grew at a rate of nearly 4.0%, making it the area with the fastest rate of growth within Metropolitan's service area between the years 2000 and 2005.

Figure I-2
Service Area Population Growth 1970-2005



Source: US Census, California Department of Finance, SCAG and SANDAG

Figure I-3
Average Annual Population Growth Rates by Served County



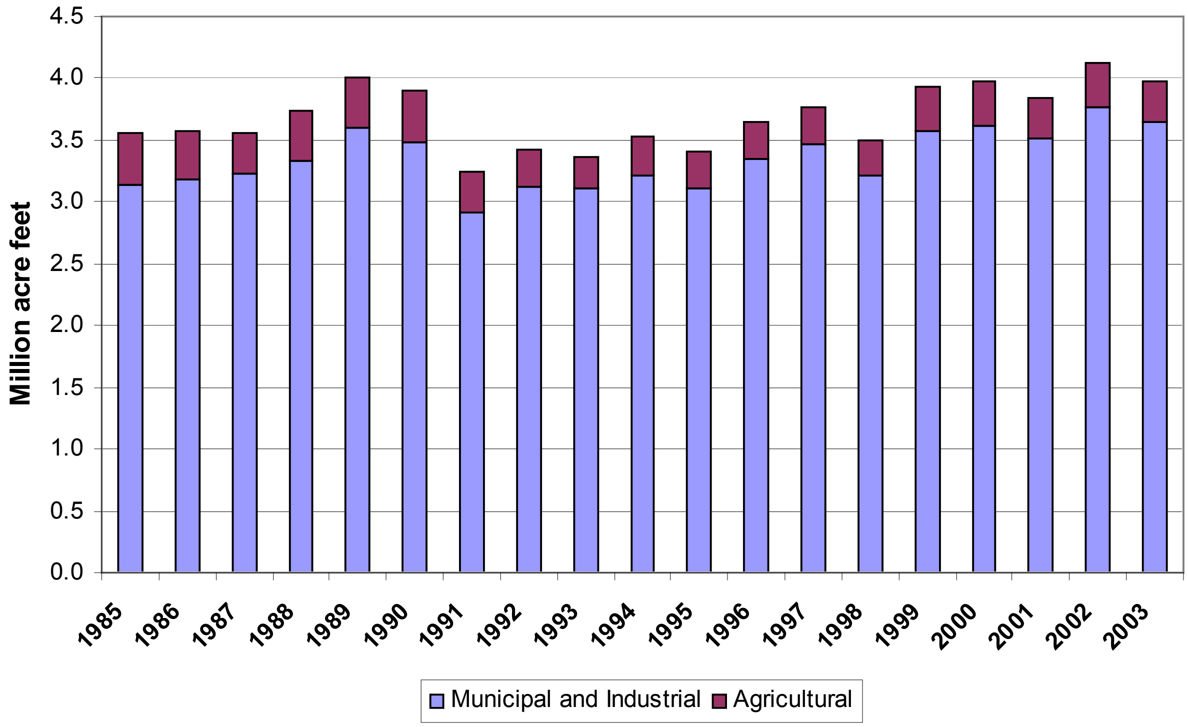
Source: US Census, California Department of Finance, SCAG and SANDAG

Historical Retail Water Demands

Figure I-4 presents historical retail water demands on a calendar year basis in Metropolitan's service area. Since 1980, retail water demands varied from 3.0 million acre feet (maf) in 1983 to 4 maf in 1989. Due to the economic recession, drought impacts, and conservation, water use declined to 3.3 maf in 1991. Demand remained below the 1989 peak level as a result of continuing effects from the recession and the drought coupled with a number of wet years and ongoing conservation efforts. In 2002, retail demands reached an estimated 4.2 maf, approaching the earlier peak level for the first time in the decade.

Of the 4.1 maf projected to be used in 2005, 3.8 maf (92 percent) are estimated to be used for municipal and industrial purposes (M&I), and 0.3 maf (8 percent) for agricultural purposes. The relative share of M&I water use to total water use has been increasing over time as agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 14 percent in 1980, 11 percent in 1990 and 8 percent in 2003.

Figure I-4
Retail Demand In Metropolitan's Service Area



Per Capita Water Use

Per capita water use does not express the amount of water actually used by an individual, because it includes all categories of urban water use, including residential, commercial, industrial, fire fighting and other. Furthermore, per capita water use is not a good measure of water use efficiency. Per capita water use can be a useful measure of how water use within a particular region is changing over time. Figure I-5 shows the change in per capita water use within Metropolitan's service territory. This shows that per capita water use fell from a high of 219 gallons per capita per day (gpcd) in 1989 to a low of 171 gpcd in 1991, at the time of water-use restrictions. Since that time, per capita use has varied between 176 and 193 gpcd, which is well below the pre-drought levels. Much of the year-to-year variation results from local precipitation.

A number of factors affect per capita water use in a particular location, including the relative share of residential versus nonresidential water use in an area, the number and type of housing units, the number of employees, the types of businesses, persons per household, lot sizes, income levels, and climate. Table I-4 shows per capita water use by county within Metropolitan's service area. Water use varies widely between counties. In Southern California, many of the differences in per capita water use among the counties can be attributed to climate differences. Within Metropolitan's service area, the inland counties of Riverside and San Bernardino account for the greatest levels of M&I per capita water use, and the coastal plain counties – Los Angeles, Orange, San Diego, and Ventura – have lower M&I per capita water use.

Figure I-5
Per Capita Water Use in Metropolitan's Service Territory

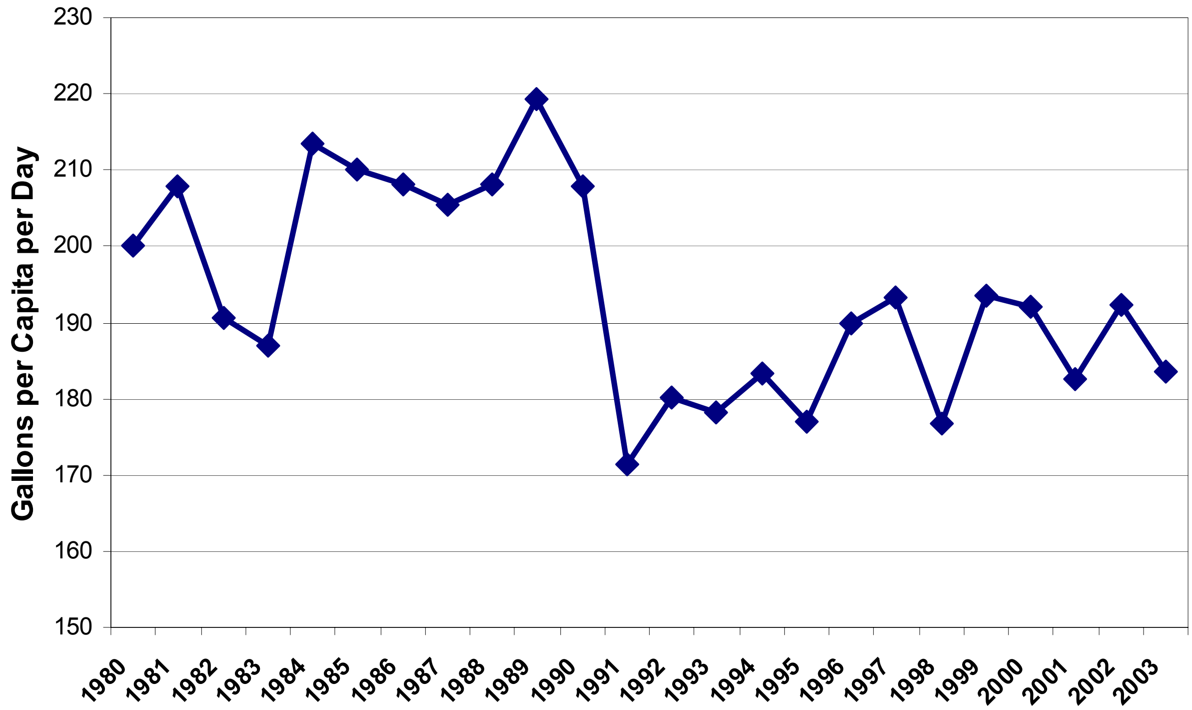


Table I-4
Municipal and Industrial Per Capita Water Use
(gallons per person per day)

Precipitation County	(Dry) 1990	(Wet) 1995	(Average) 2000
Los Angeles	188	167	174
Orange	231	196	209
Riverside	293	219	257
San Bernardino	273	213	267
San Diego	204	164	185
Ventura	227	179	197
Metropolitan Total	**208**	**177**	**192**

Climate and Rainfall

As Figure I-6 shows, Metropolitan's service area encompasses three major climate zones. Table I-5 reports the 30-year (1975-2004) average temperature, rainfall and evapotranspiration (expressed as Et_o) information for representative locations within those three zones. Annual rainfall also varies within the region: average annual rainfall in Pasadena from 1980 through 2003 was more than double the 11 inches received at the San Diego airport and Culver City. Region wide, annual rainfall routinely varies by more than 100% from year to year.

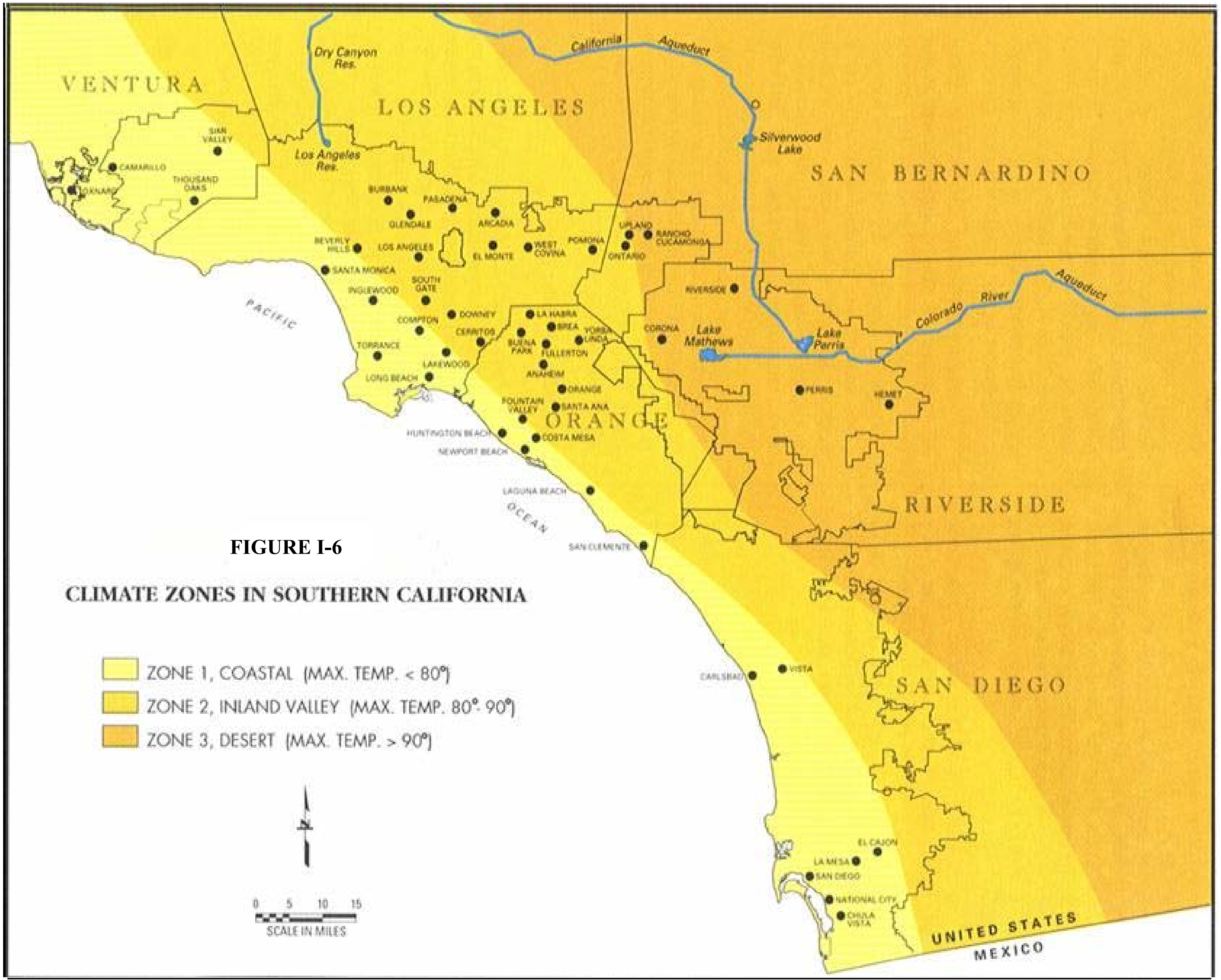


FIGURE I-6

CLIMATE ZONES IN SOUTHERN CALIFORNIA

Water Supplies

Historically, Metropolitan has been responsible for obtaining water for the region through its operation of the Colorado River Aqueduct and its contract with the state for State Water Project supplies. To date, Metropolitan has increased its ability to supply water, particularly in dry years, through the implementation of storage and transfer programs. Figure I-7 presents historical annual regional water supplies, and Figure I-8 shows Metropolitan's historical annual imported water supplies.

Table I-5
Weather Variables in Three Zones in Metropolitan's Service Area

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Temperature													
Los Angeles	59.00	60.09	61.33	63.94	66.62	70.38	74.22	75.10	74.27	69.67	63.26	58.93	66.40
Riverside	54.83	56.10	58.11	62.05	66.73	72.08	77.33	77.99	74.99	67.86	59.41	54.65	65.23
San Diego	57.99	58.80	60.08	62.42	64.64	67.32	70.73	72.21	71.60	67.59	61.87	57.64	64.41
Average Precipitation													
Los Angeles	3.12	4.08	3.14	0.87	0.33	0.09	0.01	0.12	0.32	0.51	1.03	1.96	15.59
Riverside	2.39	2.58	2.23	0.68	0.23	0.09	0.04	0.17	0.26	0.38	0.78	1.13	10.80
San Diego	2.24	2.27	2.21	0.83	0.18	0.07	0.03	0.09	0.20	0.50	0.97	1.30	10.91
Et_o													
Los Angeles	2.20	2.45	3.64	4.74	5.31	6.06	6.75	6.66	5.01	3.95	2.73	2.31	51.81
Riverside	2.49	2.91	4.16	5.27	5.94	6.56	7.22	6.92	5.35	4.05	2.94	2.56	56.37
San Diego	1.83	2.20	3.42	4.49	5.25	5.67	5.86	5.61	4.49	3.42	2.36	1.83	46.43

Figure I-7
Annual Regional Water Supplies In Metropolitan's Service Area

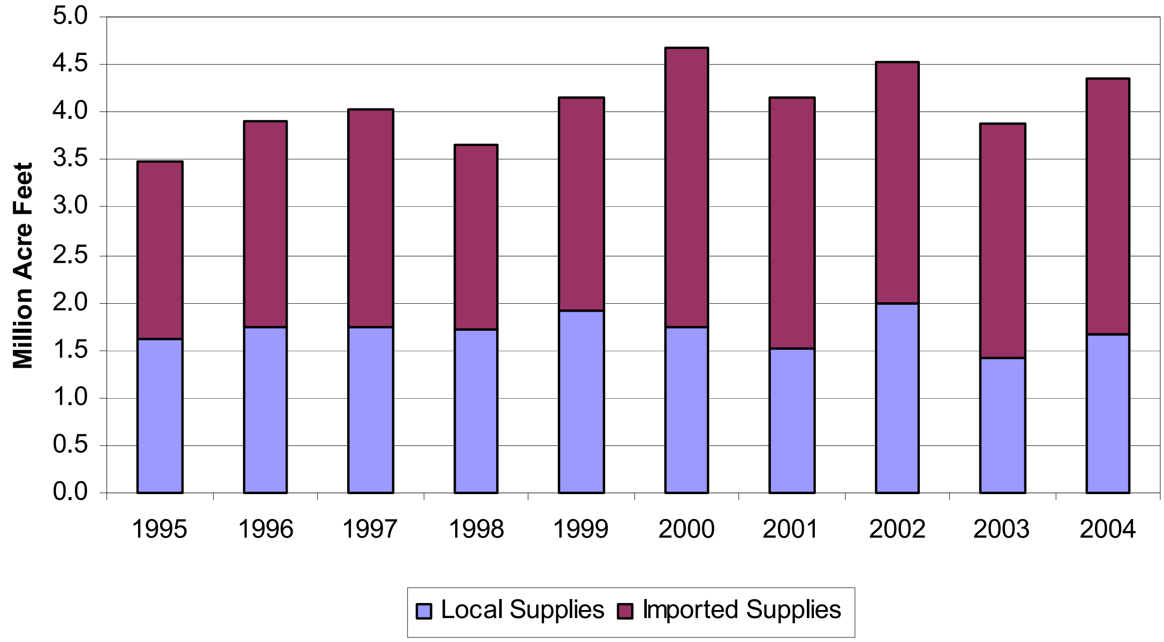
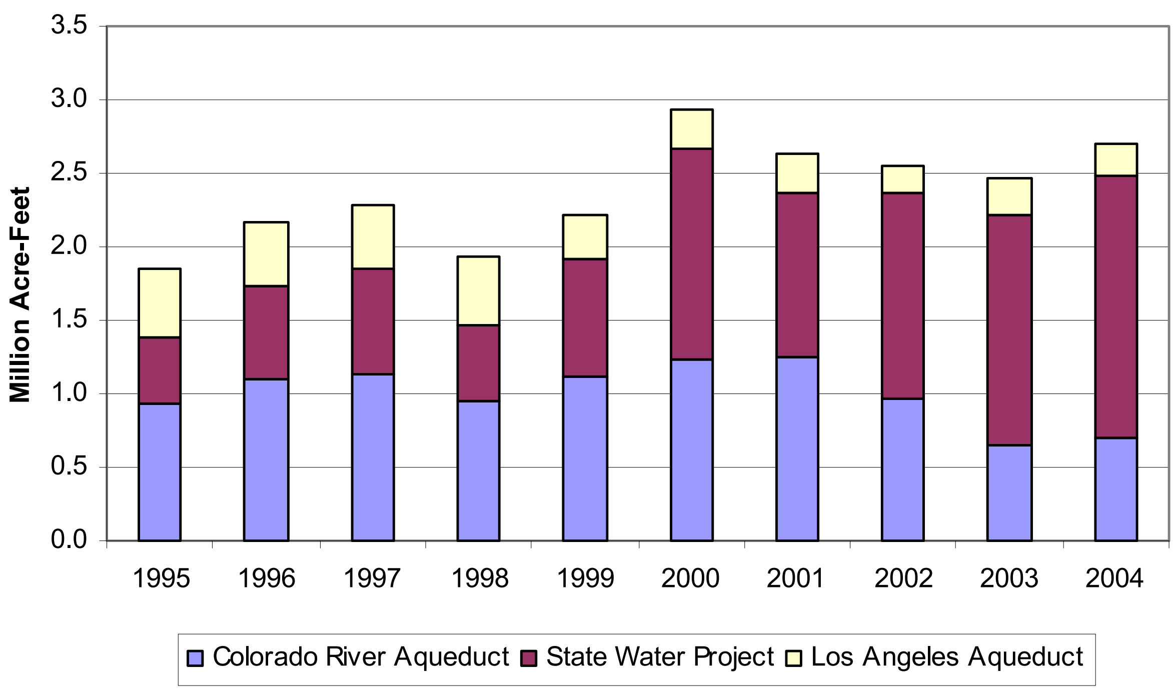


Figure I-8
Imported Water Supplies In Metropolitan's Service Area



II. PLANNING FOR THE FUTURE

In its role as supplemental supplier to the Southern California water community, Metropolitan faces ongoing challenges in meeting the region's needs for water supply reliability and quality. Increased environmental regulations and competition for water from outside the region have resulted in changes in delivery patterns and timing of availability of imported water supplies. At the same time, the Colorado River basin has experienced a five-year drought that is unprecedented in recorded history, while total water demand continues to rise within the region because of population and economic growth.

As described in the previous chapter, the water used in Southern California comes from a number of sources. About one-third comes from local sources, and the remainder is imported from three sources: the Colorado River, the Sacramento-San Joaquin River Delta (via the State Water Project), and the Owens Valley and Mono Basin (through the Los Angeles Aqueducts).[1]

Because of competing needs and uses associated with these resources, and because of concerns related to regional water operations, Metropolitan has undertaken a number of planning initiatives over the past ten years. This Regional Urban Water Management Plan summarizes these efforts, which include the Integrated Resources Plan (IRP), the IRP Update, the Water Surplus and Drought Management Plan, Strategic Plan and Rate Restructure. Together, they provide a policy framework, guidelines and resource targets for Metropolitan to follow into the future.

While Metropolitan coordinates regional water supply planning for the region through its inclusive integrated planning processes, Metropolitan's member agencies also conduct their own planning analyses – including their own urban water management plans - and may develop projects independently of Metropolitan. Appendix 6 shows a list of these potential future local projects provided to Metropolitan by its member agencies.

[1] Although the water from the Los Angeles Aqueduct is imported, Metropolitan considers it a local source because it is managed by the Los Angeles Department of Water and Power and not by Metropolitan.

II.1 Integrated Resource Planning

The 1996 IRP Process

In the 1990s, drought and regulatory requirements were affecting the reliability of Metropolitan's water supplies while the region's population continued to grow. To address this challenge, Metropolitan and its member agencies conducted an Integrated Resource Planning (IRP) process to determine the appropriate level of supply reliability and to establish cost-effective approaches to achieving that goal. This process was conducted in two phases. The first phase consisted of gathering and analyzing data that would help forecast future demands, the long-term status of existing supplies, and new supply alternatives that could be harnessed to meet future water needs. The second phase consisted of evaluating the supply alternatives to develop a Preferred Resource Mix. Metropolitan kept the process open and participatory by directly involving the staff of Metropolitan and its member agencies, and by inviting other water resource agencies, environmental groups and the general public to contribute via workgroup meetings, regional assemblies, public forums and member agency workshops.

The Preferred Resource Mix developed through this process relied on a diverse mix of resources. The adopted plan established a goal of 100 percent reliability for full-service demands through 2020 through the attainment of regional targets set for conservation, local supplies, State Water Project supplies, Colorado River supplies, groundwater banking, and water transfers. By adopting this diverse portfolio of supply resources, Metropolitan and its member agencies explicitly recognized the benefits of avoiding over-reliance on any single water resource.

By design, the 1996 IRP process remained dynamic, open to revisions as they became necessary in light of changing conditions. This approach has defined the policy and strategic approach of regional water supply planning.

The IRP Update

In 2001, Metropolitan completed its Strategic Plan, Rate Restructure and IRP Review, all of which provided essential input to the IRP Update. In November 2001 Metropolitan's Board approved an action plan to conduct the first update of the 1996 IRP. The goals of this task were:

- To review the achievements to date, and measure them against the goals adopted in 1996;
- To identify changed conditions that might require adjustments to the adopted plan; and
- To extend the planning period from 2020 through 2025.

During 2002 and the first half of 2003, Metropolitan staff presented reports to its Water Planning, Quality and Resources Board Committee. In August of 2003, Metropolitan circulated a draft Update Report to the member agencies for review and comment. A copy of the report can be found at http://usmet11.mwd.dst.ca.us/idmweb/cache%5C003677571-1.pdf.

Results of the IRP Update

The first step of the IRP Update entailed identifying and quantifying those conditions that had changed since the 1996 IRP that could change the outlook for supply/demand balance. The most significant change involved increased participation by local agencies in developing local supplies and promoting savings from conservation. The analysis also identified local infrastructure needs, as well as the need to maintain contingency planning that would allow the region the flexibility needed to manage and overcome supply risks.

Metropolitan then used these changed conditions to evaluate the reliability outlook for the region's water supplies and to update the resource plan to provide for 100 percent reliability, assuming a repeat of the historic hydrology through the year 2025. The resulting changes in the IRP resource targets are shown in Table II-1 and serve as the foundation for the planning assumptions used in the RUWMP.

In adopting the IRP Update, Metropolitan's Board directed staff to develop a process for annually reporting on the implementation progress in meeting the IRP Update goals.

Table II-1
Comparison of Resource Targets
(Thousand Acre-feet)

Resource	1996 IRP 2020	IRP Update 2020	Change	IRP Update 2025
Local Resources				
Conservation	882	1,028	+146	1,107
Recycling/ Groundwater Recovery/ Desalination	500	750	+250	750
Colorado River Aqueduct*	1,200	1,250	+50	1,250
State Water Project	593	650	+57	650
Conjunctive Use	300	300	0	300
CV Storage and Transfer	300	550	+250	550
MWD Surface Storage**	620	620	0	620

*The 1,250,000 acre-feet supply from the Colorado River Aqueduct is a target for specific year types when needed. Metropolitan is not depending upon a full aqueduct in every year.
**Target for Surface Storage represents the total amount of water that can be extracted from storage.

IRP Update Outreach

In keeping with the practice adopted in the first IRP, the Update process included extensive cooperation among Metropolitan, its member agencies, and other organizations. Table II-2 contains the schedule of meetings and names of the involved stakeholder groups, and Table II-3 contains the schedule of outreach programs that member agencies conducted for the purpose of informing the public and inviting comment.

Table II-2
Stakeholder Participation in IRP Update

Year	Month	Meeting
2001	November December	*SAWPA[1] Meeting:* Review and discuss IRP Update process *Northern Caucus[2] Meeting*: Review and discuss IRP Update process
2002	January	*Member Agency Managers Meeting*: Review and discuss Jan. Board Report. Sent out *IRP Report Card #1* *SAWPA* Meeting: Review and discuss IRP Update progress
	February	*Member Agency Managers Meeting:* Review and discuss Feb. Board Report Request member agency input/verification on Local Supply Information *SAWPA Meeting:* Review and discuss IRP Update progress
	March	*Member Agency Managers Meeting:* Review and discuss March Board Report *SAWPA Meeting:* Review and discuss IRP Update progress.
	April	*Member Agency Meeting:* Review initial conclusions of IRP *SAWPA Meeting:* Review and discuss IRP Update progress *Central /West Basin Caucus Meeting[3]:* Review and discuss IRP Update progress *Southern California Water Dialogue[4]:* Review and discuss IRP Update progress
	May	*Member Agency Managers Meeting:* Review and discuss May Board Report *SAWPA Meeting:* Review and discuss IRP Update progress
	September	*Member Agency Technical Review Meeting*: Review Resource Assumptions Sent out *IRP Report Card #2*
	October	*Member Agency Managers Meeting*: Review and discuss local data and buffer scenario[5]
	November	*Member Agency Managers Meeting:* Review and discuss Nov. Board Report *Member Agency Advisory Meeting:* Consensus on buffer
2003	January	*Member Agency Managers Meeting:* Review Final IRP Recommendation with policy question
	August	Sent out draft IRP Update Report for member agency review/comment
	September	*Member Agency Managers Meeting:* Review Draft IRP Update Report *Member Agency Workshop:* Review Draft IRP Update Report

[1] The Santa Ana Watershed Project Authority (SAWPA) includes representation from Inland Empire Utilities Agency, Eastern Municipal Water District, San Bernardino Valley Municipal Water District, Western Municipal Water District, and Orange County Water District

[2] The Northern Caucus consists of managers from member agencies in the north of Metropolitan's service area.

[3] The Central/West Basin Caucus consists of board members and staff from the Central/West Basin sub-agencies.

[4] The Southern California Water Dialogue is a voluntary public group that meets most months to consider issues related to Southern California's future water supply.

[5] A "buffer" of additional recycled water projects were identified that would be considered if proposed recycled water projects failed to be successful.

Source: Metropolitan's Integrated Water Resources Plan Update, July, 2004.

Table II-3
IRP Update Public Outreach 2004

Month	Day	Organization/Audience
April	1	*Water Policy Forum:* MWDOC (Event #1)
	7	*Western MWD Cal Fed Outreach:* Board, public
	7	*Eastern MWD:* Board, public, local officials, constituents
	8	*City of Long Beach – IRP Forum:* Water Commissioners
	19	*Central Basin MWD/West Basin MWD*: Local constituents, elected officials, public
	20	*LADWP – Southern California Water Dialogue:* Elected officials, environmental interests, public, LADWP staff, DWR staff
	22	*MWDOC – IRP Forum (Event #2)*Member agencies, public, local officials, staff
	22	*City of Beverly Hills:* Commissioners, staff
	27	*San Diego County Water Authority:* Board, local agencies, general public
	28	*Three Valleys/IEUA:* Board, local agencies, staff, local officials
May	14	*MWDOC - Event # 3: Water Advisory Committee of Orange County*: Board members, elected officials, city staff, community members
	19	*Foothill MWD:* Board, local agencies, general public
	19	*West Basin Water Association:* Local boards, elected officials, staff, community leaders
	24	*Calleguas and Las Virgenes:* Board, local agencies, general public
June	24	Ci*ty of Pasadena:* Board, general public

Source: Metropolitan's Integrated Water Resources Plan Update, July, 2004.

II.2 Evaluating Supply Reliability

The Act requires that three fundamental planning analyses be performed to evaluate supply reliability as part of the development of a Plan. The first is a water supply reliability assessment, which requires development of a detailed evaluation of the supplies necessary to meet demands over at least a 20-year period in average, single year, and multi-year drought conditions. The second is a water shortage contingency plan that documents the stages of actions needed to address up to a 50 percent reduction in an agency's water supplies. Finally, the Act requires the development of a plan that defines the actions to be taken in the event of a catastrophic interruption in water supplies.

To complete these analyses, Metropolitan developed estimates of future demands and supplies from Metropolitan and local sources. Supply and demand analyses for the single and multiple year droughts were based on conditions for the SWP. For this source, the single driest year was 1977, and the three-year dry historical period was 1990-1992. The SWP provides the optimal basis for analysis because it is Metropolitan's largest and most variable supply. For the average year, the analysis used 83 years of historic hydrology (1922 to 2004) to develop estimates of supply and demands.

Estimating Demands on Metropolitan

Metropolitan derived its demand forecasts by first estimating total retail demands for the region and then factoring in the impacts of conservation. Details of this step are detailed in Appendix A.1 of this report. Next, it derived projections of local supplies using data on current and expected local supply programs and the IRP Local Resource Program Target. The difference between the resulting total demands, including conservation, and local supplies is the expected regional demand on Metropolitan supplies. These estimates of demands on Metropolitan were developed for a single dry year, multiple dry years, and average years. Tables II-4 through II-6 show these estimates. Metropolitan has shared these underlying supply assumptions with its member agencies.

Retail Demands
Retail M&I demands represent the full spectrum of water use within the region, including residential, commercial, industrial, institutional and un-metered uses. To forecast urban water demands, Metropolitan used the MWD-MAIN Water Use Forecasting System (MWD-Main), which is a combination of statistical and end-use methods that has been adapted to conditions in Southern California. The analysis based its population estimates on projections developed for the SCAG 2004 Regional Transportation Plan and SANDAG 2030 Forecast. Output from MWD-Main was then adjusted for expected conservation.

Conservation
The forecast of future conservation included a detailed accounting of water conservation that distinguished between:

- *Code-based Conservation* – Water saved as a result of changes in water efficiency requirements for plumbing fixtures in plumbing codes.

- *Active Conservation* – Water saved directly as a result of conservation programs by water agencies (includes implementation of Best Management Practices.)
- *Price-effect Conservation* – Water saved by retail customers attributable to the effect of changes in the real (inflation-adjusted) price of water.

After including the effects of conservation in the retail demands, the analysts calculated forecasts of local supplies.

Local Supplies

These forecasts of local supplies relied on information gathered from a number of sources including past urban water management plans, Metropolitan's annual local supply surveys, and communications between Metropolitan and member agency staff. The 2005 RUWMP includes only existing projects, projects with firm contracts for LRP funding, and projects that have met specific environmental documentation and financing criteria. Appendix 5 provides lists of the projects meeting these criteria.

Firm Demands

After calculating the expected regional demands on Metropolitan supplies, projected firm demands were calculated based on Metropolitan's established reliability goal. For the purposes of reliability planning, the 1996 IRP established a reliability goal that states that full service demands at the retail level would be satisfied under all "foreseeable hydrologic" conditions through 2020. This goal allows for intermittent interruptions to non-firm, discounted rate supplies sold under the Seasonal Storage Program and the Interim Agricultural Water Program. Thus, firm demand on Metropolitan equals Full Service demands (Tier I and Tier II) plus 70% of the Interim Agricultural Water Program. For the purpose of analysis, "foreseeable hydrologic conditions" is understood to mean under "historical hydrology," which presently covers the range of historical hydrology spanning the years 1922 through 2004. Tables II-4 through II-6 show estimates of firm demands on Metropolitan for single dry year, multiple dry years and average years.

Table II-4
Metropolitan Regional Water Demands
Single Dry Year
Acre Feet

		2010	2015	2020	2025	2030
A.	**Total Demands**[1]	**5,546,000**	**5,782,000**	**6,037,000**	**6,248,000**	**6,454,000**
	Retail Agricultural	337,000	303,000	271,000	239,000	221,000
	Retail Municipal and Industrial	4,978,000	5,225,000	5,502,000	5,745,000	5,971,000
	Groundwater Replenishment	182,000	192,000	198,000	198,000	196,000
	Seawater Barrier	49,000	62,000	66,000	66,000	66,000
B.	**Total Conservation** [2]	**865,000**	**955,000**	**1,028,000**	**1,107,000**	**1,188,000**
	Existing Active (through 2004) [3]	94,000	92,000	92,000	91,000	91,000
	Code-based, Price-Effect, and Remaining IRP Target	521,000	613,000	686,000	766,000	847,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**Total Local Supplies**	**2,159,000**	**2,414,000**	**2,552,000**	**2,575,000**	**2,593,000**
	Groundwater	1,375,000	1,394,000	1,399,000	1,412,000	1,430,000
	Surface Water	93,000	93,000	93,000	93,000	93,000
	Los Angeles Aqueduct	96,000	95,000	95,000	95,000	95,000
	Groundwater Recovery	87,000	115,000	115,000	115,000	115,000
	Total Recycling	310,000	387,000	408,000	408,000	408,000
	Desalination	28,000	128,000	150,000	150,000	150,000
	Other Imported Supplies	170,000	202,000	292,000	302,000	302,000
D.	**Total Metropolitan Demands (D=A-B-C)**	**2,523,000**	**2,414,000**	**2,457,000**	**2,565,000**	**2,671,000**
	Full Service (Tier I and Tier II)	2,274,000	2,170,000	2,220,000	2,347,000	2,476,000
	Replenishment Service [4]	144,000	153,000	159,000	159,000	145,000
	Interim Agricultural Water Program	105,000	91,000	78,000	59,000	50,000
	Firm Demands on Metropolitan [5]	**2,348,000**	**2,234,000**	**2,275,000**	**2,388,000**	**2,511,000**

Notes:
All units are acre-feet unless specified, rounded to the nearest hundred
Totals may not sum due to rounding
(1) Growth Projections: SCAG 2004 Regional Transportation Plan; SANDAG 2030 Forecast
(2) The 2030 savings target is derived from the 2003 IRP Update forecast projections for 2030; it is not an official target for 2030.
(3) Includes code-based savings originated through an active implementation program
(4) Replenishment Service as defined in MWD Administrative Code Section 4114
(5) Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands

Table II-5
Metropolitan Regional Water Demand
Multiple Dry Year
(acre feet)

		2010	2015	2020	2025	2030
A.	**Total Demands[1]**	**5,575,000**	**5,848,000**	**6,103,000**	**6,329,000**	**6,542,000**
	Retail Agricultural	337,000	306,000	274,000	243,000	222,000
	Retail Municipal and Industrial	5,012,000	5,294,000	5,567,000	5,823,000	6,057,000
	Groundwater Replenishment	178,000	189,000	196,000	197,000	197,000
	Seawater Barrier	48,000	59,000	66,000	66,000	66,000
B.	**Total Conservation [2]**	**865,000**	**955,000**	**1,028,000**	**1,107,000**	**1,188,000**
	Existing Active (through 2004) [3]	94,000	92,000	92,000	91,000	91,000
	Code-based, Price-Effect, and Remaining IRP Target		613,000	686,000	766,000	847,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**Total Local Supplies**	**2,140,000**	**2,396,000**	**2,559,000**	**2,587,000**	**2,593,000**
	Groundwater	1,378,000	1,409,000	1,412,000	1,425,000	1,431,000
	Surface Water	78,000	79,000	79,000	79,000	79,000
	Los Angeles Aqueduct	97,000	104,000	104,000	108,000	108,000
	Groundwater Recovery	108,000	114,000	115,000	115,000	115,000
	Total Recycling	300,000	375,000	407,000	408,000	408,000
	Desalination	9,333	114,000	150,000	150,000	150,000
	Other Imported Supplies	170,000	201,000	292,000	302,000	302,000
D.	**Total Metropolitan Demands (D=A-B-C)**	**2,570,000**	**2,499,000**	**2,515,000**	**2,635,000**	**2,761,000**
	Full Service (Tier I and Tier II)	2,346,000	2,277,000	2,300,000	2,436,000	2,573,000
	Replenishment Service [4]	119,000	130,000	136,000	137,000	137,000
	Interim Agricultural Water Program	105,000	92,000	79,000	62,000	51,000
	Firm Demands on Metropolitan [5]	**2,420,000**	**2,341,000**	**2,355,000**	**2,479,000**	**2,609,000**

Notes:
All units are acre-feet unless specified, rounded to the nearest hundred
Totals may not sum due to rounding
(1) Growth Projections: SCAG 2004 Regional Transportation Plan; SANDAG 2030 Forecast
(2) The 2030 savings target is derived from the 2003 IRP Update forecast projections for 2030; it is not an official target for 2030.
(3) Includes code-based savings originated through an active implementation program
(4) Replenishment Service as defined in MWD Administrative Code Section 4114
(5) Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands

Table II-6
Metropolitan Regional Water Demand
Average Year

		2010	2015	2020	2025	2030
A.	**Total Demands[1]**	**5,520,000**	**5,759,000**	**6,010,000**	**6,220,000**	**6,419,000**
	Retail Agricultural	326,000	294,000	263,000	233,000	215,000
	Retail Municipal and Industrial	4,945,000	5,190,000	5,466,000	5,707,000	5,931,000
	Groundwater Replenishment	200,000	213,000	215,000	214,000	207,000
	Seawater Barrier	49,000	62,000	66,000	66,000	66,000
B.	**Total Conservation [2]**	**865,000**	**955,000**	**1,028,000**	**1,107,000**	**1,188,000**
	Existing Active (through 2004) [3]	94,000	92,000	92,000	91,000	91,000
	Code-based, Price-Effect, and Remaining IRP Target	521,000	613,000	686,000	766,000	847,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**Total Local Supplies**	**2,393,000**	**2,614,000**	**2,748,000**	**2,771,000**	**2,770,000**
	Groundwater	1,416,000	1,430,000	1,431,000	1,444,000	1,442,000
	Surface Water	100,000	99,000	99,000	99,000	99,000
	Los Angeles Aqueduct	252,000	253,000	253,000	253,000	254,000
	Groundwater Recovery	111,000	115,000	115,000	115,000	115,000
	Total Recycling	316,000	387,000	408,000	408,000	408,000
	Desalination	28,000	128,000	150,000	150,000	150,000
	Other Imported Supplies	170,000	202,000	292,000	302,000	302,000
D.	**Total Metropolitan Demands (D=A-B-C)**	**2,262,000**	**2,191,000**	**2,234,000**	**2,341,000**	**2,460,000**
	Full Service (Tier I and Tier II)	1,994,000	1,925,000	1,977,000	2,102,000	2,236,000
	Replenishment Service [4]	169,000	180,000	183,000	183,000	177,000
	Interim Agricultural Water Program	99,000	86,000	74,000	56,000	47,000
	Firm Demands on Metropolitan [5]	**2,063,000**	**1,985,000**	**2,029,000**	**2,141,000**	**2,269,000**

Notes:
All units are acre-feet unless specified, rounded to the nearest hundred
Totals may not sum due to rounding
(1) Growth Projections: SCAG 2004 Regional Transportation Plan; SANDAG 2030 Forecast
(2) The 2030 savings target is derived from the 2003 IRP Update forecast projections for 2030; it is not an official target for 2030.
(3) Includes code-based savings originated through an active implementation program
(4) Replenishment Service as defined in MWD Administrative Code Section 4114
(5) Firm demand on Metropolitan equals Full Service demands plus 70% of the Interim Agricultural Water Program demands

II.3 Water Supply Reliability

After estimating demands for single dry year, multiple dry years, and average years the water reliability analysis requires urban water suppliers to identify projected supplies to meet these demands. Table II-7 summarizes the sources of supply for the single dry year (1977 hydrology), while Table II-8 shows the region's ability to respond in future years under a repeat of the 1990-92 hydrology. Table II-8 provides results for the average of the three dry years rather than a year-by-year detail, because most of Metropolitan's dry-year supplies are designed to provide equal amounts of water over each year of a three-year period. These tables show that the region can provide reliable water supplies under both the single driest year and the multiple dry year hydrologies. Table II-9 reports the expected situation on average over all of the historic hydrologies. Appendix A-3 contains detailed justifications for the sources of supply used for this analysis.

The reliability analyses in the IRP Update report showed that Metropolitan can maintain reliable supplies under the conditions that have existed in past dry periods throughout the period 2010 through 2025. As the tables provided below show, that level of reliability extends through 2030. Metropolitan has also identified buffer supplies, including additional SWP groundwater storage and transfers that could serve to supply the additional water needed.

Table II-7
Single Dry-Year
Supply Capability[1] & Projected Demands
(Repeat of 1977 Hydrology)
(acre-feet per year)

	2010	2015	2020	2025	2030
Current Supplies					
In-Basin Storage	1,149,000	1,161,000	1,113,000	1,066,000	1,017,000
California Aqueduct [2]	777,000	777,000	777,000	777,000	777,000
Colorado River Aqueduct [3]	722,000	699,000	699,000	699,000	699,000
Supplies Under Development					
In-Basin Storage	78,000	103,000	103,000	103,000	103,000
California Aqueduct	330,000	259,000	350,000	350,000	350,000
Colorado River Aqueduct	95,000	460,000	400,000	400,000	400,000
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
Metropolitan Supply Capability	***3,151,000***	***3,424,000***	***3,407,000***	***3,360,000***	***3,311,000***
Metropolitan Supply Capability w/CRA Maximum of 1.25 MAF [4]	***3,151,000***	***3,356,000***	***3,309,000***	***3,252,000***	***3,203,000***
Firm Demands on Metropolitan [5,6]	***2,348,000***	***2,234,000***	***2,275,000***	***2,388,000***	***2,511,000***
Potential Reserve & Replenishment Supplies	**803,000**	**1,122,000**	**1,034,000**	**864,000**	**692,000**

[1] Represents supply capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct
[3] Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct
[4] Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[5] Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[6] Includes projected firm sales plus 70% of projected IAWP agricultural sales

Table II-8
Multiple Dry-Year
Supply Capability[1] & Projected Demands
(Repeat of 1990-92 Hydrology)
(acre-feet per year)

	2010	2015	2020	2025	2030
Current Supplies					
In-Basin Storage	514,000	518,000	502,000	487,000	470,000
California Aqueduct[2]	912,000	912,000	912,000	912,000	912,000
Colorado River Aqueduct[3]	722,000	699,000	699,000	699,000	699,000
Supplies Under Development					
In-Basin Storage	78,000	103,000	103,000	103,000	103,000
California Aqueduct	330,000	215,000	299,000	299,000	299,000
Colorado River Aqueduct	95,000	460,000	400,000	400,000	400,000
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
Metropolitan Supply Capability	***2,651,000***	***2,872,000***	***2,880,000***	***2,865,000***	***2,848,000***
Metropolitan Supply Capability w/CRA Maximum of 1.25 MAF [4]	***2,651,000***	***2,804,000***	***2,782,000***	***2,757,000***	***2,740,000***
Firm Demands on Metropolitan [5,6]	***2,420,000***	***2,341,000***	***2,355,000***	***2,479,000***	***2,609,000***
Potential Reserve & Replenishment Supplies	**231,000**	**463,000**	**427,000**	**278,000**	**131,000**

[1] Represents supply capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct
[3] Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct
[4] Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[5] Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[6] Includes projected firm sales plus 70% of projected IAWP agricultural sales

Table II-9
Average Year
Supply Capability[1] & Projected Demands
(Average of 1922 – 2004 Hydrologies)
(acre-feet per year)

	2010	2015	2020	2025	2030
Current Supplies					
In-Basin Storage	0	0	0	0	0
California Aqueduct [2]	1,772,000	1,772,000	1,772,000	1,772,000	1,772,000
Colorado River Aqueduct [3]	711,000	678,000	677,000	677,000	677,000
Supplies Under Development					
In-Basin Storage	0	0	0	0	0
California Aqueduct	185,000	185,000	240,000	240,000	240,000
Colorado River Aqueduct	0	0	0	0	0
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
Metropolitan Supply Capability	***2,668,000***	***2,600,000***	***2,654,000***	***2,654,000***	***2,654,000***
Metropolitan Supply Capability w/CRA Maximum of 1.25 MAF [4]	***2,668,000***	***2,600,000***	***2,654,000***	***2,654,000***	***2,654,000***
Firm Demands on Metropolitan [5,6]	***2,063,000***	***1,985,000***	***2,029,000***	***2,141,000***	***2,269,000***
Potential Reserve & Replenishment Supplies	**605,000**	**615,000**	**625,000**	**513,000**	**385,000**

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

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct

[3] Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct

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

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

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

II.4 Water Shortage Contingency Analysis

In addition to the Water Supply Reliability analysis addressing average year and drought conditions, the Act requires agencies to document the stages of actions that it would undertake in response to water supply shortages, including up to a 50% reduction in its water supplies. Metropolitan has captured this planning in its Water Surplus and Drought Management Plan (WSDM Plan) which guides Metropolitan's planning and operations during both shortage and surplus conditions.

Water Surplus and Drought Management Plan

In April of 1999, Metropolitan's Board of Directors adopted the Water Surplus and Drought Management Plan (WSDM Plan).[2] It provides policy guidance for managing regional water supplies to achieve the reliability goals of Southern California's Integrated Resources Plan (IRP). It identifies the expected sequence of resource management actions that Metropolitan will execute during surpluses and shortages to minimize the probability of severe shortages and eliminate the possibility of extreme shortages and shortage allocations. Unlike Metropolitan's previous shortage management plans, the WSDM Plan recognizes the link between surpluses and shortages, and it integrates planned operational actions with respect to both conditions.

Through effective management of its water supply, Metropolitan fully expects to be 100 percent reliable in meeting all non-discounted non-interruptible demands throughout the next twenty five years. The benefits of Metropolitan's contingency planning approach have been evident in recent years. Of particular note are the region's successes in dealing with operational constraints such as the rehabilitation of the Colorado River Aqueduct in 2003, the disruption to Delta diversions caused by the Jones Tract flooding in 2004, and the strong position of local storage despite five years of dry conditions.

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

WSDM Plan Principles and Goals
The guiding principle of the WSDM plan is to manage Metropolitan's water resources and management programs to maximize management of wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle came the following supporting principles:

[2] Metropolitan Water District of Southern California. *Water Surplus and Drought Management Plan,* Report No. 1150, August, 1999.

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

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

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

<u>Surplus and Shortage Stages</u>
The WSDM Plan distinguishes between Surpluses, Shortages, Severe Shortages, and Extreme Shortages. Within the WSDM Plan, these terms have specific meanings relating to Metropolitan's ability to deliver water to its customers.

<u>Surplus:</u> Metropolitan can meet full-service and interruptible program demands, and it can deliver water to local, regional and out-of-region storage.

<u>Shortage:</u> Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.

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

<u>Extreme Shortage:</u> Metropolitan must allocate available supply to full-service customers.

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

Surplus Stages

Metropolitan's supply situation is considered to be in surplus as long as net annual deliveries can be made to water storage programs. Deliveries for storage in the Diamond Valley Lake and in the SWP terminal reservoirs continue through each surplus stage provided there is available storage capacity. Withdrawals from Diamond Valley Lake for regulatory purposes or to meet seasonal demands may occur in any stage. Deliveries to other storage facilities may be interrupted, depending on the amount of the surplus.

Shortage Actions

When Metropolitan must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, it is still able to meet all end-use demands for water. For shortage stages 1 through 4, Metropolitan will meet demands by withdrawing water from storage. At shortage stages 5 through 7, Metropolitan may undertake additional shortage management steps, including issuing public calls for extraordinary conservation, considering curtailment of Interim Agricultural Water Program deliveries in accordance with their discounted rates, exercise water transfer options, or purchase water on the open market.

At shortage stage 7 Metropolitan will develop a plan to allocate available supply fairly and efficiently to full-service customers. The allocation plan will be based on the Board-adopted principles for allocation. Metropolitan intends to enforce these allocations using rate surcharges. Under the current WSDM Plan, the surcharges will be set at a minimum of $175 per af for any deliveries exceeding a member agency's allotment. Any deliveries exceeding 102% of the allotment will be assessed a surcharge equal to three times Metropolitan's full-service rate.

Figure II-1 shows the actions under surplus and shortage stages when an allocation plan would be necessary to enforce mandatory cutbacks. The overriding goal of the WSDM Plan is to never reach Shortage Stage 7, an Extreme Shortage. Given present resources, Metropolitan fully expects to achieve this goal over the next twenty five years.

Annual Reporting Schedule on Supply/Demand Conditions

Managing Metropolitan's water supply resources to minimize the risk of shortages requires timely and accurate information on changing supply and demand conditions throughout the year. To facilitate effective resource management decisions, the WSDM Plan includes a monthly schedule for providing supply/demand information to Metropolitan's senior management and Board of Directors, and for making resource allocation decisions. Table II-10 shows this schedule.

Figure II-1
Resource Stages, Anticipated Actions, And Supply Declarations

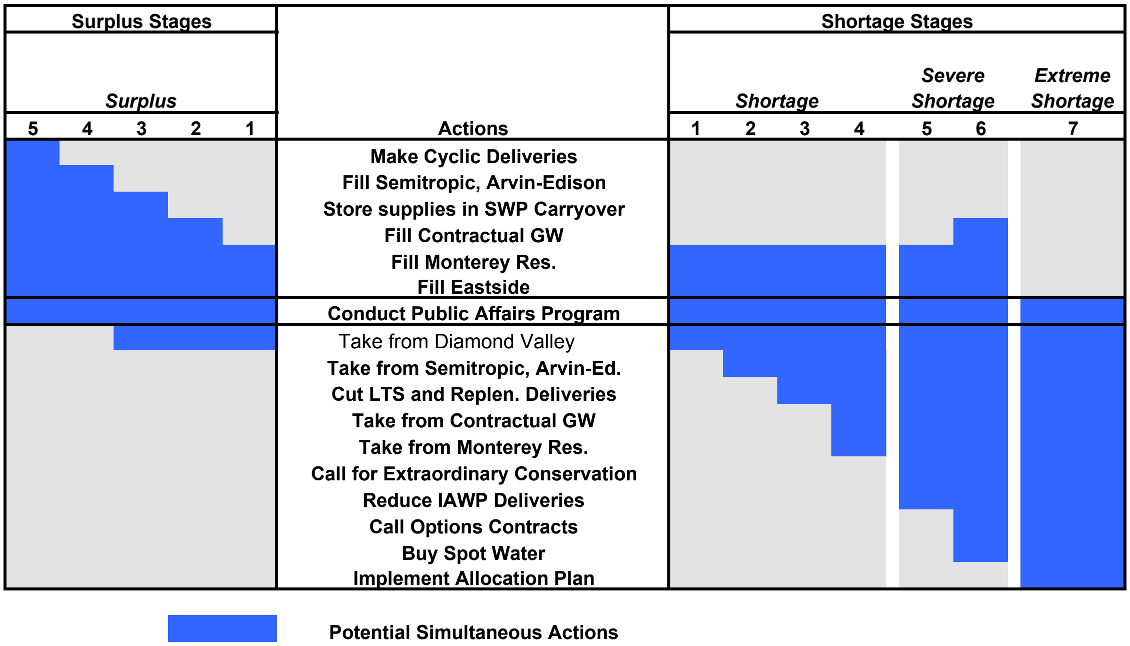


Table II-10
Schedule of Reporting and Resource Allocation Decision-Making

Month	Informational Report/Management Decision
Jan.	Initial supply/demand forecasts for year
Feb.-Mar.	Update supply/demand forecasts for year
Apr.-May	Finalize supply/demand forecasts Management decisions re: Contractual Groundwater and Option Transfer Programs Board decisions re: Need for Extraordinary Conservation
Oct.	Report on Supply and Carryover Storage
Nov.	Management decisions re: Long-Term Seasonal and Replenishment Groundwater Programs, Interruptible Agricultural Water Program

II.5 Catastrophic Supply Interruption Planning

The third type of planning needed to evaluate supply reliability is a catastrophic supply interruption plan that documents the actions necessary for a catastrophic interruption in water supplies. For Metropolitan this planning is captured in the analysis that went into developing the Emergency Storage Requirements.

Emergency Storage Requirements

Metropolitan established its criteria for determining emergency storage requirements in the October 1991 Final Environmental Impact Report for the Eastside Reservoir, which is now named Diamond Valley Lake. These criteria were again discussed in Southern California's 1996 Integrated Resources Plan. Metropolitan's Board has approved both of these documents.

These emergency storage requirements are based on the potential of a major earthquake damaging the aqueducts that transport Southern California's imported water supplies (SWP, CRA, and Los Angeles Aqueduct). The adopted criteria assume that damage from such an event could render the aqueducts out of service for six months. Therefore, Metropolitan has based its planning on a 100 percent reduction in its supplies for a period of six months, which is a greater shortage than required by the Act.

To safeguard the region from catastrophic loss of water supply, Metropolitan has made substantial investments in emergency storage. The emergency plan outlines that under such a catastrophe, interruptible service deliveries would be suspended, and firm supplies to member agencies would be restricted by a mandatory cutback of 25 percent from normal-year demand levels. At the same time, water stored in surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available, and Metropolitan would draw on its emergency storage, as well as other available storage. Metropolitan has reserved approximately one-third of Diamond Valley Lake storage to meet such an emergency, while the remainder is available for dry-year and seasonal supplies. In addition, Metropolitan has access to emergency storage at its other reservoirs, at the SWP terminal reservoirs, and in its groundwater conjunctive use storage accounts. With few exceptions, Metropolitan can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted by a major earthquake. The WSDM Plan shortage stages will guide Metropolitan's management of available supplies and resources during the emergency to minimize the impacts of the catastrophe.

In addition to the criteria used to develop the emergency storage requirements, Metropolitan cooperated with DWR and others in 2005 on a preliminary study of the potential effects of extensive levee failures in the Delta.[3] This study was limited in scope, and it investigated only two of a potential range of scenarios. Metropolitan's analysis showed that its investment in local storage and water banking programs south of the Delta would provide the resources necessary to continue operating under the scenarios investigated. In particular, Metropolitan's analysis showed that it would be able to supply all firm requirements to its member agencies under both scenarios, but that it would need to interrupt replenishment deliveries to the area's groundwater

[3] Jack R. Benjamin & Associates, Inc. *Preliminary Seismic Risk Analysis Associated with Levee Failures in the Sacramento-San Joaquin Delta,* June, 2005.

basins and curtail water supplies to one third of the interruptible agriculture within its service territory. Metropolitan's analysis further suggested that the scenarios investigated were not the worst-case situation. Under more extreme hydrologies, Metropolitan might have to reduce firm deliveries to Metropolitan's member agencies by as much as 10 percent.

Electrical Outages

Metropolitan has also developed contingency plans that enable it to deal with both planned and unplanned electrical outages. These plans include the following key points:

- In event of power outages, water supply can be maintained by gravity feed from Diamond Valley Lake.
- Maintaining water treatment operations is a key concern. As a result, all Metropolitan treatment plants have backup generation sufficient to continue operating in event of supply failure on the main electrical grid.
- Valves at Lake Skinner can be operated by the backup generation at the Lake Skinner treatment plant.
- Metropolitan owns mobile generators that can be transported quickly to key locations if necessary.

II.6 Other Supply Reliability Risks

In its IRP Update, Metropolitan identified two risks to its future supply reliability:

1. Implementation Risk. For local programs, Metropolitan has taken a region-wide, competitive approach to securing new supplies. This approach encourages innovation, and as a result some projects could either fail to meet their expected contribution to the IRP goals, or they could fail to do so in the expected timeframe. In addition, programs related to imported water supplies may not perform as expected.

2. Water Quality Issues. Concerns relating to water quality could pose an increasing challenge for water supply reliability. Water quality issues might threaten existing supplies through contamination, or water quality standards may become more stringent because of changing water quality regulation or the discovery of a previously unknown risk. These events may lead to the loss of a water supply source or a reduction in a source's usefulness because of a need to blend supplies to meet water quality standards.

The amount of water at risk because of these concerns cannot be quantified with current knowledge. To reduce the likelihood of such shortfalls, the IRP Update instituted a planning buffer of up to ten percent of regional demands. This buffer calls for the identification of an additional 500 taf of contingency supplies above that needed to meet demands in 2025. The buffer supplies would include an equal proportion of local and imported supplies. Projects identified as buffer supplies may not be implemented or may only be partially implemented, depending on future conditions and future Board actions. However, identifying these supplies will allow a more speedy response to events that might otherwise compromise regional reliability.

Climate Change

Another potential risk to future water supply reliability is posed by climate change. In recent years, as the science of climate change has become more broadly accepted and potential widespread implications to water resources have been identified, the issue has come to the forefront. As a major steward of the region's water supply resources, Metropolitan is committed to performing its due diligence with respect to climate change.

Current scientific research suggests that increasing concentrations of atmospheric greenhouse gases are producing global-scale temperature and precipitation changes. Global climate models predict that by the end of the century, average winter temperatures could increase by more than 7º Fahrenheit, and summer temperatures by as much as 18º Fahrenheit. The results of precipitation studies have been less definitive and vary widely between models and scenarios, predictions range from slight increases in precipitation to decreases of up to 30 percent.

Potential Impacts
While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- reduction in Sierra Nevada snowpack
- increased intensity and frequency of extreme weather events, and
- rising sea levels resulting in
  - increased risk of damage from storms, high-tide events, and the erosion of levees, and
  - potential pumping cutbacks on the State Water Project (SWP) and Central Valley Project (CVP).

Other important issues of concern due to global climate change include:

- effects on local supplies such as groundwater
- changes in urban and agricultural demand levels and patterns
- impacts to human health from water-borne pathogens and water quality degradation
- declines in ecosystem health and function
- alterations to power generation and pumping regimes.

<u>Metropolitan's Activities</u>
An extended Colorado River drought put climate change on Metropolitan's radar screen in the mid-1990s. In 2000, Metropolitan's Board received a briefing on the potential impacts of climate change on water supply by leading experts in the field. Metropolitan then hosted a California Water Plan meeting on climate change and a held Drought Preparedness Workshop on similar issues. In March 2002, the Board adopted policy principles on global climate change as related to water resource planning. The Principles stated in part that 'Metropolitan supports further research into the potential water resource and quality effects of global climate change, and supports flexible "no regret" solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts.'

In support of the policy principles, Metropolitan has participated in or attended numerous regional, state and national climate change studies and workshops. These workshops include those held by Universities, State Agencies such as the California Energy Commission (CEC) and DWR, and national workshops such as those held by the American Water Works Association Research Foundation (AWWARF) and the National Center for Atmospheric Research. Most recently, Metropolitan helped sponsor and participated in a large international conference held in Orange County by GEWEX (the Global Energy and Water Experiment). Metropolitan's Chairman of the Board gave the Keynote address, discussing climate change information specifically relevant to water agencies.

Metropolitan's Integrated Resources Planning was recently featured as a regional utility case study for adapting to climate change. The case study, in AWWARF's *Climate Change and Water Resources: A Primer for Municipal Water Providers*, highlights several examples of how Metropolitan, in conjunction with its member agencies, is expanding its supply portfolio to maintain reliability and flexibility. This portfolio includes conservation and recycling, groundwater conjunctive use, transfer programs, and storage and conveyance facilities such as Diamond Valley Lake and the nearly completed Inland Feeder.

Looking Ahead

As the water industry begins to address the potential impacts of climate change, several challenges and uncertainties require additional work. Among these challenges is the need to gain understanding of the impact of climate change on precipitation. While many climate models show precipitation decreasing in response to climate change, others show precipitation increasing. This discrepancy has major implications in terms of water supply impacts. Another challenge is translating the global climate impacts to regional impacts, a process called "downscaling." More research is needed to generate reliable watershed-level climate and hydrological information that will be useful to water agencies. A major challenge for Metropolitan in assessing potential impacts is that our region's water supplies are derived from four geographically unique watersheds, managed by numerous federal, state and regional agencies.

Moving forward, a number of State and Federal agencies, stakeholders, universities, and other entities are beginning to perform and fund the kind of research needed to better understand the potential impacts of climate change on the State's water supply resources. Several of Metropolitan's member agencies are also beginning to address climate change impacts. Metropolitan realizes the importance of planning for future uncertainties, but it is also bound by the need to be prudent and fiscally responsible to its customers. We hope to see improvements in climate change science and modeling techniques and/or technology that will enable us to make sound policy and practical decisions in the future.

II.7 Pricing and Rate Structures

General Overview of MWD Rate Structure

This section provides an overview of Metropolitan's rate structure. The rate structure is designed to accomplish the following:

- Accountability - Define the linkage among costs, charges, and benefits through a cost of service approach consistent with industry guidelines and practices;

- Regional Provider - Ensure that regional services meet the existing and future needs of member agencies;

- Equity - Ensure that users, including member agencies and other entities, pay the same rates and charges for like classes of services and provide fair allocation of costs through rates and charges;

- Environmental Responsibility - Encourage wise environmental stewardship and effective demand management by funding conservation and recycling projects and programs, and use pricing to encourage investments in conservation, recycling and other economical local supplies;

- Choice and Competition - Offer choices for services to member agencies and accommodate the development of a water transfer market;

- Water Quality - Support source quality improvements and water treatment systems that are required to ensure safe drinking water and are required to make water recycling and groundwater management programs feasible; and

- Financial Integrity - Establish a financial commitment from the member agencies that provides financial security for Metropolitan and does not transfer undue risk to member agencies.

The rate structure includes the following benefits to how Metropolitan recovers the cost of providing services:

- The water rate used in the previous rate structure is unbundled into separate rates for supply, conveyance and distribution, water stewardship and power;

- A tiered pricing structure encourages the development of cost-effective local water resources, including conservation, water recycling, groundwater recycling and desalination. In addition, member agencies with increasing demands for Metropolitan system supplies will pay a larger proportion of the cost of developing supply;

- A Capacity Charge allocates a greater share of the cost of peak distribution capacity to member agencies that cause the greatest peak demands on the system; and

- A water stewardship rate provides a dedicated source of funding for the continuation of regional investments in conservation and recycling and other economical local resources.

Revenue Management

A high proportion of Metropolitan's revenues come from volumetric water rates. As a result, Metropolitan's revenues can vary according to regional weather and the availability of statewide water supplies. In dry years, local demands increase and Metropolitan may receive revenues in excess of its cost of service. In contrast, in wet years demands will decrease, and revenues may be below the cost of service. In addition, statewide supply shortages such as those in 1991 could cause a decrease in Metropolitan's revenues. Such revenue surpluses and shortages could cause instability in water rates and in Metropolitan's financial condition. To mitigate this risk, Metropolitan maintains reserves, with a minimum and maximum balance, to stabilize water rates during times of reduced water sales. The reserves hold revenues collected during times of high demand and are used to offset the need for revenues during times of low sales.

Rate Structure Components

The different elements of the rate structure are discussed below and summarized in Table II-11.

System Access Rate (SAR)
The SAR recovers the cost of the conveyance and distribution system that is used on an average annual basis through a uniform volumetric rate. All users pay the SAR for access to conveyance and distribution capacity in the Metropolitan system.

The SAR is charged for each acre-foot of water conveyed and distributed by Metropolitan. All users (member agencies and third parties) using the Metropolitan system to convey water pay the same SAR for the use of the system conveyance and distribution capacity used to meet average annual demands.

Water Stewardship Rate (WSR)
The WSR provides a dedicated source of funding for conservation and local resources development. The WSR supports Metropolitan's funding of future conservation and local supply projects. Because of the uniform benefits (e.g. greater available system capacity through reduced use by others) conferred on all system users by investments in conservation and local resources, all users of Metropolitan's conveyance and distribution system pay the water stewardship rate.

Table II-11
Rate Structure Components

Rate Design Elements	Service Provided/ Costs Recovered	Type of Charge
System Access Rate	Conveyance/Distribution (Average Capacity)	Volumetric ($/af)
Water Stewardship Rate	Conservation/Local Resources	Volumetric ($/af)
System Power Rate	Power	Volumetric ($/af)
Treatment Surcharge	Treatment	Volumetric ($/af)
Capacity Charge	Peak Distribution Capacity	Fixed/Volumetric ($/cfs)
Readiness-To-Serve Charge	Conv./Distr./Emergency Storage(Standby Capacity)	Fixed ($Million)
Tier 1 Supply Rate	Supply	Volumetric/Fixed ($/af)
Tier 2 Supply Rate	Supply	Volumetric ($/af)
Surplus Water Rates	Replenishment/Agriculture	Volumetric ($/af)

<u>System Power Rate (SPR)</u>
The SPR recovers the costs of energy required to pump water to Southern California through the State Water Project and Colorado River Aqueduct. The cost of power is recovered through a uniform volumetric rate. The SPR is applied to all deliveries to member agencies. Wheeling parties will pay for the actual cost (not system average) of power needed to move the water. For example, water wheeled through the California Aqueduct would pay the actual variable power cost incurred by DWR to move the water.

<u>Treatment Surcharge</u>
The treatment surcharge recovers the costs of providing treated water service through a uniform, volumetric rate.

<u>Capacity Charge</u>
The capacity charge is levied on the maximum summer day demand placed on the system between May 1 and September 30 for the three previous calendar-years. Demands measured for the purposes of billing the capacity charge include all firm demand and agricultural demands as well as wheeling service. Because it is interruptible with 24 hours notice, replenishment service is not included in the measurement of peak day demand for purposes of billing the capacity

charge. A member agency can reduce its capacity charge payments by reducing peak day demands on the system.

Readiness-To-Serve Charge (RTS)

The RTS is a fixed charge (currently totaling $80 million) that recovers the cost of the portion of system conveyance and storage capacity that is on standby to provide emergency service and operational flexibility.

The total RTS charge is allocated among the member agencies based on a ten-calendar-year rolling average of firm demands. Replenishment and agricultural deliveries are excluded, while water transfers and exchanges are included for purposes of calculating the ten-year rolling average used to allocate the RTS. At the option of the member agencies, a per-parcel standing charge is collected to offset a portion of the RTS obligation.

Tier 1 Supply Rate

The costs of maintaining existing supplies and developing additional supplies are recovered through a two-tiered pricing approach. The Tier 1 Supply Rate recovers the majority of the supply revenue requirement and reflects the cost of existing supplies. The amount of water an agency can purchase under the lower Tier 1 rate is determined by its base demand and whether or not the agency has chosen to sign a Purchase Order with Metropolitan. An agency's base demand is determined by the maximum annual amount of firm delivery purchased from Metropolitan in the 13 years ending June 30, 2002. Member agencies can choose to execute a Purchase Order that commits the agency to purchase a minimum average level of 60 percent of its base demand over the ten-year period ending 2012. Thus, if an agency's base demand was 20 taf, an executed Purchase Order would commit the agency to purchasing a total of 120 taf over the period 2003-2012 (20 taf base demand x 60 percent x 10 years). Member agencies with a Purchase Order can purchase up to 90 percent of their base demand at the Tier 1 rate, and any remaining needs would be purchased at the higher Tier 2 rate. Member agencies without a Purchase Order can pay the Tier 1 Supply Rate for firm demands up to 60 percent of their base demand, and pay the higher Tier 2 rates for the remainder of their purchases.

Tier 2 Supply Rate

The Tier 2 Supply Rate is set at Metropolitan's cost of developing new supply, thus encouraging the member agencies and their customers to protect existing local supplies and develop cost-effective local supply resources and conservation. The Tier 2 Supply Rate also recovers a greater proportion of the cost of developing additional supplies from member agencies that have increasing demands on the Metropolitan system. Therefore, the Tier 2 Supply Rate partially addresses customer equity between member agencies that are not increasing their demands on the system and member agencies that continue to need additional imported water supplies.

As described above, the Tier 2 Supply Rate will be charged for all firm water sales above 60 percent of a member agency's base demand unless the member agency elected to execute a Purchase Order. If a member agency submits a Purchase Order, it will pay the Tier 2 Supply Rate for all firm demands that exceed 90 percent of its base demand.

Replenishment Program and Agricultural Water Program

Metropolitan currently administers two pricing programs that make surplus system supplies (system supplies in excess of what is needed to meet consumptive municipal and industrial demands) available to the member agencies at a discounted water rate. The replenishment program provides surplus system supplies, when available, for the purpose of replenishing local storage. The interim agricultural water program also makes surplus system water available for agricultural purposes.

The following tables provide further information regarding Metropolitan's rates. Table II-12 summarizes the rates and charges to be effective January 1, 2005. Average costs by member agency will vary depending upon an agency's RTS allocation, capacity charge and relative proportions of treated and untreated Tier 1, Tier 2, Long-term Seasonal Storage, and agricultural water purchases. Table II-13provides a snapshot of the Capacity Charge, calculated for Calendar Year 2005. Table II-14 provides the details of the Readiness-to-Serve charge calculation broken down by member agency. Table II-15 provides the current Purchase Order commitment quantities by member agency.

Table II-12
Rates and Charges Summary

Rate Categories **Volumetric ($/af) unless otherwise noted)**	**Effective 1/1/2005**	**Effective 1/1/2006**
Water Supply Rate		
Tier 1	$73	$73
Tier 2	$154	$169
System Access Rate	$152	$152
Water Stewardship Rate	$25	$25
System Power Rate	$81	$81
Full Service Untreated Volumetric Cost		
Tier 1	$331	$331
Tier 2	$412	$427
Treatment Surcharge	$112	$122
Full Service Treated Volumetric Cost		
Tier 1	$443	$453
Tier 2	$524	$549
Other Volumetric		
Replenishment Water Rate: untreated	$238	$238
Interim Agricultural Water Program: untreated	$241	$241
Treated Replenishment Water Rate	$325	$335
Treated Interim Agricultural Water Program	$329	$339
Other Charges (non-volumetric)		
Readiness-to-Serve Charge		
(Total charge in $millions, allocated to members by share of 10 year demands)	$80	$80
Capacity Charge	$6,800	$6,800
Three-year average of peak day demands($/cfs)		

Table II-13
Capacity Charge Detail

	Peak Day Demand (cfs) (May 1 through September 30) Calendar Year				
AGENCY	2001	2002	2003	3-Year Peak	Calendar Year 2005 Capacity Charge ($6,800/cfs)
Anaheim	56.5	54.3	43.7	56.5	$ 384,200
Beverly Hills	32.3	30.1	29.6	32.3	219,640
Burbank	36.6	38.2	41.1	41.1	279,480
Calleguas	240.9	258.5	262.6	262.6	1,785,680
Central Basin	122.1	119.2	133.4	133.4	907,120
Compton	7.6	9.6	11.7	11.7	79,560
Eastern	186.6	204.3	219.0	219.0	1,489,200
Foothill	23.8	21.7	26.0	26.0	176,800
Fullerton	24.2	27.6	24.8	27.6	187,680
Glendale	58.6	56.3	60.0	60.0	408,000
Inland Empire	171.8	155.3	182.9	182.9	1,243,720
Las Virgenes	35.8	43.5	36.9	43.5	295,800
Long Beach	60.6	51.7	86.6	86.6	588,880
Los Angeles	404.9	645.0	671.1	671.1	4,563,480
MWDOC	452.7	479.2	520.0	520.0	3,536,000
Pasadena	43.2	75.5	57.1	75.5	513,400
San Diego [1]	1084.6	1241.4	1240.6	1296.0	8,812,800
San Fernando	0.1	0.0	0.0	0.1	680
San Marino	2.7	6.8	6.5	6.8	46,240
Santa Ana	24.8	39.6	28.8	39.6	269,280
Santa Monica	23.9	28.5	36.9	36.9	250,920
Three Valleys	188.3	203.8	211.0	211.0	1,434,800
Torrance	44.4	38.8	43.4	44.4	301,920
Upper San Gabriel	32.5	45.3	70.9	70.9	482,120
West Basin	248.3	256.0	260.5	260.5	1,771,400
Western	246.1	262.6	251.5	262.6	1,785,680
Total	**3,854**	**4,393**	**4,557**	**4,679**	**$ 31,814,480**

(1) San Diego capacity set at 1,296 cfs per surface storage operating agreement terms

Table II-14
Readiness-to-Serve Charge (by Member Agency)

Member Agency	Rolling Ten-Year Average Firm Deliveries (Acre-Feet) FY1992/93 - FY2001/02	RTS Share	6 months @ $80 million per year (7/04-12/04)	Rolling Ten-Year Average Firm Deliveries (Acre-Feet) FY1993/94 - FY2002/03	RTS Share	6 months @ $80 million per year (1/05-6/05)	Total RTS Charge
Anaheim	17,356	1.12%	$ 446,116	17,464	1.09%	$ 435,120	$ 881,236
Beverly Hills	13,301	0.85%	341,899	13,363	0.83%	332,960	674,859
Burbank	14,120	0.91%	362,930	13,514	0.84%	336,719	699,650
Calleguas MWD	95,365	6.13%	2,451,255	97,828	6.09%	2,437,467	4,888,722
Central Basin MWD	63,983	4.11%	1,644,617	64,476	4.02%	1,606,477	3,251,094
Compton	4,006	0.26%	102,968	3,733	0.23%	93,014	195,981
Eastern MWD	58,751	3.78%	1,510,133	62,106	3.87%	1,547,431	3,057,565
Foothill MWD	9,358	0.60%	240,530	9,675	0.60%	241,057	481,587
Fullerton	7,427	0.48%	190,904	7,738	0.48%	192,802	383,706
Glendale	27,151	1.74%	697,879	26,752	1.67%	666,552	1,364,431
Inland Empire Utilities Agency	44,473	2.86%	1,143,137	47,034	2.93%	1,171,888	2,315,024
Las Virgenes MWD	19,801	1.27%	508,957	20,184	1.26%	502,896	1,011,854
Long Beach	37,953	2.44%	975,531	37,670	2.35%	938,575	1,914,106
Los Angeles	190,217	12.22%	4,889,336	202,968	12.64%	5,057,144	9,946,480
Municipal Water District of Orange County	213,813	13.74%	5,495,840	216,197	13.47%	5,386,753	10,882,593
Pasadena	16,274	1.05%	418,304	17,963	1.12%	447,563	865,867
San Diego County Water Authority	414,479	26.63%	10,653,763	432,316	26.93%	10,771,569	21,425,332
San Fernando	76	0.00%	1,961	61	0.00%	1,520	3,481
San Marino	1,168	0.08%	30,025	1,111	0.07%	27,674	57,699
Santa Ana	11,670	0.75%	299,971	11,784	0.73%	293,600	593,571
Santa Monica	9,134	0.59%	234,791	9,907	0.62%	246,847	481,638
Three Valleys MWD	63,146	4.06%	1,623,095	65,362	4.07%	1,628,560	3,251,655
Torrance	21,416	1.38%	550,464	21,527	1.34%	536,359	1,086,823
Upper San Gabriel Valley MWD	9,172	0.59%	235,760	10,220	0.64%	254,646	490,406
West Basin MWD	147,247	9.46%	3,784,845	146,263	9.11%	3,644,289	7,429,135
Western MWD	45,323	2.91%	1,164,988	48,183	3.00%	1,200,519	2,365,506
MWD Total	1,556,178	100.00%	$ 40,000,000	1,605,396	100.00%	$ 40,000,000	$ 80,000,000

Table II-15
Purchase Order Commitments and Tier 1 Limits
(by Member Agency)

	Tier 1 Annual Limit	Purchase Order Commitment (acre-feet)
Anaheim	22,240	148,268
Beverly Hills	13,380	89,202
Burbank	16,336	108,910
Calleguas	103,801	692,003
Central Basin	72,360	482,400
Compton	5,058	33,721
Eastern	75,700	504,664
Foothill	10,997	73,312
Fullerton	11,298	75,322
Glendale	26,221	174,809
Inland Empire	59,752	398,348
Las Virgenes	20,565	137,103
Long Beach	39,471	263,143
Los Angeles	304,970	2,033,132
MWDOC	222,924	1,486,161
Pasadena	21,180	141,197
San Diego	500,705	3,338,035
San Fernando	630	-
San Marino	1,199	-
Santa Ana	12,129	80,858
Santa Monica	11,109	74,062
Three Valleys	70,400	469,331
Torrance	20,967	139,780
Upper San Gabriel	16,511	110,077
West Basin	156,874	1,045,825
Western	58,769	391,791
Total	**1,875,546**	**12,491,453**

II.8 Public Participation

Because of the diverse needs, interests, and institutional entities within the region, the IRP goals will only be achieved through an open and participatory process that involves the major stakeholders. The IRP process reached out to water managers, policy decision-makers, interest groups, and individuals. They provided valuable input and guidance regarding the preferred water resource strategy and carefully reviewed the technical analyses supporting the decision-making process. The 1996 IRP and the IRP Update contain details of the public participation.

Public involvement in Metropolitan's planning process continues and has been an integral part of the development of this UWMP report. In September 2004, Metropolitan kicked off the update of its Regional Urban Water Management Plan with a meeting at Metropolitan's headquarters. At that meeting an initial draft data set of demographics, total demands after conservation, local supplies, and demands on Metropolitan at the member agency and regional levels was distributed. In addition, Metropolitan staff held over 20 meetings with 14 different member agencies to review the initial draft data set. Based on these meetings, Metropolitan distributed a final draft data set to the member agencies in August 2005. Simultaneously, Metropolitan developed preliminary estimates of its existing and planned water sources in five-year increments under single and multiple year drought conditions as well as average year conditions as required under the Act.

These demand and supply estimates were included in the draft copy of the RUWMP distributed to the member agencies in May 2005. Following the distribution, member agencies hosted a series of six Metropolitan workshops to review and take comment on the draft report from member agencies and their subagencies. Metropolitan selected this number of workshops to keep the number of participants at each meeting low and to encourage an interactive review process. Table II-16 lists the workshops held.

Table II-16
Regional Urban Water Management Plan
Workshop Schedule

Date of Meeting	Member Agencies Attending
May 23	San Diego County Water Authority
May 25	Western MWD, Eastern MWD
June 6	Municipal Water District of Orange County, Santa Ana, Anaheim, Fullerton
June 7	Los Angeles Department of Water and Power, Beverly Hills, Burbank, Glendale, Pasadena, Santa Monica, San Fernando, Long Beach, Compton, Torrance
June 9	Three Valleys Municipal Water District, Inland Empire Utilities Agency, San Marino, Upper San Gabriel MWD, Foothill MWD
June 13	Las Virgenes MWD
June 2	West Basin and Central Basin

On August 24 2005, staff made a presentation on the soon-to-be-released final draft document to the Southern California Water Dialogue, encouraging members to comment on the draft and to attend and make comments at the public meeting. Through this group, outreach was attempted to over 400 individuals, affiliated with a broad and diverse set of agencies, consultants, environmental groups and other non-profit organizations. Participants represent organizations ranging from the Sierra Club, the Mono Lake Committee and The Nature Conservancy, to the Building Industry Association and the Southern California Water Committee, to agencies such as the Los Angeles Department of Water and Power, the San Diego County Water Authority, and the Mojave Water Agency. Over thirty people attended this meeting. A subsequent meeting was held with this group on September 28, 2005 to review and take comments and questions on the document.

The final draft was posted prominently on Metropolitan's website on September 12, 2005. In addition, notice of the availability of the document was sent to the member agencies as well as cities and counties in the Metropolitan service area. Appendix A.4 includes a copy of the letter sent to cities and counties in Metropolitan's service area notifying them of the meeting

Finally, Metropolitan held the publicly-noticed meeting required by the Urban Water Management Planning Act. Appendix A.4 also includes a copy of the Public Notice advertising the meeting that was included in Southern California newspapers on Monday, September 26 and Monday, October 3, 2005.

In summary, this Urban Water Management Plan involved a number of agencies and groups in its preparation:

Water Agencies assisted in plan development, received a copy of draft documents, commented on those documents, were invited to and attended the public meeting, and received notice of the intention to adopt.

Relevant Public Agencies such as cities and counties received notice that the document was available, were invited to comment on those documents, were invited to attend the public meeting, and received notice of the intention to adopt.

Other Groups such as the Southern California Water Dialogue, received a presentation on the draft, were invited to comment on those documents, were invited to attend the public meeting, and received notice of the intention to adopt. Through the Southern California Water Dialogue, outreach was attempted to over 400 individuals, affiliated with a very broad and diverse set of agencies, consultants, environmental groups and other non-profit organizations. Participants represent organizations ranging from the Sierra Club, the Mono Lake Committee and The Nature Conservancy, to the Building Industry Association and the Southern California Water Committee, to agencies such as the Los Angeles Department of Water and Power, the San Diego County Water Authority, and the Mojave Water Agency.

Website Posting: The final draft was posted prominently on Metropolitan's website on September 12, 2005.

III. IMPLEMENTING THE PLAN

The reliability evaluation conducted as part of the 1996 IRP revealed that without future investments in local and imported supplies, the region could experience a supply shortage of at least 0.79 million acre feet about 50 percent of the time (or once every other year) by 2020. Since that time Metropolitan, its member agencies, and other local agencies have worked to implement the goals identified in the IRP. The IRP Update demonstrated that these efforts have moved the region toward its goal of long-term regional water supply reliability.

Metropolitan has worked in many different areas to bring about this improved supply reliability. The major drivers have been:

- conservation
- water recycling and groundwater recovery
- storage and groundwater management programs within the Southern California region
- storage programs related to the State Water Project (SWP) and the Colorado River
- other water supply management programs outside of the region.

Many of these programs are already successfully implemented. Others, including institutional and facility changes in the Colorado River region and the SWP, will take more time to execute. Figure III-1 shows the expected ability to meet demands in future single dry years by water supply source. Table III-1 provides the details of the Metropolitan supplies to meet the regional demands. The following sections discuss each of these programs, distinguishing between successes to date and the programs that are still under way.

Figure III-1
Dry-Year Demand and Supplies

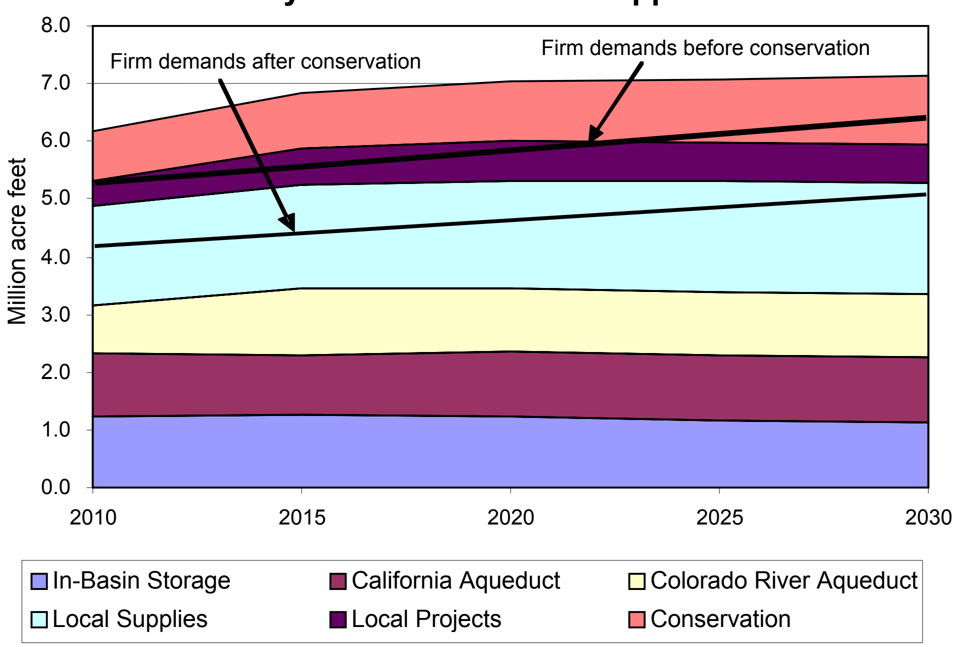


Table III-1
Single Dry-year Supply Capability[1] & Projected Demands
(Repeat of 1977 Hydrology)
(acre-feet per year)

	2010	2015	2020	2025	2030
Current Supplies					
In-Basin Storage	1,149,000	1,161,000	1,113,000	1,066,000	1,017,000
California Aqueduct [2]	777,000	777,000	777,000	777,000	777,000
Colorado River Aqueduct [3]	722,000	699,000	699,000	699,000	699,000
Supplies Under Development					
In-Basin Storage	78,000	103,000	103,000	103,000	103,000
California Aqueduct	330,000	259,000	350,000	350,000	350,000
Colorado River Aqueduct	95,000	460,000	400,000	400,000	400,000
Transfers to Other Agencies	0	(35,000)	(35,000)	(35,000)	(35,000)
Metropolitan Supply Capability	*3,151,000*	*3,424,000*	*3,407,000*	*3,360,000*	*3,311,000*
Metropolitan Supply Capability w/ CRA Maximum of 1.25 MAF [4]	***3,151,000***	***3,356,000***	***3,309,000***	***3,252,000***	***3,203,000***
Firm Demands on Metropolitan [5,6]	***2,348,000***	***2,234,000***	***2,275,000***	***2,388,000***	***2,511,000***
Potential Reserve & Replenishment Supplies	**803,000**	**1,122,000**	**1,034,000**	**864,000**	**692,000**

[1] Represents supply capability for resource programs under listed year type.
[3] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct
[2] Colorado River Aqueduct includes water management program supplies conveyed by the aqueduct
[4] Maximum CRA deliveries limited to 1.25 MAF including SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[5] Based on SCAG 2004 RTP, SANDAG 2030 forecasts, projections of member agency existing and contracted active conservation and local supplies, remaining regional targets for active conservation, SDCWA/IID Transfer supplies and Coachella and All-American Canals lining supplies.
[6] Includes projected firm sales plus 70% of projected IAWP agricultural sales

III.1 Existing / Developed Local Supplies

Approximately 50 percent of the regional water supplies come from resources controlled or operated by local water agencies. These resources include water extracted from local groundwater basins, catchment of local surface water, and non-Metropolitan imported water supplied through the Los Angeles Aqueduct and the Colorado River Aqueduct.

Groundwater

The groundwater basins that underlie the region provide approximately 90 percent of the local water supply in Southern California. The major groundwater basins in the region provide an annual average supply of approximately 1.41 million acre-feet. Most of this water recharges naturally, but approximately 200 taf is replenished through imported supplies. By 2025, estimates show that groundwater production will increase to 1.44 million acre-feet.

Because the groundwater basins contain a large volume of stored water, it is possible to produce more than the natural recharge of 1.16 million acre feet and the replenishment amount for short periods of time. During a dry year, replenishment deliveries can be postponed, but doing so requires that the shortfall be restored in wet years. Similarly, in dry years the level of the groundwater basins can be drawn down, as long as the balance is restored to the natural recharge level by increasing replenishment in wet years. Thus, the groundwater basins can act as a water bank, allowing deposits in wet years and withdrawals in dry years.

Surface Water

In addition to the groundwater basins, local agencies maintain surface reservoir capacity to capture local runoff. The annual average yield captured from local watersheds is estimated to average approximately 100 taf per year. The majority of this supply comes from reservoirs within the service area of San Diego County Water Authority.

Los Angeles Aqueduct

Although the Los Angeles Aqueduct (LAA) imports water from outside the region, Metropolitan classifies water provided by the LAA as a local resource because it is developed and imported by a local agency (the Los Angeles Department of Water and Power). This resource is estimated to provide approximately 250 taf per year on average, which may be reduced to approximately 96 taf during a historical dry period.

IID/San Diego County Water Authority Transfer

The San Diego County Water Authority (SDCWA) has executed an agreement with the Imperial Irrigation District (IID) under which IID will transfer to SDCWA. The transfer began in 2003 with 10 taf made available to SDCWA in that year. The transfer volumes will increase in accordance with an annual build-up schedule, reaching 100 taf annually by 2013 and stabilizing at 200 taf annually in 2023. Currently, the water is being conserved through land fallowing arrangements made by IID with its customers. Beginning in 2013, IID will begin replacing land fallowing with irrigation efficiency measures that will allow farming operations to continue with reduced amounts of applied water. By 2017 all of the transferred water should be made available through irrigation and distribution system efficiency measures. The water transferred by IID is made available by SDCWA to Metropolitan for diversion at Lake Havasu. Metropolitan provides a matching volume of water to SDCWA by exchange.

Coachella and All-American Canal Lining Projects

The Coachella Canal Lining Project consists of building a new 33-mile concrete-lined canal, including the construction of new siphons, to replace 34 miles of an existing earthen canal that currently results in water conveyance losses due to seepage. Project construction began in 2004 and is scheduled to be completed in January 2007. The project is expected to conserve 26 taf annually.

The All-American Canal Lining Project consists of replacing 23 miles of earthen canal with a concrete-lined canal constructed parallel to the existing canal. Construction is scheduled to begin in 2005 and end in the fall of 2008. This project is expected to conserve 67.7 taf annually.

Costs to construct these projects are to be advanced by the SDCWA and reimbursed with state funds. Pursuant to the QSA and related agreements, the total 93.7 taf of annual yield from these projects will be allocated as follows:

- 16 taf will be allocated to the San Luis Rey Settlement Parties in San Diego County to resolve a long-standing Indian water rights dispute;
- the remaining 77.7 taf will be allocated to SDCWA.

The conserved water will be made available at Lake Havasu for diversion by Metropolitan, and by exchange, Metropolitan will deliver the respective volumes of water to the San Luis Rey Settlement Parties and SDCWA.

Table III-2 provides an estimate of these supplies in average and dry years.

Table III-2
Local Supplies*
(Thousand Acre Feet)

	2010		2025		2030	
	Average Year	Dry Year	Average Year	Dry Year	Average Year	Dry Year
Local Groundwater						
From Natural Recharge	1,160.0	1,160.0	1,160.0	1,160.0	1,160.0	1,160.0
Replenishment	256.0	214.6	283.5	251.7	282.3	270.3
Local Runoff Stored	100.0	93.3	99.2	93.5	98.6	93.5
Los Angeles Aqueduct	252.5	95.5	253.2	95.3	253.6	95.3
IID/SDCWA Transfer	70.0	70.0	200.0	200.0	200.0	200.0
Coachella & All American Canal Lining	93.7	93.7	93.7	93.7	93.7	93.7
Total	1,932.2	1,727.1	2,089.6	1,894.2	2,088.2	1,912.8

* Does not include local projects such as groundwater recovery, recycling and desalination, which are discussed in Section III-3.

III.2 Conservation

Conservation is a core element of Metropolitan's long-term water management strategy. From 1992 through the end of FY 2004, Metropolitan has invested more than $213 million in conservation-related programs within the region.[1] Among other measures, this investment has resulted in the retrofit of more than 2.3 million toilets with ultra-low flow models (ULFTs) and the distribution of more than 93,000 high efficiency clothes washers (HECWs). Collectively, Metropolitan's conservation programs and other conservation in the region will reduce Southern California's reliance on imported water by more than 1 million acre-feet per year by 2025.

Metropolitan's conservation policies and practices are shaped largely by two factors: Metropolitan's IRP and the California Urban Water Conservation Council *Memorandum of Understanding Regarding Water Conservation in California* (Urban MOU). As a signatory to the Urban MOU, Metropolitan has pledged to make a good faith attempt to implement a prescribed set of urban water conservation Best Management Practices (BMPs). Many of Metropolitan's conservation programs exceed BMP requirements.

IRP Goals

Metropolitan's IRP places equal emphasis on local and imported resource development. The IRP treats conservation as a core local supply, on par with other resources such as water recycling and storage. As described in the IRP, conservation savings result from both "active" and "code-based" conservation efforts. "Active" conservation consists of water-agency funded programs such as rebates, installations, and education. "Code-based" conservation, formerly described as "passive" conservation, consists of demand reductions attributable to conservation-oriented plumbing codes and usage reductions resulting from increases in the price of water. Code-based conservation occurs without direct agency action targeted at conservation. Including regional pre-1990 conservation savings, Metropolitan's 2025 IRP total conservation target is approximately 1.1 million acre-feet per year. A large share of the target has already been achieved through existing Metropolitan and member agency programs, pre-1990 savings, price effects, and continued savings that accrue from plumbing codes. The remainder is expected to be achieved through additional agency-sponsored active conservation programs, plumbing code changes, and price effects.

Issues

Unlike traditional water supplies, conservation reduces water demand in ways that must be quantified indirectly. Demand is reduced through changes in consumer behavior and savings from water-efficient fixtures like ultra-low-flow toilets and showerheads. Quantifying and projecting conservation savings requires specially designed estimating models. Such models were used for both the 1996 IRP targets and IRP Update projections.

Conservation savings are commonly estimated from a base-year water-use profile. Metropolitan uses 1980 as the base year because the start of that year marked the effective date of a new plumbing code in California requiring toilets in new construction be rated at 3.5 gallons per flush or less. Between 1980 and 1990, the region saved an estimated 250,000 acre-feet per year as the

[1] Conservation achievements cited in this section are as of the end of FY 2004 unless otherwise noted.

result of this 1980 plumbing code and unrelated water rate increases. These savings are referred to as “pre-1990 savings.” The 1996 IRP target combines pre-1990 savings and estimates of more recently achieved savings.

Distinguishing between active and code-based conservation can be analytically complex when, for example, active programs for fixtures are concurrent with conservation-related plumbing codes. This plan combines active and code-based conservation savings using methods that avoid double counting.

Metropolitan does not currently assign a savings value for public awareness campaigns and conservation education because any initial effect on demand reduction and the longevity of the effect are hard to measure. It is generally accepted that these programs prompt consumers to install water saving fixtures and, therefore, that they have a residual benefit of increasing the effectiveness of companion conservation programs.

Changed Conditions

Since the publication of the last Regional Urban Water Management Plan in 2000, two significant implementation successes are important to note. Both the achieved regional conservation savings and the member agencies’ plans for increased local supply development have been greater than expected.

A more complete list of changes to the conservation projections in the IRP Update include the following changes in data and methods:

1. New demographic projections
2. New water savings estimates for high-efficiency fixtures
3. New projections of active conservation
4. Explicit handling of price-effect savings
5. Explicit differentiation between active and code-based savings.

The net effect of these changes is a higher projected level of conservation savings.

Implementation Approach

Metropolitan’s implementation approach for achieving the revised conservation target includes support to member agencies in developing cost-effective BMP-oriented active conservation programs and in developing new, innovative programs that address regional water uses. Metropolitan’s rate structure stewardship charge provides a funding mechanism for active programs. Metropolitan will continue to seek state and federal funding in coordination with the member agencies.

Implementation of Conservation “Best Management Practices”

These agency-sponsored programs are closely linked to the efforts of the California Urban Water Conservation Council (CUWCC)—the organization created to administer the Urban MOU. As a signatory to the CUWCC’s Urban MOU, Metropolitan has pledged to make a good faith effort to implement a prescribed set of urban water conservation BMPs. Metropolitan provides technical and financial support needed by member agencies in meeting the terms of the Urban MOU. Table III-3 provides a list of the BMPs and compares how they apply to Metropolitan, which is a water wholesaler, versus retail water agencies. Enclosed with this report are copies of the BMP reports Metropolitan has filed with the CUWCC.

In addition to implementing cost-effective BMPs, Metropolitan actively supports many program committee activities run by the CUWCC. For example, Metropolitan has historically provided staff time and financial resources in support of CUWCC's ongoing efforts to document and increase the effectiveness of BMP-related conservation efforts. Metropolitan staff members participate in several CUWCC governing committees. Metropolitan frequently supports CUWCC research studies. Presently, Metropolitan is represented on the following CUWCC committees:

- Steering Committee
- AB2717 Landscape Committee
- Commercial, Industrial, and Institutional Committee
- Residential Committee
- Landscape Committee
- Research and Evaluation Committee
- PBMP Subcommittee (Potential BMPs)

Table III-3
Urban Water Conservation Best Management Practices

BMP Number	BMP Description	Applies to Retailers	Applies to Wholesalers
1	Residential Water Surveys	Yes	No
2	Residential Plumbing Retrofits	Yes	No
3	System Water Audits, Leak Detection	Yes	Yes
4	Metering and Commodity Rates	Yes	No
5	Large Landscape Audits	Yes	No
6	High Efficiency Washing Machines	Yes	No
7	Public Information	Yes	Yes
8	School Education	Yes	Yes
9	Commercial, Industrial, & Institutional	Yes	No
10	Wholesale Agency Assistance	No	Yes
11	Conservation Pricing	Yes	Yes
12	Conservation Coordinator	Yes	Yes
13	Water Waste Prohibition	Yes	No
14	Residential ULFT Replacements	Yes	No

The following sections describe Metropolitan's conservation programs.

Conservation Credits Program

Metropolitan's Conservation Credits Program (CCP) provides the basis for financial incentives and funding for urban BMP and other demand management related activities. Established in 1988, this funding mechanism supports Metropolitan's commitment to conservation as a long-term water management strategy.

The basis of Metropolitan financial support to member agency conservation efforts is estimated as the lesser of $154 per acre-foot of water saved or one-half of the program cost. In general, CCP funded water conservation project proposals must:

- Have demonstrable water savings;
- Reduce water demands on Metropolitan's system; and
- Be technically sound and require Metropolitan's participation to make the project financially and economically feasible.

The Regional Supply Unit

Metropolitan staff is responsible for developing and administering Metropolitan's water conservation policies and programs. Approximately 10 people focus their efforts on water conservation issues. Staff members serve as the primary liaisons to Metropolitan's member agencies and other pertinent agencies and organizations.

Metropolitan's conservation programs focus on three main areas: residential indoor programs, landscape programs, and commercial, industrial and institutional programs.

Residential Programs

The residential conservation programs consist of ultra-low-flush toilets (ULFT), high efficiency clothes washers (HECW), and water-use efficiency surveys (Surveys). Metropolitan extended funding to include installing conserving devices that exceed standards in new development.

<u>Ultra-Low-Flush Toilet (ULFT) Program</u>
This program addresses BMP 14: conserving water by replacing older, high water using toilets (3.5 gallons-per-flush and greater) with 1.6 gallons per flush ULFTs. Metropolitan began co-funding member agency-managed ULFT programs in 1988, and to date, 25 of Metropolitan's 26 member agencies have conducted ULFT programs. This activity is the largest of Metropolitan's conservation programs. Metropolitan funds ULFT retrofit programs at $60 per ULFT installed. In August 2002, Metropolitan began funding dual-flush toilets at $80 per unit installed. These toilets exceed the current standard of 1.6 gallons per flush and, thus, have higher water savings than ULFTs.

ULFT programs are implemented through rebates or distributions. Rebate programs allow customers to purchase their choice of ULFT. Distribution programs provide ULFTs to customers at little or no charge. Rebates and vouchers typically range in value from $60 to $75, depending on the managing water agency's policy. In both the rebate and voucher programs, the customer is responsible for disposing of the old toilet.

Table III-4 shows the total cumulative savings from ULFT toilets, including all previous installations. In FY 2003-04, the estimated savings were 81 taf per year, translating into a lifetime savings exceeding 1.6 million af.

Table III-4
ULFT Installation and Savings History

Calendar Year	Annual Installs Number of ULFTs	Cumulative Installs Number of ULFTs	Accumulated ULFT Savings (Acre-Feet) Annual Savings	Lifetime Savings
Pre-1999		1,310,354	45,556	911,116
1999	189,294	1,499,648	52,131	1,042,620
2000	197,214	1,696,862	58,968	1,179,360
2001	105,324	1,802,186	62,595	1,251,899
2002	258,403	2,060,589	71,515	1,430,298
2003	159,559	2,220,148	76,994	1,539,872
2004	130,180	2,350,328	81,491	1,629,820

High Efficiency Clothes Washer Rebate Program

The installation of high-efficiency clothes washers (HECWs) is a growing segment in water conservation. In September 1997, the California Urban Water Conservation Council adopted BMP 6 for HECWs, and it approved revisions in March 2004. The revisions contain two options for how to credit agencies. The first option is based on the washer's "water factor" (WF), which is a measure of the amount of water used to wash a standard load of laundry. Washers with lower water factors save more water. The first option awards 1 point for HECWs with water factors 9.5 through 8.6; 2 points for WF 8.5 through 6.1; and 3 points for WF 6 and less. It does not award points for HECWs with water factors greater than 9.5. The second method grants 1 point for all washers regardless of the water factor.

Metropolitan supported the passage of California legislation requiring all washers sold in the state to meet an 8.5 water factor standard by 2007 and a 6.0 water factor standard by 2010. Since these standards exceed federal standards, the California Energy Commission (CEC) is preparing a waiver request to submit to the U.S. Department of Energy (DOE) that will allow California to promulgate a standard that is more stringent than federal standards. Two or three years may elapse before DOE responds.

Regardless of the outcome of the waiver request to DOE, Metropolitan continues to promote HECWs. As of the end of FY 2004, Metropolitan has provided incentives to purchase over 93,000 washers. From 1995 through October 2004, Metropolitan offered a $35 per washer incentive. From 1999 to 2001, Metropolitan partnered with Southern California Edison, which added an additional incentive of $50-$100. In 2002, Metropolitan received a grant from CALFED for an additional $90 per HECW, which brought the total Metropolitan incentive to $125 per washer. During the span of this grant, participation in the program increased from an average of 4,000 units per year to 20,000 units per year. At the close of that grant Metropolitan provided a temporary increase in its own funding to $110 per HECW, and in 2004, it received a

Proposition 13 grant for the additional $75 per HECW, so the total incentive remained at $110 per washer. In November 2004, Metropolitan's increased its HECW base incentive to $60 for washers with minimum water savings of 9,000 gallons per year. Grant funds were exhausted by June 2005, and Metropolitan has provided bridge funding until supplemental funds from Proposition 50 are available.

New Development Program
Metropolitan recently adopted incentives for new developments to install highly efficient fixtures that exceed current water use efficiency standards. Other opportunities to promote the installation of water-efficient devices in new developments will be explored with manufacturers, the building industry, and stakeholders.

Residential outdoor audit program
Metropolitan funds a residential landscape efficiency program through outdoor audits and weather-based irrigation controller rebates. Landscape audits provide customers with a recommended irrigation schedule and suggested improvements for irrigation systems. Installation of weather-based irrigation controllers (WBICs) is supported through the coordinated rebate program described below

Residential Weather-Based Irrigation Controller (WBIC) Rebate
Weather-based irrigation controllers are a rapidly evolving conservation technology. It entails devices that adjust irrigation schedules based on rain, temperature, sunlight, soil moisture, or some combination of indicators. Metropolitan began funding WBIC incentives in homes after conducting a pilot study that evaluated potential savings and ease of use. The incentive is $65 per WBIC, plus $5.50 per station over 12 stations for residential sites

Non-Residential Landscape Water Use Efficiency Program

Metropolitan has funded large landscape audits since 1993, retrofit of landscapes with centralized irrigation controllers since 1998, and rebates for weather-based irrigation controllers (WBIC) since 2002.

In September 2004, Metropolitan began an updated large landscape program. The new program provides Metropolitan's member agencies with the flexibility to choose from three components that best fit specific landscape sites. The long-standing landscape training program – Professional Protector del Agua – supports the first two of these three components:

1. Water Use Accountability
2. Measured Water Savings
3. Commercial and Institutional WBIC rebates

1. Water Use Accountability. This program improves landscape water management practices through training and timely water use reports. Agencies provide landscape owners, managers, and maintenance personnel with reports that compare the actual site water use to water budgets. Each billing cycle, the agencies generate water use update reports. In addition, participants may receive landscape water management training either by Metropolitan or the agency. Metropolitan provides incentives to reimburse agencies for up to

50% of their program costs. Incentives are $2.50 per acre per month of irrigated landscape under management if Metropolitan provides the training, or $3.50 per acre per month if the agency provides the training.

2. Measured Water Savings: Metropolitan provides incentives to upgrade landscape irrigation equipment that can provide verified water savings. In addition, participants may receive landscape water management training. A dedicated landscape meter is required to participate in this pay-for-performance program component. Incentives are $115 per acre-foot of verified saving if Metropolitan provides the training, and $154 per acre-foot if the agency provides the training. The incentives continue to be paid for up to five years or one-half of the project cost.

3. Commercial and institutional WBIC Rebate: Metropolitan provides an incentive of $500 per acre of irrigated landscape for WBICs.

Professional Protector del Agua (PPDA)
Metropolitan provides classes on efficient landscape water management. Agencies can provide equivalent training via their own staff or program vendor to meet the program requirements. An agency needs to choose whether Metropolitan or the agency will be providing PPDA training or the equivalent at the outset of their program.

Southern California Heritage Landscape Program
In 2002, Metropolitan launched a public outreach campaign targeting outdoor water use. The campaign, coordinated with participating member agencies, included funding for the promotion of efficient residential watering through irrigation controllers, a watering index to assist in estimating efficient watering times, and a native and California-friendly plant program. Metropolitan expanded these programs in 2003 and 2004 with an extensive media and outreach campaign and launched a consumer-oriented outdoor conservation savings web site.

The landscape program is expected to reduce summer and fall outdoor water use. The actual savings rate will be measured, but will not be included in the IRP Update's resource goals. Quantifying the potential savings is complicated because of possible overlaps with other programs – some of the outdoor savings, when measured, may be confounded with price-induced savings unless the effort is preceded by a controlled evaluation study.

Commercial, Industrial and Institutional Programs

Prior to the establishment of the Commercial, Industrial, and Institutional (CII) rebate program in 1997, Metropolitan conducted approximately 900 (CII) water-use surveys. These surveys provided the initial information used to determine the menu of eligible rebates and their dollar amounts, as shown in Table III-5.

Table III-5
CII Rebates Offered

Device	Incentive Amount
ULFT (Gravity & Flush Valve)	$60
Dual-flush toilet	$80
Upgrade from ULFT to dual-flush	$20
Urinal	$60
Pre-Rinse Spray Valve	$50
HECW	$100
Water broom	$100
Cooling Tower Controller	$500
X-Ray Film Processor Recirculating System	$2,000

In 1999, Metropolitan partnered with its member agencies to pilot the feasibility of working with a regional vendor for program marketing, management, and paying of rebate checks. Based on the success of this pilot program, a vendor-administered regional program began in 2004. Member agencies wishing to manage their own commercial program remain eligible to receive the device incentives listed above.

Industrial Process Improvement Program

Metropolitan's Industrial Process Improvement (IPI) program provides incentives to industrial customers for improving the water efficiency of their processes. Metropolitan has offered incentives to industrial customers since 1997. Initially, the complexity of the program and the difficulty in sector marketing resulted in low participation rates. In 2004, Metropolitan conducted focus groups to gather ideas for improving the IPI program. The resulting improvements – that encourage water efficiency actions by individual operators within their facilities – include:

a) Partial payment of the conservation incentive up front
b) Streamlining the application process
c) Providing outside vendor services for technical advice
d) Eliminating limits on project size.

Additionally, Metropolitan has initiated partnering opportunities with local sanitation districts to help market the program.

Innovative Conservation Program

Metropolitan's Innovative Conservation Program (ICP) began in October 2001 with a request for proposals for new conservation technologies. The 2001 ICP identified two promising new technologies: X-ray film processing water recyclers and water brooms. These two technologies have been added to Metropolitan's existing programs. In 2003, Metropolitan issued a second ICP request for proposals that resulted in the following ICP grants:

- An evaluation of water savings potential of commercial connectionless food steamers;
- An evaluation of the effectiveness of water savings with instant hot water systems;
- An artificial lawn demonstration test project;
- A swimming pool cover rebate survey;
- Research on surfactants that optimize water usage in turf and ornamentals;
- A native- and drought-tolerant plant pilot incentive program;
- A study of the efficiency of closed loop irrigation controls;
- A study of water conservation opportunities in supermarkets;
- A flow control valve study; and
- Root scorch prevention of container-grown California native plants sold in the retail trade.

These projects are all in various stages of completion.

Price-Effect Conservation

Numerous demand studies have shown that retail water rates and rate structures can be effective in promoting water savings. Consumers respond to price increases by reducing discretionary water use and by installing water-conserving devices. As retail rates within the region increase, and as water agencies adopt conservation-oriented rate structures, Metropolitan expects discretionary household and commercial and industrial water use to decrease. This reduction was modeled and incorporated into the IRP Update as a source of conservation. Most of the savings are expected to come from reductions in outdoor irrigation, which is the major discretionary component of residential and commercial use.

Grant Programs

Additional funding for conservation programs has been made available through government agencies. Metropolitan has worked to obtain a share of this funding to enhance the region's water conservation investments. Table III-6 and the following summaries describe briefly the sources and uses of these funds.

Table III-6
Grant Program Funding

Funding Source	Program/Project	Funding Amount ($1,000s)	Description	Status
CALFED				
	Residential HECW	$925	Increase rebate amount	Completed
	Protector del Agua	$100	Course development	Completed
	CII	$34		
Prop 13 Grants				
	HECW	$2,500	Increase rebate amount	
	ET Controllers	$1,800	Initiate rebates	
CPUC (w/CUWCC)				
2003	Pre-Rinse Spray Valves: Phase 1	$1,600*	12,000 direct installations*	Completed
2004	Pre-Rinse Spray Valves: Phase 2	$2,200*	17,000 direct installations*	In progress
USBR				
2003	CA-Friendly Landscapes	$182	New home landscapes	
2003	Data Loggers	$50	Software error analysis	Deferred
2004	CA-Friendly Landscapes	$60	New home landscapes	
2004	Synthetic Turf pilot	$220		In progress
2004	World Forum	$50	College/university grants	In progress
2004	CII Regionwide	$250	Add $ to rebate amounts and for administration	Completed
2005	Protector del Agua	$50	Develop web classes	Pending
2005	Landscape Market Analysis	$50		Pending
2005	City Makeover	$50	Public landscapes	In progress
Water for the West				
	Protector del Agua	$25	Develop web classes	In progress
Prop 50				
	Residential HECW	$1,660	Increase rebate amount	Pending
	CA-Friendly Cities	$423	Public landscapes	Pending
	High Efficiency Toilets	$1,000		Pending
	Protector del Agua	$77.5	Develop on-line classes	Pending

* This amount is Metropolitan's share of the project.

<u>CALFED</u>

- Residential High Efficiency Clothes Washers funded at $925,000
- Protector del Agua funded at $100,000
- CII conservation ($34,000)

<u>Proposition 13-Funded Grants</u>

Proposition 13 (The Safe Drinking, Clean Water, Watershed Protection, and Flood Protection Act) provided funding for water conservation. Within Metropolitan's region, grant funds received in 2003 went toward the following programs:

- Residential High Efficiency Clothes Washer Rebate Program – $ 2.5 million – used to extend the rebate program for high-efficiency clothes washers for about a year at the rebate level of $110 per unit.
- Evapotranspiration (ET) Irrigation Controller Installation Rebate – $ 1.8 million – used to establish a new rebate program that will install 5,500 units and perform studies over a three-year period.

California Public Utilities Commission (CPUC) Grants
- In 2003, Metropolitan partnered with the California Urban Water Conservation Council to use CPUC grant funding to install 12,000 pre-rinse spray valves in restaurants within Metropolitan's service area. The effort is expected to result in savings approaching 14,000 acre-feet over the five-year life of the devices.
- In 2004, a Phase 2 project is funded at the $2.2 million level to install 17,000 valves.

U.S. Bureau of Reclamation Grants
The following projects received funding from USBR during 2003:
- California Friendly Landscape pilot for new homes using incentives to establish up to 10 acres of water- efficient landscaping – $ 182,000
- Evaluation of data loggers, devices that attach to a water meter to provide precise, unobtrusive water use information – $ 50,000
- Metropolitan facilitated grantees with funding. Funds were granted directly to applicants for four additional Innovative Conservation Programs – $ 250,000.

The following projects received funding from USBR in 2004:
- Increased California Friendly Landscape Pilot for new homes by $60,000
- Synthetic Turf Replacement Program funding to promote, install, and study artificial turf on municipal and other public lands – $220,000
- World Water Forum for an "innovative conservation and technology" grant program for college and university teams – $50,000.
- Regional administration and enhanced rebate amounts for Industrial Process Improvement Programs – $250,000.

The following projects were selected by USBR in 2005, but the funds have not yet been distributed:

- Protector del Agua. Development of web-based classes –$50,000.
- Landscape Market Analysis – $50,000.
- City Makeover. Funds for landscape conservation by public agencies – $50,000.

Water for the West
- Protector del Agua. Development of web-based classes –$50,000.

Proposition 50 Grant Funds
- Residential High Efficiency Clothes Washers. Provided funds to increase the rebate amount – $1.6 million.
- California Friendly Landscape Pilot for new homes by $423,000

- High Efficiency Toilets – $1 million.
- Protector del Agua. Development of on-line classes – $77,500.

Measurement and Evaluation

The Measurement and Evaluation effort has four primary functions:
- Providing a means to measure and evaluate the effectiveness of current and potential conservation programs.
- Developing reliable estimates of various conservation programs and assessing the relative benefits and costs of these interventions.
- Providing technical assistance and support to member agencies in the areas of research methods, statistics and program evaluation.
- Documenting the results and the effectiveness of Metropolitan-assisted conservation efforts.

Metropolitan's staff has served as technical advisors for a number of state and national studies involving the quantification and valuation of water savings.

Other Conservation-Related Activities at Metropolitan

Conservation activities are closely coordinated with Metropolitan's External Affairs Group. Table III-7 summarizes the major conservation-related activities of BMP 7 administered by External Affairs. Table III-8 shows Metropolitan's extensive commitment to BMP 8's conservation-related education programs.

<u>Water System Operations Group</u>
Metropolitan's Water System Operations Group works to fulfill BMP 3 (System Water Audits, Leak Detection, and Repair) and BMP 4 (Metering With Commodity Rates for All New Connections and Retrofit of Existing Connections).

Leak Detection
Metropolitan has a variety of ongoing system-wide leak detection programs. Each week, a mathematical algorithm compares inflow with outflow for Metropolitan's entire system. Major control structures and hydroelectric plants are inspected weekly. Field crews patrol and visually inspect Metropolitan's pipelines daily for leaks. The 242-mile Colorado River Aqueduct is patrolled daily by both air and ground crews. All underground structures are checked every six months as part of a continuous preventive maintenance program.

Metering
As a wholesale water supplier, Metropolitan has no retail customers. However, the majority of inter-agency water service connections are metered. Any new water agency supplied by Metropolitan would likely be metered.

Other activities include:

- Re-evaluating the $154 value provided by the conservation credit program in light of up-to-date supply costs.
- Creating a 5-year strategy document regarding agency financing, including rates.

- Tightening annexation policies to ensure greater compliance with the initiation of water efficiency measures in newly annexed areas.
- Annual SB60 reporting
- Launching the bewaterwise.com website
- Maintaining 9 CIMIS stations
- Conducting a customer attitude survey in 2003
- Developing new incentives for HETs, waterless urinals, and differential incentives for higher Water Factor HECWs
- Completing the Orange County Saturation study in 2002.

Metropolitan charges a fixed unit price per acre-foot for water service to its member agencies. For increases in supplies, Metropolitan's rates include a second tier that is set at the cost of new supply sources, so it is higher than the first tier. The purpose of this second tier is to encourage competition at market rates among alternative water sources, such as water transfers, recycling and desalination. This commodity-based revenue structure complies with BMP 11.

Achievements to Date

Conservation is an integral part of water supply planning and operations at Metropolitan. The Regional Supply Unit works to improve the understanding of the costs and benefits of conservation so investment decisions are both efficient and effective at meeting program goals. As a cooperative member of California's water conservation community, Metropolitan has made significant contributions to the development and coordination of conservation activities throughout the state. These contributions have been recognized in the form of "Gold Star" certification from the Association of California Water Agencies and awards from the United States Bureau of Reclamation and California Municipal Utilities Association.

Table III-9 summarizes Conservation Credits Program savings and payments. Table III-11 summarizes activities Metropolitan implemented in its service area in the past decade (as of the end of FY 2004) and shows the achievements the region has made in implementing these programs. Table III-12 shows the most recent conservation projections by category without future active conservation programs—the total conservation achievement picture based on all activities to date.

Summary

Conservation continues to be an important part of Metropolitan's water supply planning. Continued investment in cost-effective conservation is a key goal in the IRP process, and its importance has increased in the IRP Update.

Table III-7
External Affairs Group
Conservation-Related Activities

Program or Activity	Description
Speaker's Bureau	Provides speakers for organizations, service clubs, churches, business and other community groups and associations. An estimated 15,000 – 20,000 people attend these presentations annually.
Community Relations	Organizes and conducts an average of 80 Board of Director-sponsored inspection trips of Metropolitan's distribution system per year for elected officials, community leaders and members of the public. Approximately 3,000 people learn about Metropolitan's conservation and water management policies and practices each year through these trips. Additionally, Metropolitan's education curriculum and program activities engage an average of 150,000 students per year.
Media and Publications	Conducts editorial briefings and media field trips; assembles press packets; prepares and disseminates news releases, speeches, videos, fact sheets, brochures, articles and editorials describing Metropolitan's water management objectives and programs.
Government Relations	Provides elected officials, public agencies, businesses and organizations with information about Metropolitan's water management objectives and programs.

Table III-8
School Education Programs

Program or Activity	Date Initiated	Date Updated	Current Status	Grades	Description
Admiral Splash	1983	2001	Ongoing	Grade 4	A two-week program focusing on Southern California history, the water cycle, supply and the distribution system, water uses and conservation.
All About Water	1991	1998	Ongoing	K-3	Activities to teach young students about droughts, conservation, water quality and physical properties of water.
Geography of Water	1993	1998	Ongoing	Grades 4-8	A curriculum module on the relationship between population, precipitation, geography, economics, and water distribution.
Water Politics	1994	2004	Ongoing	Grades 9-12	A case study-based exploration of water supply issues facing Southern California, the Colorado River Basin, and the Middle East.
Water Ways	1995	2001	Ongoing	Grade 5	A supplement integrated into fifth-grade U.S. History featuring activities regarding water use, sources, ethics, and environment issues selected from three historical periods. This includes historical attitudes towards the stewardship of water.
Water Quality	2001	-	Ongoing	Grades 7-12	Hands-on activities to investigate water quality issues, with conservation as an element of the overall picture.
Water Works	2001	-	Ongoing	Grades 7-12	A school to career, job specific program featuring activities and profiles on a variety of water-related careers, including conservation specialist.
Water Times	2005	-	Ongoing	Grade 6	An age-appropriate newspaper that provides interdisciplinary concepts, tools, and calculations related to water conservation, and that conveys an overall ethic of water stewardship.

Table III-9
Conservation Credits Program

	Residential	Landscape	Commercial	Total
Water Savings* (AF)				
FY 2004/05	95,700	2,550	14,050	112,300
FY 2003/04	90,300	2,700	9,250	102,250
FY 2002/03	84,816	2,525	4,789	92,130
Since Inception (1990)	759,894	27,065	40,185	827,145
Payments ($ millions)				
FY 2004/05	8.6	0.2	1.9	10.7
FY 2003/04	12.5	0.4	3.8	16.7
FY 2002/03	12.1	0.1	2.7	14.9
Since Inception (1990)	162.3	2.2	12.2	176.7

* Includes code-based conservation originated as active.

Note: Program expenditure decreased in FY 2004/05 primarily due to saturation of residential ultra-low flush toilets and reduction in commercial high-efficiency clothes washer incentives.

Table III-10
Conservation Achievements In Metropolitan's Service Area

BMP Number	BMP Name	Metropolitan Program Description	Device/Activity Description	Number Implemented	Metropolitan Expenditures
1	Residential Water Surveys	Financial support for surveys, retrofits,	Surveys	69,901	$1,960,538
			Toilet devices distributed	1,132,765	$1,311,740
			Residential R&D (projects)	8	$299,799
2	Residential Plumbing Retrofits	Financial support for retrofits and	Low Flow Showerheads distributed	2,968,576	$12,413,187
		Distributions	Faucet aerators distributed	225,239	$224,073
6	High Efficiency Washing Machines	Financial support for rebates	Residential High Efficiency washers rebated	93,062	$6,022,786
14	Residential ULFT Replacement	Financial incentives for toilet retrofits	Some agencies are reaching saturation	2,134,839	$133,501,638
		Residential Sector Total		6,624,390	$155,733,761
5	Large Landscape	Financial support for retrofit surveys	Audits conducted	2,173	$845,035
			Central controller	7	$703,175
			Protector del Agua graduates	30,747	$1,935,205
			Landscape R&D (projects)	11	$473,868
		Large Landscape Sector Total		32,938	$3,957,283
9	Commercial, Industrial, Institutional	Financial support for retrofit surveys,	ULFT	58,511	$3,777,731
		workshops and research & development	Urinals	2,146	$168,587
			Flush Valve kits	755	$18,723
			Cooling Tower retrofits	640	$311,615
			Clothes Washer rebates	19,705	$4,258,134
			Industrial Process Improvements	3	$172,157
			Pre-Rinse spray valves	12,675	$842,623
			Other device rebates	1,704	$429,576
			Workshops on commercial retrofits	7	$7,000
			CII R&D (projects)	11	$336,403

Table III-10 (contd.)
Conservation Achievements In Metropolitan's Service Area

BMP Number	BMP Name	Metropolitan Program Description	Device/Activity Description	Number Implemented	Metropolitan Expenditures
CII Sector Total				96,157	$10,322,549
3	System Water Audits, Leak Detection	Distribution system audits/leak detection	MWD surveys own pipes & aqueducts		$3,850,000
4	Metering and Commodity Rates	All connections metered	Yes		
7	Public Information	Materials & programs provided	Launched multi-media regional message	0	$15,344,641
8	School Education	Full range of school curricula		0	$8,990,293
10	Wholesale Agency Assistance	Technical and financial support for BMPs 1, 2, 5, 6, 7, 8, 9, 11, and 14	Regional water efficiency media campaign, some programs managed for MWD's service area		
11	Conservation Pricing	Commodity rate structure in place			
12	Conservation Coordination	Staff of 10 people		0	$13,282,690
13	Water Waste Prohibition	Exempt		0	$0
	Various	Programs no longer offered		1,719	$1,569,070
Miscellaneous Programs Total				1,719	$43,036,694
Cumulative Total Spent by Metropolitan Water District through FY 2004:					**$213,050,287**

Table III-11
2005 UWMP Final Forecast
Total Conservation - All Sources Plus IRP Target

	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Existing Active (through 2004)*, Code-based, Price-Effect, and Remaining IRP Target	486,000	615,000	705,000	778,000	857,000	938,000
Pre-1990	250,000	250,000	250,000	250,000	250,000	250,000
Total	736,000	865,000	955,000	1,028,000	1,107,000	1,188,000

* Includes code-based savings originated through an active implementation program

III.3 RECYCLING, GROUNDWATER RECOVERY, AND DESALINATION

IRP Goals

With the adoption of the 1996 IRP, Metropolitan's members and Board set resource goals for Metropolitan to achieve during the next 25 years to meet its supply reliability and water quality objectives in a cost-effective manner. These goals call for strong reliance on local water management options, including conservation and increased use of local resources.

Metropolitan's projection of the regional implementation of direct-use recycling, groundwater recovery, and seawater desalination exceed the 1996 IRP goals. In 2004, Metropolitan's board adopted an IRP Update that includes a target of 150,000 acre-feet per year for seawater desalination projects to meet future demands.

The 1996 IRP set a year 2020 production target for combined water recycling and groundwater recovery elements totaling 500 taf per year. Of that amount, about 251 taf per year (FY 2002) are currently being produced: 209 taf per year from recycling and 43 taf per year from groundwater recovery. The IRP Update set a year 2025 target production for combined water recycling, groundwater recovery, and seawater desalination elements totaling 750 taf per year, including an increase of 250 taf as a supply buffer. Table III-12 shows the IRP goals for these water supplies.

Table III-12
Target Range for Water Supplies from Recycling and Groundwater Recovery

Year	Delivery Goals (taf)
2005	355
2010	410
2020	500-750
2025	500-750

Water recycling has proven to be an effective drought-proof supply, and it helps local agencies comply with environmental regulations. Currently, more than half of the water recycling in California occurs in Metropolitan's service area. In addition, local agencies have implemented several projects to recover contaminated or degraded groundwater for potable uses that help meet the region's current or future water demand. The groundwater recovery projects use a variety of treatment technologies to remove undesirable constituents such as nitrates, VOCs, perchlorate, color and salt. The increases in groundwater production in some cases require additional artificial replenishment and may not be sustainable on an annual basis. Desalination of brackish groundwater and other local supplies is also an important element in the continued supply reliability of the region.

Issues

Meetings with member agencies related to the previous Urban Water Management Plan and the IRP Update highlighted an important issue: a significant amount of future recycling has been dedicated to groundwater replenishment and seawater barriers (non-consumptive or non-direct use) rather than for direct use to offset potable demand (urban or agricultural), which was Metropolitan's expectation when it developed its 1996 IRP recycling target. Thus, supply analyses must properly identify potable and non-potable uses of water.

A. Recycling

Local water recycling projects involve collecting wastewater that is currently discharged within the service area, treating that water to a suitable standard for specific uses, and using that recycled water for non-potable uses. This section provides a description of the water sources that potentially could be used for recycled water.

Wastewater Disposal in the Service Area

As part of regional planning that encourages the collection and use of recycled water, a database has been developed to catalogue the name of each wastewater treatment facility, operating agency, location and elevation of the facility, extent of wastewater treatment, capacity and anticipated production, method of effluent disposal, and influent and effluent water qualities. As shown in Table III-13, this database identifies 89 wastewater treatment plants within Metropolitan's service area.

Wastewater treatment capacity provides an indication of the amount of wastewater being generated and disposed of within Metropolitan's service area. Most wastewater plants in the service area provide secondary treatment using activated sludge, a level of treatment that complies with the Clean Water Act. Inland wastewater plants generally provide treatment to tertiary levels so the effluent may be disposed of in a stream or other water body or for beneficial reuse. A small percentage of tertiary treated effluent undergoes reverse osmosis or electrodialysis reversal processes, producing high-quality recycled water for groundwater recharge, industrial uses, or, in some instances, municipal uses.

Within Metropolitan's service area, many local agencies collect and treat municipal wastewater. Some of the largest agencies include:

- Los Angeles County Sanitation Districts
- Orange County Sanitation District
- City of Los Angeles Bureau of Sanitation
- San Diego Metropolitan Wastewater Department
- Eastern Municipal Water District
- Inland Empire Utilities Agency

Table III-13
Existing and Projected Total Effluent Capacity
Wastewater Treatment Plants within Metropolitan's Service Area

Treatment Level	Existing Capacity(MGD)	2010 Capacity (MGD)	2040 Capacity (MGD)
Primary	2,120	2,668	3139
Secondary	1,546	2,232	2708
Tertiary	607	1,080	1464
Advanced	34	184	229

This data was compiled as part of the South California Comprehensive Water Reclamation and Reuse Study and is included in the Phase IB Summary Report – December 1998.

Many small special-purpose wastewater agencies, dual-purpose (water and wastewater) special districts, and municipal wastewater agencies also operate within Metropolitan's service area.

As a rule, wastewater is collected in a sewer collection system. From there, it flows by gravity to a centrally located treatment plant. Once treated, wastewater is disposed of through one of three mechanisms:

1. Ocean Outfalls – Treated wastewater is either disposed of directly through an ocean outfall or conveyed to the ocean outfall via a land pipeline.

2. Reuse – About 209 taf per year goes to irrigation, industrial processes, and groundwater recharge applications. A few inland treatment plants (in Riverside and San Bernardino counties) irrigate feed and fodder crops with recycled water. While this use is considered beneficial, it is not necessarily the highest and best use for recycled water. Higher value uses, however, will require more developed markets.

3. Live Stream Discharge – A number of inland plants pump treated effluent into local streams and rivers. That water is then used downstream for beneficial uses, or it flows into the ocean. Some of the affected rivers (or ephemeral streams) include:

   - Los Angeles River
   - Santa Ana River
   - Calleguas Creek
   - Rio Hondo & San Gabriel Rivers
   - Santa Margarita River

Regional Planning for Optimal Recycling

In the 1990s, the United States Bureau of Reclamation, in conjunction with Metropolitan, the California Department of Water Resources, and six other Southern California water agencies, studied the feasibility of regional water reclamation projects in Southern California.[1] This study

[1] This was the Southern California Comprehensive Wastewater Recycling and Reclamation Project (SCCWRRS).

identified 34 potential regional projects within Metropolitan's service area with an estimated yield of 450 taf per year. Metropolitan and its member agencies continue to explore these and other projects and develop updated plans on a regular basis.

Uses of Recycled Water

Currently, there are about 355 taf per year of planned and permitted uses of recycled water throughout Metropolitan's service area. These uses include landscape irrigation, commercial and industrial use, seawater intrusion barriers, and groundwater recharge applications. Approximately 480 taf per year of new recycled water could be developed in Metropolitan's service area by the year 2025, and an additional 130 taf per year could be developed by the year 2050, for a total of 610 taf per year. A number of these projects are currently being implemented and will go on-line within the next five years. Other projects are in various stages of planning, and their development will depend on cost, financing, regulatory actions, and water supply demands.

<u>Groundwater Recharge</u>
Metropolitan's service area overlies numerous groundwater basins, many of which are overdrafted, and some of which are threatened by seawater intrusion. Water agencies along the Los Angeles and Orange county coastline inject water into the underlying groundwater basins to create a barrier against this seawater. A limited amount of the injected water originates as captured storm water, but the major part is recycled, imported, or extracted from deep wells. Increasing the proportion of recycled water can free imported water for direct consumption. Currently, approximately 60 taf per year of recycled water is "permitted" for recharge and seawater barrier injection into the Orange County, Central and West Coast groundwater basins.

About 30 percent of the recycled water in Metropolitan's service area is used for groundwater replenishment and seawater barriers. Table III-14 presents a summary of this recycled water use.

Table III-14
Existing Groundwater Replenishment and Seawater Barrier Injection Projects Using Recycled Water
(af per year)

Project	Recycled Water Use
OCWD Water Factory 21	2,700
West Coast Barrier[1]	7,500
Central Basin Spreading	45,000
Alamitos Barrier	3,000
Total	58,200

1 An additional 5,000 af per year of recycled water is expected to be permitted in 2006.

On average, these and other seawater barriers recharge approximately 50 taf per year with imported water or water from extraction wells. Within the next decade, projections show that 90 percent of the water used for seawater barriers will be supplied by recycled water treated with microfiltration followed by reverse osmosis, freeing other water for direct consumption.

Large-scale groundwater replenishment projects require case-by-case review by the California Department of Health Services (CDHS). The greater the percentage of recycled water used for replenishment, the more stringent the CDHS requirements.

Typically, groundwater recharge projects are linked with the construction of new wells to increase basin yield and offset demand for imported water. This conjunctive use element of groundwater recharge projects adds the cost of groundwater extraction facilities and energy to the project's total cost. New wells cost between $500,000 and $1 million.

One potential concern related to the use of recycled water for groundwater recharge could be adverse impacts to groundwater quality from organic contaminants, metals, and salts. CDHS has proposed regulations for recharge with recycled water into an aquifer used as a domestic supply source. The proposed regulations limit the amount of recycled water that can be recharged to a maximum of 20 percent blend at the nearest production well without treatment, and treatment technologies are prohibitively expensive. Despite these regulations, a large market exists for the use of recycled water, but realizing a significant demand for recycled water will require modifying regulations based on future studies of the health effects of recycled water.

Industrial

Industrial users represent a large potential market for recycled water, particularly in heavily industrialized areas, such as the cities of Vernon, Commerce, Industry and the Wilmington area of Los Angeles. Additionally, refineries in El Segundo in West Basin MWD's service area and in the City of Torrance use approximately 8 taf per year of recycled water. Typical industrial uses include cooling tower makeup water, boiler feed water, paper manufacturing, carpet dying, and process water. Industrial users are high-demand, continuous-flow customers, which allows greater operational flexibility by allowing plants to base load operations rather than contend with seasonal and diurnal flow variations. Because of these operational benefits, industrial users reduce the need for storage and other peak demand facilities and management.

Irrigation

Currently, about 86 taf per year of recycled water is used to irrigate golf courses, parks, schoolyards, cemeteries and greenbelts throughout Southern California. Using recycled water for irrigation reduces the need for imported water during the critical summer months and in drought situations when water supplies are most scarce.

Technical and Economic Issues of Recycled Water

The use of recycled water is growing rapidly in Metropolitan's service area. Further expanding its use will depend on progress in research, regulatory change, public acceptance, and financing of local projects.

Metropolitan supports:

- Increasing water recycling in California and the Colorado River Basin;
- Advocating funding assistance by parties that benefit both directly and indirectly from the use of recycled water;
- Expanding recycled water uses;

- Reviewing recycled water regulations to ensure streamlined administration, public health and environmental protection;
- Planning efforts and voluntary cooperative partnerships at the local and statewide levels;
- Conducting research and studies to address public acceptance, new technologies and health effects assessments.

Funding - Capital risk is a significant constraint to increased recycled water project development. Recycled water systems are separate from the potable system, so projects require significant capital investments in treatment and distribution. Variability in demand for recycled water lengthens the time needed to develop markets fully, which can affect project economics by increasing unit costs during early years of operation. Uncertainty of market demands creates a risk to the cost recovery required for the repayment of capital debt.

Estimates show the need for $2.6 billion in capital improvements for near-term projects to develop 450 taf per year of recycled water from future projects. This funding could come from many sources, including water agencies, wastewater agencies, and federal and state funding programs. However, the large capital risk may deter agencies from undertaking these projects.

Metropolitan developed the Local Projects Program (LPP) and subsequently the Local Resources Program (LRP) to assist member agencies in overcoming this obstacle. In its role as the regional water supplier, Metropolitan provides financial assistance to participating projects that offer regional benefits to offset regional supply shortages.

In addition to the LPP and LRP, many water agencies partner with wastewater agencies to provide needed financial resources. The San Diego County Water Authority's Reclaimed Water Development Fund assists local agencies in developing recycling projects in San Diego County. Wastewater agencies understand that beneficial reuse may be a cost-effective alternative to regulatory and disposal issues. Implementing a reuse program can defer or eliminate the need for ocean outfall expansions and extensions. Also, a recent trend by the regulatory community to require zero discharge during certain periods encourages wastewater agencies to consider water reuse as a supply option. Project partnerships between water supply and wastewater treatment agencies have led to projects in which both entities contribute financial resources and share multiple benefits.

The Bureau of Reclamation's Title XVI program represents another major funding source. Title XVI was authorized by Congress in 1992, and approximately $232 million has been appropriated to projects in Metropolitan's service area.

Proposition 204 (1996 bond measure) provided $60 million for water recycling loans. Proposition 13, approved by voters in 2000, has supplemented Proposition 204 funds with $40 million in grants and low interest loans. Proposition 13 funding also provided $235 million to the Santa Ana Watershed Project Authority, a portion of which will likely be used to fund recycled water projects. Proposition 50, passed in 2002, includes funding for the development of local projects including water recycling, and it is expected to be an important source of funding for local projects.

In the recent Framework For Action, CALFED staff recommended that state and federal governments spend up to $2 billion over the next seven years on water use efficiency projects, including water conservation and recycling.

Regulatory Issues

Two state agencies are involved in regulating water recycling projects. The Regional Water Quality Control Board (RWQCB) is the permitting authority, and the California Department of Health Services (CDHS) oversees health concerns and standards. Combining water quality concerns and health effects requires meeting stringent goals and standards. Title 22 of the California Administrative Code provides specific guidelines for treatment levels and corresponding reuse opportunities. However, there are no uniform criteria for groundwater recharge applications. Currently, state regulatory agencies review and determine requirements for recharge projects on a case-by-case basis. In many instances, CDHS is required to make interpretations regarding Title 22.

Institutional Issues

Multiple local agencies are often involved in proposed water recycling projects. For example, recycled water from a single wastewater source may be used by a number of recycled water distributors, or the recycled water may be treated and delivered by an agency in one service area and used in another. Also, an agency responsible for wastewater collection and treatment may wish to deliver recycled water within a water district's service area. Projects that involve groundwater recharge require close coordination with groundwater managers. In most instances, these projects require a committed agency that is willing to negotiate with other affected agencies to develop water recycling.

Water Quality

Water quality requirements for various types of irrigation and industrial uses are critical when evaluating whether recycled water will be an acceptable supply. Possible constituents in recycled water, such as TDS, chloride, pH, or ammonia, may cause problems for specific applications.

Seasonal Storage

Production of wastewater at a water reclamation plant is relatively uniform year round since indoor residential use does not vary much from winter to summer. Flows may be somewhat higher in the winter at the wastewater reclamation plant from stormwater inflow into the sewers, but more than 60 percent of irrigation demand on recycled water (parks, golf courses, etc.) is in summer (May through September). Therefore, some recycled water projects store surplus production of recycled water in the winter for later use during the dry summer months to optimize recycling. Agencies such as Las Virgenes Municipal Water District and Irvine Ranch Water District have undertaken extensive engineering and operational studies to manage their seasonal supply variations. Operational storage is also needed because regulations only allow watering at night to reduce opportunities for direct public contact.

Brine Disposal

Brine disposal is a critical issue facing Southern California in the further development of recycled water projects. Metropolitan and the U.S. Bureau of Reclamation conducted a Salinity Management Study that identified the need for approximately $200 million in additional brine sewer lines to export salts from the watersheds to the ocean. The study recommended that these brine lines be built to maintain the long-term salt balance of the groundwater basins and to maintain the quality of the recycled water supplies at water reclamation plants. The Southern California Salinity Coalition, a coalition of water and wastewater agencies, has advocated for state and federal financial assistance to build these regional brine lines.

Public Acceptance

Public education programs are an integral part of recycled water project implementation. Recycled water users and the general public need to be educated on recycled water benefits, and they need to be reassured of the safety of recycled water. To encourage public acceptance, Metropolitan supports a continuous review of recycled water use regulations to ensure streamlined administration, public health, environmental protection, and research efforts that address public acceptance, new technologies, and health effects assessments.

B. Groundwater Recovery

All Southern California groundwater basins experience varying degrees of water quality challenges as a result of urban and agricultural uses. The accumulation of high-salinity water and degradation from volatile organics are two common constraints to the economic use of groundwater for urban applications. In some cases, the threat of increased salt buildup can also complicate the conjunctive use of groundwater basins and imported supplies.

In limited instances, recovering degraded groundwater costs less than purchasing imported water from Metropolitan. As a result, these projects have moved forward on their own because they make economic sense. In many cases, particularly where total dissolved solids are the constituent of concern, more expensive membrane processes are required, and agencies are more reluctant to make the capital investments necessary to recover the degraded water. In those cases, agencies typically seek financial assistance to offset costs to the extent that recovering degraded water has a regional benefit.

Use of degraded groundwater normally requires high levels of treatment. Once treated, however, recovered groundwater may be delivered to potable water systems. Membrane processes used to recover the majority of severely degraded water have a high capital cost and incur a high operational cost for power.

All processes that recover degraded groundwater also produce concentrated waste flows for which disposal can be problematic. Most importantly, membrane processes produce significant volumes of brine – about 15 percent of the treated water – that require disposal to an ocean outfall or sanitary sewer. Since discharge to sewers only exacerbates the salinity problems that challenge downstream water recycling projects, brine disposal requires expensive ocean outfalls.

Lastly, most of the groundwater basins in Southern California are regulated by basin managers. Where the safe yield of a groundwater basin is at its maximum, these regulations might require that recovered groundwater projects include replenishment with supplemental water.

Metropolitan initiated its Groundwater Recovery Program (GRP) in 1991 to encourage local agencies to treat and use degraded groundwater for municipal purposes. Under the GRP, Metropolitan provided financial assistance of up to $250 per acre-foot to local agencies for the construction and operation of project facilities used to recover degraded groundwater that will cost the implementing agency more than purchasing that water supply from Metropolitan. The GRP was open to all technologies that recovered and used degraded groundwater. It was retired in 1998 with the initiation of the Competitive Local Resources Program, which includes both recycled water and groundwater recovery projects.

C. Seawater Desalination

Until recently, seawater desalination has been considered uneconomical to be included in the region's water supply mix. However, recent breakthroughs in membrane technology and plant siting strategies have helped reduce desalination costs, warranting consideration among alternative resource options outlined in Metropolitan's IRP Update. The IRP Update includes a target of 750 taf per year of local water production by 2025 that could include up to 150 taf per year of seawater desalination.

As a first step to implementing this plan, Metropolitan issued a competitive request for proposals targeting 50 taf per year of desalinated seawater. Metropolitan would provide financial assistance of up to $250 per acre-foot of desalinated seawater developed and used within Metropolitan's service area for up to 25 years. Five member agencies submitted proposals for about 142 taf per year of desalinated seawater, including San Diego County Water Authority, Long Beach Water Department, Los Angeles Department of Water and Power, West Basin Municipal Water District, and the Municipal Water District of Orange County, which are expected to come on line by 2010.

However, the implementation of large-scale seawater desalination plants faces considerable challenges. These challenges include high capital and operation costs for power and membrane replacement, availability of funding measures and grants, addressing of environmental issues, and addressing the requirements of permitting agencies, such as the Coastal Commission. These issues require additional research and investigation. Metropolitan is providing $250,000 to five member agencies to conduct research in various aspects of seawater desalination. They are reviewing and assessing treatment technologies, pretreatment alternatives, and brine disposal issues, and they are identifying and evaluating resource issues such as permitting, environmental review and the regulatory approvals associated with the delivery of desalinated seawater to regional and local distribution system.

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

Changed Conditions

The status of locally planned recycling and groundwater recovery projects changes from year to year. Metropolitan periodically surveys its member agencies for planned projects to coordinate local supply projections and plans. Changes in long-term strategies, regulations, funding priorities, and new opportunities contribute to changing outcomes. In fact, this dynamic nature of local supply plans accounts for much of the change between the 1996 IRP and the Update.

Other changes since the 1996 IRP include the following:

- Decreases in the estimated cost of seawater desalination;
- Faster than expected development of groundwater recovery supplies;
- Decrease in potable supply offset by recycled water due to higher than projected local recycling production dedicated to non-direct uses, such as groundwater replenishment and seawater barriers.

Implementation Approach

The IRP Preferred Resource Mix provides Metropolitan with a strategy to meet future water supply reliability needs. Developing locally owned water recycling, groundwater recovery, and seawater desalination projects allows Metropolitan to reduce its capital improvements and its O&M costs for water importation, treatment, and distribution. Metropolitan schedules its financial assistance for these types of projects to conform to expanding regional needs for imported water.

Since 1982, Metropolitan has implemented several programs to provide financial assistance to its member agencies and subagencies for developing local water supplies. Metropolitan's incentive programs are based on a pay-for-performance principle, with incentive payments provided on a contractual basis for yield developed by local agencies and applied to beneficial uses. These incentive programs have been instrumental in helping the region implement the 1996 IRP local resource targets. Since the inception of the program, Metropolitan has invested more than $165 million and partnered with member agencies on 54 recycling projects and 20 groundwater recovery projects. Member and retail agencies have also funded a significant number of local projects without Metropolitan funding, many of which pre-date Metropolitan's incentive programs.

Metropolitan's Incentive Programs

Local Projects Program

Metropolitan implemented the LPP in 1982 to assist with the development of recycled water supply projects. At that time, the Board recognized that water recycling generally costs more than buying imported water from Metropolitan. Since then, the LPP was modified to continue the development of water recycling projects in Southern California. The basic purpose of the LPP was to provide financial support to local agencies developing recycled water projects that cost more than Metropolitan's imported supplies, thus reducing the demand for imported water and improving regional water supply reliability.

Between 1986 and 1990, the LPP contribution for a project was a minimum of $75 per af of production, which roughly equaled Metropolitan's avoided energy cost for pumping an equivalent amount of water through the State Water Project. In April 1990, Metropolitan's Board modified the LPP contribution to $154 per af. In August of 1995, Metropolitan's Board adopted the Local Resources Program (LRP) Conversion and revised the contribution scheme for existing LPP projects. The contribution for a project ranged from $0 to a maximum of $250 per af, based on the difference between the project's unit cost and Metropolitan's treated water rate. Existing participants in the LPP had a choice of remaining at the flat rate of $154 per af or converting to the revised contribution methodology. LPP and Local Resources Program Conversion were retired in 1998 with the initiation of the Competitive Local Resources Program.

<u>Groundwater Recovery Program</u>

Following on the success of its LPP, which included two projects to recover degraded groundwater, Metropolitan initiated its Groundwater Recovery Program (GRP) in 1991 to encourage local agencies to treat and use degraded groundwater for municipal purposes.

The GRP supported member agency efforts to improve regional water supply reliability through conjunctive use and the development of additional local sources of supply. Similar to the LPP, Metropolitan provided financial assistance to local agencies for the construction and operation of project facilities used to recover degraded groundwater that will cost the implementing agency more than purchasing that water supply from Metropolitan. Unlike LPP, Metropolitan provided financial assistance based on the difference between the project unit cost and Metropolitan's treated water rate, up to a maximum of $250 per af. The GRP was open to all technologies that recovered and used degraded groundwater. The GRP was retired in 1998 with the initiation of the Competitive Local Resources Program, which includes both recycled water and groundwater recovery projects.

<u>Competitive Local Resources Program</u>

In June 1998, following extensive joint development and endorsement from Metropolitan's member agencies, Metropolitan's Board retired the LPP, GRP, and LRP Conversion programs and established the Competitive LRP in their places. The primary objective of the Competitive LRP is to support the development of cost-effective water recycling and groundwater recovery projects that reduce demands for imported supplies. The Competitive LRP uses a competitive Request for Proposals (RFP) process to encourage the development of cost-effective recycled and groundwater recovery projects.

To qualify for inclusion in the LRP, a project must be selected through a competitive RFP process. A review committee provides an objective evaluation of project proposals and identifies the mix of project proposals that best meets the region's needs consistent with the objectives of the IRP. Qualifying and scoring criteria guide the review committee in its ranking of LRP project proposals. These criteria set basic standards to ensure that the proposed project provides an increased level of recycled water and is capable of being implemented. Projects that pass the qualifying criteria received a numerical score based on the following categories:

- Readiness to proceed
- Diversity of input discharges
- Regional water supply benefits

- Water quality benefits
- Metropolitan facility benefits (will the project postpone or delay new facilities?)
- Operational reliability and probability of success
- Increased beneficial uses
- Cost to Metropolitan

In 1998, Metropolitan issued an RFP to meet the short-term goal of obtaining an additional 53 taf per year of local resource production by 2010, offering incentives of up to $250 per af for terms of up to 25 years. The RFP specified that Metropolitan would select project proposals based on selection criteria up to these levels. In response to the RFP issued in 1998, Metropolitan received a total of 28 proposals with an ultimate yield of more than 140 taf per year. Fourteen projects with a combined total yield of 51.5 taf per year were selected for inclusion in the LRP, and contracts for Metropolitan to provide financial assistance have been executed. In April 2003 Metropolitan issued an additional RFP, offering financial incentives of up to $250 per acre-foot for terms of up to 25 years. In response, member agencies submitted 27 proposals for projects that would produce 113 taf per year. A review committee of Metropolitan staff and water resource consultants evaluated the proposals using selection criteria previously adopted by the Board. This process resulted in the selection of thirteen projects to be eligible for incentive payments, as shown in Table 15. Future targets for recycling production identified in the IRP Update will likely use a similar competitive process. Metropolitan will continue to assist in the development of recycled water projects in Southern California as its ongoing planning process identifies water recycling needs.

Seawater Desalination Program

Metropolitan and its member agencies view seawater desalination as a future component of a diversified water supply portfolio. Recent and continuous breakthroughs in membrane technology have helped reduce desalination costs, warranting consideration among alternative resource options outlined in Metropolitan's IRP. The IRP Update includes a target of 750 taf per year of local water production by 2025 that includes up to 150 taf per year of seawater desalination.

Table III-15
Thirteen Local Resource Program Projects Selected in 2004

Project / Member Agency	Yield (AF/Yr)	Contribution ($/AF)
City of Industry Regional WRP / Three Valleys MWD	8,867	50 – 200
Direct Reuse Phase IIA / Upper San Gabriel Valley MWD	2,258	65-200
Groundwater Replenishment System / MWDOC	31,000	100-137
Hansen Area WRP / LADWP	3,665	12-250
IRWD Recycled Water System Upgrade / MWDOC	8,500	117
Pomona Well No. 37 / Three Valleys MWD	1,100	100
RW Distribution Extension / Las Virgenes MWD	225	155
RW Distribution Ext. Malibu Golf Course /Las Virgenes	300	175
RW Pipeline Reach 16 / Eastern MWD	820	82
Sepulveda Basin WRP Phase IV / LADWP	546	125
South Valley Water Recycling Project / LADWP	1,000	175
Tapo Canyon WTP / Calleguas MWD	1,445	100
Wells No. 7 & 8 / Torrance	5,189	160

Source: Metropolitan's SB 60 Report

Metropolitan initiated the Seawater Desalination Program (SDP) in 2001. This program provides financial assistance of up to $250 per af per year for 25 years for desalinated seawater that is developed and used within Metropolitan's service area. Five member agencies have submitted proposals for about 142 taf per year of desalinated seawater: San Diego County Water Authority, Long Beach Water Department, Los Angeles Department of Water and Power, West Basin Municipal Water District, and the Municipal Water District of Orange County. The Board has directed Metropolitan staff to develop contracts to pursue projects proposed under this program.

Metropolitan continues to work with its member agencies to develop a research agenda for specific projects. Metropolitan is also involved in efforts to assess current desalination projects and to compare project features and applicability to Southern California, such as an evaluation of permitting and regulatory approvals associated with delivery of desalinated seawater to regional and local distribution systems.

<u>Innovative Supply Program</u>
This program was designed to encourage investigations into alternative approaches to increasing the region's water supply. In April 2003 Metropolitan issued a solicitation for competitive proposals to investigate these innovative ideas. The competitive program provides a systematic

approach for objectively considering proposals from organizations and individuals on new supply ideas rather than on a case-by case basis.

Metropolitan received 17 proposals including harvesting storm runoff, on-site water recycling, desalination and waterbag technology for brine disposal. The proposals requested total funding of $1.2 million, almost 5 times the project budget of $250,000. The proposals were scored according to innovation, the likelihood of success, and the potential benefits to Metropolitan and its member agencies.

In May 2004, Metropolitan selected 10 projects for grant funding. Currently, seven projects have completed investigations and submitted final reports documenting findings. The remaining projects require more time to complete. Staff will report findings to the board upon completion and will hold a workshop with member agencies to review and consider the results.

Achievements to Date

Since 1982 Metropolitan has committed to providing financial assistance to the development of water recycling projects throughout its service area. Since adopting the IRP in 1996, Metropolitan, along with its 26 member agencies, has made significant progress in achieving regional targets for recycling and groundwater recovery. Metropolitan currently provides funding to 54 recycled water projects, of which 39 were in operation in 2004. Local projects not receiving funding from Metropolitan provide an additional 134 taf of recycled water to the region.

Since 1991, Metropolitan executed GRP and LRP contracts for 20 recovered groundwater projects that produced about 43 taf per year in 2004. In addition to the projects under Metropolitan's programs, about 21 taf per year of degraded groundwater is recovered by agencies in Metropolitan's service area without Metropolitan's financial assistance.

Table III-16 summarizes the current level of regional production from these local projects. To date, Metropolitan has invested $124 million in recycling programs and $41 million for groundwater recovery. In March 2004, Metropolitan selected 13 additional projects for funding through the Local Resources Program. Metropolitan plans to provide about $158 million toward developing these projects over the next 25 years. These new groundwater recovery and recycled water projects are expected to collectively produce about 65,000 acre-feet per year of additional local supplies. Table III-17 summarizes groundwater and recycled water production and incentive payment to date.

In 2003, Metropolitan conducted an audit of the performance of projects under the LRP. As a result, it terminated LRP incentive agreements for non-performing projects and reduced its financial obligations for projects with poor performance. These actions ensured that the funded programs continued to provide cost-effective water supplies to the region.

Summary

Metropolitan has continued to develop and refine its programs to encourage the involvement of its member agencies in water recycling, groundwater recovery and desalination. The adopted IRP Update relies heavily on these sources for future water supply. Changing conditions over the last five years have reduced the costs of these options. Developing and managing these programs requires considerable coordination and refinement to allow Metropolitan to adjust to changing conditions and to achieve its IRP goals.

Table III-16
2004 Water Production From Recycling and Groundwater Recovery
(taf)

Type of Project	With Metropolitan Funding	Without Metropolitan Funding	Total
Recycled Water	75	134	209
Groundwater Recovery	43	21	64
Total	118	155	273

Table III-17
Local Resources Programs

	Recovered Groundwater	Recycled Water	Total
Projects[1]			
Planned	24	57	81
In Operation	18	41	59
Ultimate Yield (AFY)	84,110	270,986	355,096
Deliveries (af)[2]			
FY 2004/2005	34,374	65,394	99,768
FY 2003/2004	43,181	75,619	118,800
Since Inception	278,055	732,358	1,010,412
Payments ($ millions)			
FY 2004/2005	$6.34	$13.34	$23
FY 2003/2004	$8.28	$14.95	$22
Since Inception	$47.8	$137.5	$165

[1] 12 project agreements are no longer in effect.

[2] 2004/2005 values are lower than the previous year because high local precipitation led to reduced demand for irrigation water.

III.4 STORAGE AND GROUNDWATER MANAGEMENT PROGRAMS: WITHIN THE REGION

IRP Goals

The region's water supply relies on a number of sources affected by variations in precipitation. In addition, the imported water supplies are transported to the region in aqueducts that cross a number of seismic faults, which could put the region's imported water supply at risk at any particular time.

Since the 1950s, local water management in Metropolitan's service area has included the conjunctive use of surface water and groundwater sources. Conjunctive use of water refers to the use and storage of imported surface water supplies in groundwater basins and reservoirs during periods of abundance. This stored water is available for use during periods of low surface water supplies as a way of dealing with seasonal and multiyear imbalances of supply and demand.

To prepare for supply disruptions, Metropolitan and its member agencies have adopted goals for water storage within the region. Metropolitan has identified 400 taf of storage that should be set aside for use in emergencies, such as a disruption to the California Aqueduct. In addition to that storage, Metropolitan's planning process calls for dry-year storage that can be called on at times of supply shortage due to drought. The 1996 IRP identified a 2020 in-region surface water target of 620 taf of dry year storage - 400 taf of dry year storage in Diamond Valley Lake (DVL), and about 220 taf in the SWP terminal reservoirs (Castaic and Perris) made available through the Monterey Amendment to the SWP contract. This target has been achieved and remains unchanged in the IRP Update.

Storage capacity in the region's groundwater basins allows for conjunctive use programs. These basins are recharged with imported surface water supplies using spreading basins and injection wells. Numerous recharge facilities in Southern California are currently being used to replenish groundwater basins. The 1996 IRP identified the need for about 200 taf per year of dry-year yield from in-region groundwater storage by 2000, 275 taf by 2010, and 300 taf by 2020. The IRP Update retained these targets.

Issues

Metropolitan established general long-term storage guidelines in the 1999 Water Surplus and Drought Management (WSDM) plan. The WSDM plan provides for flexibility during dry years, allowing Metropolitan to use storage for managing water quality, hydrology, and SWP issues. Dry-year surface storage yields have been characterized in several ways, including delivery capabilities over two and three-year dry periods. The approach used in the IRP Update assumes that dry-year surface storage can be used as needed and as available within the WSDM planning framework.

In analyzing its groundwater storage programs, Metropolitan has found that a three-to-one ratio of groundwater storage capacity to delivery capability generally allows for maximizing storage use under historic hydrologic variation while minimizing capital cost. In other words, for every 3,000 acre-feet of groundwater storage capacity, there should be 1,000 acre-feet of delivery capability. A ratio of less than three-to-one poses a risk of being unable to withdraw sufficient water during times of drought. Most of Metropolitan's groundwater programs have this ratio as a planning goal. With that ratio, the annual dry-year yield reported here may be maintained for three consecutive dry years.

As regional demands grow, the estimated need for emergency storage also increases. As a result, the proportion of DVL set aside for emergency storage will increase, and the dry year storage in DVL is expected to gradually decline to the 1996 IRP target of 400 taf by 2030.

Changed Conditions

Metropolitan has also refined its characterization of the flexible storage available in the SWP terminal reservoirs. Previous planning studies assumed that up to 50 percent of the available SWP flexible storage could be used in a repeat of a single dry year event, such as the 1977 hydrology. In the IRP Update, dry-year surface production, including Monterey storage, is not limited in this way. Instead, Metropolitan's reliability modeling determines the availability of stored surface water supplies in each forecast year based on historical hydrology.

For the groundwater storage programs, changed conditions since the 1996 IRP include a broadening of Metropolitan's groundwater programs from rate discount-based storage programs to include contract-based programs and bond funding for local groundwater storage projects. Previous discount-based programs provided water to those member agencies that stored the water. The region as a whole benefited from this program because those member agencies could reduce their demands in times of shortage. With contractual storage programs, however, Metropolitan retains the ability to call upon the stored water when needed, which increases the regional benefit of the stored water.

Since the 2000 UWMP, additional groundwater funding mechanisms have become available.

- In 2000, Proposition 13 appropriated $45 million for groundwater conjunctive use projects in Metropolitan's service area.
- The same Proposition made another $200 million available for additional local groundwater storage and recharge projects throughout California based on a competitive bid process.
- In 2002, Chapter 7 of Proposition 50 made $76 million available for state water supply reliability, and Chapter 8 of Proposition 50 made $500 million available for water management programs. Proposition 50 grants are allocated through a competitive-bid process similar to that of Proposition 13.

Implementation Approach

A. Surface Storage

Since the beginning of the IRP process, two significant changes have occurred to regional surface storage.

<u>Diamond Valley Lake</u>
Construction of Southern California's newest and largest reservoir nearly doubled the area's surface water storage capacity. Transport of imported water to the lake began in November 1999, and the lake reached capacity in early 2003. Diamond Valley Lake holds 800 taf, some of which is for dry-year and seasonal storage, and the remainder for emergency storage.

<u>SWP Terminal Reservoirs</u>
Under the 1994 Monterey Agreement, Metropolitan received operational control of 218,940 af in the reservoirs at the southern terminals of the California Aqueduct. Control of this storage capacity in Castaic Lake and Lake Perris gives Metropolitan greater flexibility in handling supply shortages. Seismic concerns have arisen at the Lake Perris dam. In response, DWR plans to reduce the storage amount at Lake Perris by half until those concerns can be studied and addressed. In the long-term, the reduction in storage may potentially impact the amount of flexible storage available to Metropolitan from Lake Perris, and also impact the total amount of emergency storage available.

B. Groundwater Storage

Many local groundwater storage programs have been implemented over the years to maximize the use of local water supplies. These programs have included the diversion of water flows into percolation ponds for artificially recharging groundwater basins and the recovery of degraded groundwater, and they have increased production in all types of years.

- For many years, flood control agencies within Metropolitan's service area have captured and spread storm water for groundwater replenishment. Local runoff and reclaimed water have been conserved in spreading grounds, injection wells, reservoirs, and unlined river channels. In addition, flood control agencies have operated seawater barrier projects in Los Angeles and Orange Counties to prevent seawater intrusion into the coastal groundwater basins.

- In the past, growing water quality problems raised serious concerns about the ability to sustain average annual production levels. The federal Superfund program, although slow to implement clean-up projects, has helped maintain or increase the usable groundwater. These increased levels have been augmented by water recovery projects discussed in Chapter III.3.

Conjunctive use of the aquifers offers an even more important source of dry year supplies. Unused capacity in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects will allow effective management and regulation of the region's major imported supplies from the Colorado River and Bay/Delta region. To meet the adopted targets for dry year storage, Metropolitan and its member agencies have encouraged the recharge of the groundwater basins. Over the years, Metropolitan has implemented conjunctive water use through various incentive programs. Typically this storage takes place in one of two ways:

Direct deliveries to storage — Metropolitan delivers replenishment or banked water directly to water storage facilities, including spreading sites and injection wells.

In-lieu deliveries to storage — Metropolitan delivers replenishment water directly to the member agency's distribution system. The member agency then delivers this water rather than producing water from local sources. The deferred local production results in water being left in local storage (surface or groundwater) for future use.

Metropolitan has developed a number of local programs to work with its member agencies to increase storage in groundwater basins. In the past, Metropolitan encouraged storage through its cyclic and seasonal storage programs. Metropolitan can currently draw on 20 taf per year of dry-year supply from cyclic storage accounts with several member agencies. These agreements allow Metropolitan to deliver replenishment water into a groundwater basin in advance of agency demands. Agencies can then transfer water from storage accounts when they incur a replenishment obligation to the basin. These types of agreements have been in place since the early 1970s but may be closed by 2020. Today Metropolitan is concentrating on long-term replenishment storage programs and contractual conjunctive use programs.

The following sections describe these programs in more detail.

Long term Replenishment Storage
To encourage member agencies to participate in this program, Metropolitan offers replenishment water at reduced rates. Table III-18 displays the Tier 1 charges for full service and compares them to the replenishment charges.

Table III-18
Selected Metropolitan Water Rates,
Effective 1/1/2005

Rate category	Charge per AF
Tier 1 Full Service	
Untreated full service	$331
Treated full service	$443
Replenishment Service	
Untreated replenishment service	$238
Treated replenishment service	$325

North Las Posas
In 1995, Metropolitan entered into an agreement with Calleguas Municipal Water District to develop facilities for storage and extraction in the North Las Posas Basin in Ventura County. The agreement gives Metropolitan the right to store up to 210,000 af of water in the North Las

Posas Groundwater Basin. Phase 1 and 2 wellfields (18 ASR wells) have been completed and are online. These wellfields are expected to be fully operational in 2007 after the completion of the Moorpark pipeline pumpstation by the Calleguas MWD. At that stage, the project will be able to pump 47 TAF per year from the basin. As of June 30, 2005, 48 taf are in storage. With temporary pumps in place, approximately 20 taf could be extracted in 2005 if needed.

Proposition 13 Projects

In 2000, the Department of Water Resources (DWR) made available local assistance grant funds that were provided under Proposition 13. Metropolitan was selected to receive $45 million from the disbursement to help fund the Southern California Water Supply Reliability Projects Program. Metropolitan is using that $45 million for groundwater conjunctive use projects within its service area. These projects will allow storage of imported water in wet years for use in dry years. To select which projects to invest in, Metropolitan used a competitive Request for Proposals (RFP) process designed to fund projects with the most potential for success under Metropolitan's conjunctive use principles. Since 2001, Metropolitan's staff worked to coordinate the eight conjunctive use programs selected through this process. Table III-19 describes these projects.

Raymond Basin

Metropolitan is currently working with member agencies and the Raymond Basin Management Board to develop an additional conjunctive use agreement in Raymond Basin. In January 2000, the Metropolitan Board authorized entering into agreements with the City of Pasadena and Foothill MWD to implement the groundwater storage program contingent upon satisfactorily completing all necessary environmental documentation. The Board also appropriated funds to conduct initial environmental, engineering, and planning studies. The program is expected to yield 22 taf per year by 2010.

Other Identified Programs

Metropolitan continues to discuss opportunities to expand groundwater conjunctive use storage programs throughout its service area. The use of the supplemental storage program in 2005 provides one example of these opportunities. The state's wet winter of 2004-05 provided Metropolitan with abundant water supplies. To encourage maximized storage in the region, Metropolitan is offering discount rates to its member agencies to store more water than previously planned. The water would be available at Metropolitan's call for up to six years. This and other potential programs will help to meet the groundwater storage IRP targets. Identified potential programs include:

- Chino Basin Storage Program Expansion
- Orange County Basin Storage Program Expansion
- North Las Posas Phase 3
- Central Basin Storage Program
- West Basin Storage Program
- San Fernando Basin Storage Program
- San Jacinto Basin Storage Program
- City of San Diego Storage Program

Table III-19
Conjunctive Groundwater Projects Selected Through The RFP Process

Project and Project Proponents	Storage Capacity (TAF)	Dry-Year Yield (TAF/Year)	Balance as of 12/31/2004 (TAF)	Design/ Construction Status
LOS ANGELES COUNTY				
Long Beach Conjunctive Use Project (CUP) CBMWD and Long Beach	13.0	4.3	13.0	Completed
Foothill Area GW Storage Project Foothill MWD	9.0	3.0	2.0	Started
Long Beach CUP: Expansion in Lakewood CBMWD and Long Beach	3.6	1.2	0	Executed Agreement
City of Compton Conjunctive Use Program City of Compton	2.3	0.8	0	Design
Upper Claremont Heights Conjunctive Use Three Valleys MWD	3.0	1.0	0	In Approval Process
ORANGE COUNTY				
Orange County GW Conjunctive Use Program OCWD, MWDOC	60.0	20.0	18.8	Under construction
SAN BERNARDINO COUNTY				
Chino Basin Programs IEUA, Chino Basin Watermaster	100.0	33.0	37.8	Design and Construction
Live Oak Basin Conjunctive Use Project Three Valleys MWD	3.0	1.0	0.3	Under Construction
Total	193.9	64.3		

Achievements to Date

Table III-20 summarizes the local groundwater storage identified and contracted under the local storage programs. It shows that Metropolitan has identified almost all of the 300 taf dry year supplies set as a goal for groundwater storage within the region. It also shows that additional potential programs could be pursued if required. With the completion of Diamond Valley Lake, Metropolitan has achieved its surface storage goals for the 2025 time frame. Thus, Metropolitan has identified projects that will enable it to achieve its goals for local storage, and it has implemented programs that provide the majority of that storage. For 2030 projections, Metropolitan has assumed that all programs projected to be in place in 2025 will remain in place.

Table III-20
In-Region Groundwater Storage Status
2020 & 2025 (TAF)

Project	Annual Supply	Project Status
Long-term Replenishment and Cyclic	86	Current
North Las Posas	47	Current
<u>Proposition 13 Programs</u>	64	Current
City of Long Beach		
Inland Empire		
Orange County		
Foothill		
Three Valleys		
Compton		
Long Beach – Lakewood		
<u>Proposition 13 Programs (in progress</u>)	~3	Under Development
San Diego County		
Upper Claremont		
Raymond Basin	22	Under Development
<u>Additional Programs</u>	80 or more	Under Development
Expansion of existing programs		
Chino Basin Storage Program Expansion		
Orange Co Basin Storage Program Expansion		
North Las Posas Phase 3		
New programs		
Central Basin Storage Program		
West Basin Storage Program		
San Fernando Basin Storage Program		
San Jacinto Basin Storage Program		
City of San Diego Storage Program		
Other new programs		
Total	**300**	

Note: "Current" signifies that contracts are in place, not necessarily that facilities are constructed or water in storage. "Under Development" signifies that programs have been identified and negotiations commenced, but that feasibility, environmental analysis or contractual agreements are not yet finalized.

III.5 State Water Project

IRP Goals

In 1999, Metropolitan's Board of Directors set new goals for the State Water Project (SWP) with the adoption its CALFED Policy Principles. These goals committed Metropolitan to water quality objectives, the development of a 650 taf minimum dry-year supply from the SWP by 2020, and average annual deliveries of 1.5 maf (excluding transfers and storage programs along the SWP). To achieve these goals while minimizing impacts to the Bay-Delta ecosystem, Metropolitan would maximize deliveries to storage programs during wetter years. It would also work with others to implement a number of source-water quality and supply reliability improvements in the Delta, remove operational conflicts with the Central Valley Project (CVP), and better coordinate planning and operations between the SWP and CVP.

System Description

The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by California's Department of Water Resources (DWR). Figure III-2 shows SWP facilities. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. The original State Water Contract called for an ultimate delivery capacity of 4.2 maf, with Metropolitan holding a contract for 2,011 taf.

Much of the SWP water supply passes through the San Francisco-San Joaquin Bay-Delta (Bay-Delta). More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta system. For decades, the Bay-Delta has experienced water quality and supply reliability challenges and conflicts due to variable hydrology and environmental standards that limit pumping operations.

Issues

Prior to the 1994 Bay-Delta Accord, the reliability of SWP deliveries was deteriorating rapidly. Based on an analysis of the State Water Resources Control Board's (SWRCB) draft water rights decision 1630, Metropolitan estimated that by 2005 its SWP delivery would be reduced to 171 taf – about 8.5 percent of its SWP contract entitlement -- under hydrologic conditions comparable to 1977, the driest year on record for the SWP. The SWRCB subsequently withdrew draft water rights decision 1630, and the Bay-Delta Accord, through SWRCB water rights decision 1641, established new operating criteria for the SWP. Under these new criteria, DWR projects that in critically dry years, SWP delivery would be 418 taf – about 21 percent of Metropolitan's SWP contract entitlement.

To achieve Metropolitan's overall supply reliability objectives, the yield from the SWP during critically dry years would need to increase to 650 taf by 2020, and annual deliveries (excluding transfer and storage programs along the SWP) need to average 1.5 million acre-feet per year.

Moreover, Metropolitan would meet its supply reliability goals only if it has access to SWP supplies up to its full contracted amount during wet years to replenish surface and groundwater storage.

Sustained improvement in SWP water quality also represents an important concern for Metropolitan. Metropolitan must be able to meet the increasingly stringent drinking water regulations that are expected for disinfection by-products and pathogens in order to protect public health. Meeting these regulations will require improving the Delta water supply by cost effectively combining alternative source waters, source improvement, and treatment facilities. Additionally, Metropolitan requires water quality improvements of Delta water supplies to meet its 500 mg/L salinity blending objective in a cost-effective manner, while minimizing resource losses and helping to ensure the viability of regional recycling and groundwater management programs.

Figure III-2
Current and Projected Facilities of the State Water Project

Changed Conditions

Since the 2000 RUWMP, conditions affecting the future operations of the SWP have changed. In August 2000, state and federal resources and environmental protection agencies approved the CALFED Record of Decision (ROD) for the Programmatic Environmental Impact Report/Impact Statement. The ROD identifies implementation plans for the first seven years of what is expected to be a 30-year improvement program in the Bay-Delta. A number of projects identified in the ROD relate to the conveyance capacity, water quality, and operation of the SWP. Approval of the ROD was challenges on grounds that the environmental review process did not meet legal requirements. In October 2005 a state appellate court upheld the challenge and remanded the case to the lower court for remediation. As a result, additional environmental documentation and public review may be required.

In 2003, the California Bay-Delta Act established the Bay Delta Authority as the new governance structure for the CALFED Program. Its responsibilities include providing accountability, ensuring balanced implementation, and tracking and assessing Program progress.

It also helps to coordinate actions taken by CALFED Implementing Agencies, including the California Department of Water Resources, which operates the SWP.

Also in 2003, the DWR, the United States Bureau of Reclamation (USBR), and State and Federal water contractors addressed joint operational issues. These planning and operational activities set the stage for the development of the Delta Improvement Package of 2004, which outlines actions related to water project operations in the Delta. These actions would result in increased water supply reliability, improved water quality, environmental protection and ecosystem restoration, protection of the Delta levee system, and improved real-time and long-term management. The Delta Improvements Package (DIP) also outlines conditions under which the SWP would be allowed to increase its permitted export pumping capacity from 6,680 to 8,500 cubic feet per second (cfs) at the Banks Pumping Plant in the Delta, a key requirement to achieving Metropolitan's supply reliability objectives.

Under the DIP, the CALFED Implementing Agencies would be required to report annually on the status of actions and linkages in the Delta Improvements Package to assure balanced implementation and success.

In May 2005, DWR issued to SWP contractors excerpts from its Draft SWP Delivery Reliability Report due to be released later in the year. These excerpts contained results from seven studies of SWP reliability. The first three studies replicated modeling done by DWR for its 2003 SWP Delivery Reliability Report. Studies 4 and 5 reflected changes in CVP/SWP operations consistent with the CVP/SWP Operations Criteria and Plan (OCAP). The last two studies, 6 and 7, were similar to studies 4 and 5 but also included updated SWP demand projections developed in consultation with SWP contractors. DWR recommended SWP contractors use results from studies 6 and 7 for their UWMPs.

In studies 6 and 7, SWP delivery capability under single-dry year conditions similar to 1977 shows a dramatic decrease compared to DWR's previous reliability estimates. DWR's 2003 SWP Delivery Reliability Report estimated a minimum delivery capability of 830 taf. Under the new OCAP and SWP demand assumptions, minimum delivery capability ranged between 159 taf (Study 6) and 187 taf (Study 7), a nearly 80 percent drop in delivery capability. DWR listed several attenuating circumstances that would likely result in their models overstating the drop in single dry-year SWP delivery capability. These circumstances included conservative assumptions about San Luis Reservoir minimum pool and carryover storage. According to DWR, relaxing these assumptions to better reflect how the SWP would actually be operated during a single dry year could, under some circumstances, increase delivery capability by as much as 650 taf, Thus, DWR's Draft SWP Delivery Reliability Report findings appear to place SWP single dry year delivery capability somewhere between 159 taf and 837 taf.

Metropolitan incorporated DWR's draft results into its planning models for SWP operations and concluded that delivery capability for SWP water delivered to Metropolitan for a single dry year like 1977 would be about 175 taf of Table A delivery plus about 280 taf of carryover storage delivery. For multiple dry years, similar to the period 1990-1992, annual SWP deliveries to Metropolitan would average about 509 taf of Table A water and about 93 taf of carryover storage. Previous DWR assessments of SWP delivery reliability had led Metropolitan to plan for SWP Table A deliveries of about 415 taf under a single dry year scenario like 1977 and about 830 taf under a multiple dry year scenario like 1990-1992. DWR's updated assessment of SWP delivery capability has caused Metropolitan to make a significant downward revision to previous estimates of Table A delivery for single and multiple dry year hydrologies.

Implementation Approach

Metropolitan's implementation approach for the SWP depends on the full use of the current State Water Contract provisions, including its basic Table A supply contract amount, Article 21 interruptible supplies, and Turnback Pool supply provisions. In addition, it requires successful negotiation and implementation of a number of agreements, including CALFED, the Sacramento Valley Water Management (Phase 8 Settlement) Agreement, and the Delta Improvement Package. Each of these stakeholder processes or agreements involves substantial Metropolitan and member agency staff involvement to represent regional interests. Metropolitan is committed to working collaboratively with DWR, SWP contractors, and other stakeholders to ensure the success of these extended negotiations and programs.

SWP Reliability

This section provides details of the major actions Metropolitan is undertaking to improve SWP reliability:

<u>Delta Improvements Package and Phase 8 Settlement</u>
Ensuring the successful implementation of the Delta Improvements Package is a key component of Metropolitan's approach for increasing SWP supply reliability. The Delta Improvement Package is a set of linked actions designed to allow the SWP to operate the Banks Pumping Plant in the Delta at 8,500 cfs, provided all regulatory standards are met and water is available for export. The Banks Pumping Plant is currently limited by a Corps of Engineers permit to operate at 6,680 cfs, with provision to pump at higher levels only under very limited hydrologic conditions.

The key benefits of the proposed Delta Improvement Program for urban Southern California water supply reliability include:

- Increased water supply for regional groundwater and surface water storage initiatives (130 taf per year);
- Enhanced access to voluntary water transfers upstream of the Delta as foreseen in the Record of Decision;
- Continued Endangered Species Act assurances and supply reliability through implementation of a long-term Environmental Water Account;
- Achievement of SWP supply goals for 2020 adopted by the Metropolitan Water District Board in the Southern California IRP; and
- Enhanced operation of the diversified portfolio of supplies developed over the past decade in the IRP.

The Delta Improvements Package also contains actions related to improving water quality in the Delta. Separate discussions of water quality issues appear in a later section.

Metropolitan also has been working with Bay-Delta watershed users toward settlement on how all Bay-Delta water users would bear some of the responsibility of meeting flow requirements. In December 2002, all of the parties signed a settlement agreement known as "The Sacramento Valley Water Management Agreement" or "Phase 8 Settlement Agreement." The agreement resulted from the SWRCB Bay-Delta Water Rights Phase 8 proceedings. It includes work plans to develop and manage water resources to meet Sacramento Valley in-basin needs, environmental needs under the SWRCB's Water Quality Control Plan, and export supply needs for both water demands and water quality. The agreement specifies about 60 water supply and system improvement projects by 16 different entities in the Sacramento Valley. Its various conjunctive use projects will yield approximately 185 taf per year in the Sacramento Valley, and approximately 55 taf of this water would come to Metropolitan through its SWP allocation. The Agreement specifies a supply breakdown of 110 taf (60 percent) to the SWP and 75 taf (40 percent) to the CVP.

Based on the work plans for CALFED's Bay-Delta Program and the Sacramento Valley Management Agreement, potential annual and dry-year supply capabilities are projected to be 55 taf in 2010, 55 taf in 2015, and 110 taf beyond 2015.

Monterey Amendment

The Monterey Amendment, executed by DWR and most of the State Water Contractors in 1995 and 1996, primarily addressed the allocation of SWP water in times of shortage, and it dealt with a number of other issues that facilitated more flexibility for SWP contractors. Though challenged in court, a settlement has been reached and a revised Environmental Impact Report is being prepared. The Monterey Amendment enables Metropolitan to use a portion of the San Luis Reservoir's capacity for carryover storage into the subsequent calendar year, which increases SWP annual delivery by 93 taf to 285 taf, depending on supply conditions.[1]

SWP Terminal Storage

Metropolitan has contractual rights to 65,000 af of flexible storage at Lake Perris (East Branch terminal reservoir) and 153,940 af of flexible storage at Castaic Lake (West Branch terminal reservoir). This storage provides Metropolitan with additional options for managing SWP deliveries to maximize yield from the project. Over multiple dry years it can provide Metropolitan with 73 taf of additional supply. In a single dry year like 1977 it can provide up to 219 taf of additional supply to Southern California.

Desert Water Agency/Coachella Valley WD SWP Table A Transfer

Under the transfer agreement, Metropolitan transferred 100 taf of its SWP Table A amount to Desert Water Agency/Coachella Valley WD (DWCV). Under the terms of the agreement, DWCV pays all SWP charges for this water, including capital costs associated with capacity in the California Aqueduct to transport this water and variable costs to deliver this water to Perris Reservoir. The amount of water actually delivered in any given year depends on that year's SWP allocation. Water is delivered through the existing exchange agreements between Metropolitan and DWCV. While Metropolitan transferred 100 taf of its Table A amount, it retained other rights, including interruptible water service; its full carryover amounts in San Luis Reservoir; its full use of flexible storage in Castaic and Perris Reservoirs; and any rate

[1] This includes DWCV carryover that would flow to Metropolitan through exchange agreements with Desert Water Agency and Coachella Valley Water District.

management credits associated with the 100 taf. In addition, Metropolitan is able to recall the SWP transfer water in years in which Metropolitan determines it needs the water to meet its water management goals. The main benefit of the agreement is to reduce Metropolitan's SWP fixed costs in wetter years when there are more than sufficient supplies to meet Metropolitan's water management goals, while at the same time preserving its dry-year SWP supply. In a single critically dry-year like 1977 the call-back provision of the entitlement transfer can provide Metropolitan about 5 taf of SWP supply. In multiple dry years like 1990-1992 it can provide Metropolitan about 26 taf of SWP supply.

<u>Desert Water Agency/Coachella Valley WD Advance Delivery Program</u>
Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and Coachella Valley WD in exchange for their SWP Contract Table A allocations. Metropolitan can make advance deliveries of Colorado River water under the terms of the agreement with these agencies. By making advance deliveries, Metropolitan is able take DWCV SWP Table A allocation in dry years without having to deliver an equivalent amount of Colorado River water so long as there is enough advance delivery water to cover Metropolitan's exchange obligation. This program allows Metropolitan to maximize delivery of SWP and Colorado River water in dry years. The advance delivery provision increases SWP Table A deliveries to Metropolitan by about 6 taf in a single dry-year like 1977 and by about 18 taf in multiple dry years similar to the period 1990-1992. These increases in dry-year Table A deliveries are incorporated into the estimate of SWP Deliveries under Current Programs shown in Table III-21.[2]

Table III-21 summarizes Metropolitan's SWP supply range for 2025 based on these changes. When interpreting the SWP dry year supply projections shown in this table, it is important to note that the estimates of zero dry year supply from Delta Improvements can be misleading. The primary supply benefit of Delta Improvements will be the ability to increase SWP pumping during average and wet years and storing this water for subsequent use in dry years. The projections of dry year supply for local and Central Valley storage programs discussed in Chapters III-4 and III-6 reflect this increase in stored water available for dry year delivery.

SWP Water Quality

Metropolitan requires a safe drinking water supply from the Bay-Delta to meet current and future regulatory requirements for public health protection. Finding cost-effective ways to reduce total organic carbon (TOC), bromide concentrations, pathogenic microbes, and other unknown contaminants from Bay-Delta water supply is one of Metropolitan's top priorities. Metropolitan also requires a SWP supply that is consistently low in salinity — Total Dissolved Solids (TDS) — so it can blend SWP water with higher-salinity Colorado River water to achieve salinity goals for its member agencies. In addition, Metropolitan needs consistently low-salinity SWP water to increase in-basin water recycling and groundwater management programs. These programs, essential to the successful implementation of the IRP, require that blended water supplied to the member agencies do not fall below the TDS standards adopted in Metropolitan's Salinity Action Plan.[3]

[2] 18 taf out of a total of 509 taf SWP annual delivery for a multiple dry-year event similar to the period 1990-1992 are due to the DWCV advance delivery provision. For a single-dry year similar to 1977, 6 taf out of a total of 175 taf are due to the advance delivery provision.
[3] The Action Plan is discussed in the Water Quality chapter of this report.

Table III-21
SWP Supply Projection: 2025
(TAF)

Hydrology	Multiple Dry Years (1990-1992)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
SWP Deliveries[1]	509	175	1,472
San Luis Carryover[2]	93	280	280
SWP Call-back of DWCV Table A Transfer	26	5	0
SWP Terminal Storage[4]	73	219	0
Subtotal of Current Programs	***701***	***679***	***1,752***
Programs Under Development			
Delta Improvements[3]	0	0	130
Phase 8 Agreement	110	110	110
Subtotal of Proposed Programs	***110***	***110***	***240***
Maximum Supply Capability	**811**	**789**	**1,992**

Notes:
1. Includes 76 taf of additional SWP supplies in 1977 per DWR and DWCV Table A supplies in multiple and single dry years.
2. Includes DWCV carryover.
3. Includes increasing Banks pumping capacity to 8,500 cfs.
4. SWP terminal storage is shown in the In-Basin Storage Activities tables in Appendix A.3.
* Appendix A.3 includes SWP supply projections for 2010, 2015, and 2020.

The Delta Improvement Package offers important water quality benefits to Metropolitan. In particular, levee modifications at Franks Tract and other source control actions may significantly reduce ocean salinity concentrations in Delta water, which would benefit Delta water users and export interests alike.

Franks Tract is an island located in the central Delta that was actively farmed until levee breaches in 1936 and 1938. Since 1938, the tract has remained a flooded island and its levees remain in disrepair. Tidal flows in the Delta entrap saline ocean water in the flooded tract, resulting in degraded water quality for both in-delta and export users. Recent computer modeling analyses by Metropolitan, DWR, and the US Geological Survey indicate that reducing this salinity intrusion by partially closing existing levee breach openings and/or building radial gate flow control structures will significantly reduce TDS and bromide[4] concentrations in water from the Delta during the summer and fall months and in drought years. Based on Metropolitan's analysis, improvements to Franks Tract alone could reduce peak bromide concentrations in the summer and fall months by about 33 percent at Contra Costa Water District's (CCWD) Rock Slough intake, by 27 percent at CCWD's Old River intake, and by 24 percent at the SWP intake in the South Delta. At the same time, increasing Banks Pumping Plant capacity to 8,500 cfs would allow the diversion of a larger proportion of water supplies during periods of good water quality.

[4] The importance of bromides is discussed in the Water Quality chapter.

In addition to the Delta Improvement Package, CALFED has adopted an "equivalent level of public health protection" (ELPH) program that targets water quality actions outside the Delta. CALFED Program is coordinating several SWP water quality feasibility studies and projects. These include a) a feasibility study on water quality improvement in the California Aqueduct and b) the conclusion of feasibility studies and demonstration projects under the currently funded Southern California-San Joaquin Regional Water Quality Exchange Project. With respect to the latter project, the Friant Water Users Authority (FWUA) and Metropolitan have entered into a partnership, based on an approved set of principles, to investigate the potential of enhancing the quantity and affordability of the eastern San Joaquin Valley's water supply while improving Southern California's water quality. The FWUA and Metropolitan are studying possible projects that would benefit each region while creating no adverse impacts. A pre-feasibility study of existing conditions and potential constraints was completed in 2003. Similar studies are underway with the Kings River Water Association.

SWP System Outage and Capacity Constraints

As its infrastructure ages, the SWP becomes increasingly vulnerable to natural disasters, particularly the Delta levee system and the California Aqueduct, which are both susceptible to floods and earthquakes. In June 2004, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operations. Catastrophic loss of either the Delta levee system or the aqueduct would shut down the project, affecting the welfare of millions. While Metropolitan has made substantial investments in local resources and in-basin storage to insulate Southern California against loss of its imported water supplies, additional investment is needed in the at-risk infrastructure.

The CALFED Levees Program coordinates Delta levee maintenance and improvement activities. Its goal is to protect water supplies needed for the environment, agriculture and urban uses by reducing the threat of levee failure and seawater intrusion. Over the next two to three years, CALFED Implementing Agencies will carry out a Comprehensive Program Evaluation (CPE). It will incorporate the risk study that has been commissioned by DWR, including the currently-proposed expanded scope of that study. The CPE will: a) supplement the DWR risk study to ensure that it considers all relevant levee risks, b) include the development of a formal strategic plan that contains a description of any proposed future program changes, and c) recommend priorities and estimate funding needs for the Levees Program. For example, the P.L. 84-99 ROD target will be reevaluated as part of the CPE using information from the Risk Study.

The California Aqueduct remains susceptible to floods at several points as it travels from the Delta along the west side of the San Joaquin Valley. Key among these is where the Aqueduct crosses the Arroyo Pasajero, an alluvial fan located near Coalinga, California. At that spot, the Aqueduct effectively forms a barrier to Arroyo flood flows. Although flood control facilities were built to protect the Aqueduct, the volumes of runoff and sediment deposition are much greater than originally estimated, so a significant flood risk remains. The Aqueduct was severely damaged during March of 1995 when a flood overwhelmed control facilities and overtopped the Aqueduct with 10 taf of floodwater and an estimated 800,000 cubic yards of sediment. Impacts to downstream water users lasted through the summer of 1995. In December of 2004, DWR began construction of "Phase I" improvements to the Aqueduct where it crosses the arroyo.

These improvements will increase the size of the detention basins west of the aqueduct to protect it against a 50-year storm event.

DWR is also investing in the replacement of aging SWP infrastructure critical to SWP operations. It is midway into its Turbine Rehabilitation Program at Oroville Reservoir's Hyatt-Thermalito complex. In 2004 DWR awarded a contract to replace four pumps at the Edmonston Pumping Plant in the Delta. Moreover, improved maintenance procedures have decreased the amount of time pumps at Edmonston come off-line for maintenance to less than 10 percent of the time they would otherwise be available for operation.

Because of the risk of a prolonged shutdown of the SWP caused by seismic or hydrologic events either within the Delta or along the Aqueduct, Metropolitan has acted decisively to ensure that Southern California has adequate emergency storage. Diamond Valley Lake and SWP terminal reservoir storage, combined with member-agency emergency storage, are jointly capable of providing the region with a six-month supply of water if combined with a temporary 25 percent reduction in demand. Metropolitan engineering studies indicate this would provide sufficient time to repair the SWP and resume delivery.

Achievements to Date

SWP Reliability

The discussions initiated in July 2003 at Napa between SWP and CVP contractors to resolve inter-project operational conflicts set the stage for the development of the proposed Delta Improvement Package of 2004. The primary focuses of the Napa discussions were better integration of the operations of the SWP and CVP and the development of joint planning assumptions and support for the advancement of CALFED. Key features of the proposal that resulted from the discussions include:

- <u>Consistent Planning Assumptions</u>. Previously, DWR and USBR made inconsistent planning assumptions in their various Delta-related activities. These assumptions created a significant problem for CALFED, which seeks to coordinate activities among agencies. A proposal drafted at Napa aligns the planning activities of the two project operators and provides for timely permitting of CALFED through-Delta improvements.

- <u>Project Integration Plan.</u> The project operators and their contractors agreed to better integrate project operations, allowing both projects to get more out of the existing water supply system, consistent with environmental restoration and water quality improvement goals. In essence, the Napa proposition provides for operation of SWP conveyance to benefit CVP contractors and operation of CVP storage to benefit SWP contractors. Through innovative integration of CVP-SWP operations, both groups of contractors would be able to improve supply reliability in a manner consistent with the CALFED ROD.

- <u>Better Risk Management.</u> The Napa proposition provides for better management of risk in project operations. For example, provisions allowing the SWP to "borrow" storage capacity in CVP facilities under specified conditions would allow the SWP to allocate higher amounts of water earlier in the year, a valuable improvement even if ultimate deliveries are generally unaffected. Similarly, an agreement to shift responsibility for protecting the "low-point" in San Luis Reservoir from the CVP to the SWP would provide for significant increases in CVP allocations earlier in the water year, increasing certainty for the annual business plans of CVP agricultural water users.

- Through-Delta Facility Improvements. The Napa discussions solidified support for CALFED plans to improve through-Delta facilities, including: a) implementation of the South Delta Improvement Program that would increase pumping capacity at the SWP Banks Pumping Plant to 8,500 cfs; and b) construction and operation of an intertie between the Delta Mendota Canal and the California Aqueduct.

Collectively, the actions proposed in the Napa discussions can significantly improve water supply reliability in a manner consistent with other CALFED objectives. In particular, the through-Delta physical improvements included in the CALFED ROD provide considerable flexibility for meeting water management challenges in the driest years. Expanding the capacity of the SWP Banks pumping plant increases the ability to store water south-of-the-Delta during wet periods. Withdrawing that water during dry periods relieves dry-year pressure on the environment and other Delta water users. In addition, this increased conveyance capacity adds to the ability to transport conserved water from voluntary sellers upstream of the Delta to buyers seeking additional supplies south of the Delta.

As an outcome of the Napa discussions, representatives of DWR, USBR, the California Department of Fish and Game (DFG), the United States Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS) developed a proposal for a long-term Environmental Water Account (EWA). The proposal provides for improvements in EWA "fixed assets" that include purchases of water from willing sellers. It also proposes a long-term commitment to allow EWA to borrow storage in San Luis Reservoir, an approach successfully employed on an ad-hoc basis for the past three years. In addition, the long-term EWA would provide EWA managers with control over groundwater storage and other assets to better manage their resources and protect and restore fisheries in a more cost-effective manner.

Additional meetings, held in Stockton, addressed the concerns of Delta interests regarding project operations. While discussions are still underway, these meetings suggest that a common package of actions can be implemented that provides water supply and water quality benefits to export interests, protects the interests of Delta water users, and continues the process of environmental restoration.

SWP Water Quality

The most significant achievement for SWP water quality has been continued definition and advancement of the Delta Improvement Package. Most notably, the Franks Tract studies identified cost-effective ways to achieve significant improvements in the quality of Delta export water. The Franks Tract project will be implemented in phases, with the first phase scheduled to begin in 2006.

Progress also is being made on the Southern California-San Joaquin Regional Water Quality Exchange Project. In May 2003, SAIC Engineering, Inc. completed its pre-feasibility assessment establishing baseline conditions and water management needs for the project.

Thanks in part to financial grants from CALFED, regional planning efforts are underway to explore options for water quality exchanges and technological approaches to water quality improvement as a part of the ELPH program.

SWP System Reliability

The completion and filling of Diamond Valley Lake marked the most important achievement with respect to protecting Southern California against an SWP system outage. Water began pouring into the reservoir in November 1999 and the lake was filled by early 2003. The lake can hold up to 800 taf that provides Southern California with a six-month emergency water supply as well as carryover and regulatory storage.

East Branch Enlargement

In 1986, Metropolitan and other State Water Project (SWP) contractors entered into an agreement with the DWR to enlarge the capacity of the SWP East Branch Aqueduct from the Alamo Powerplant to the Devil Canyon Powerplant. The agreement specified a staged enlargement of approximately 1500 cfs, with Metropolitan receiving an increase of 1200 cfs. Phase I of the enlargement, which provides approximately 750 cfs, began immediately and was completed in 1992. Phase II was deferred until the build-up in water demands warranted it. Metropolitan and the other East Branch Enlargement contractors are currently in discussions with DWR regarding Phase II planning and timing. Phase II would provide additional supplies and reliability for Metropolitan's eastern service area, including the Inland Empire and San Diego. Current Metropolitan demand projections indicate that Phase II will not be needed until 2015 or later.

III.6 Central Valley Storage and Transfer Programs

IRP Goals

The 1996 IRP established a major goal of increasing the reliability of supplies received from the California Aqueduct by developing flexible Central Valley storage and transfer programs. Since adopting the 1996 IRP, Metropolitan has developed numerous voluntary Central Valley storage and transfer programs, aiming for a dry-year water resource development target of 300 taf by 2010. The IRP Update maintains the same target. By 2003, Metropolitan had enough Central Valley storage and transfer programs in place to meet the 300 taf target.

Description

To date, Metropolitan's Central Valley storage programs consist of partnerships with Central Valley agricultural districts. These partnerships allow Metropolitan to store its State Water Project (SWP) supplies during wetter years for return in future drier years. Metropolitan's Central Valley transfer programs consist of partnerships with Sacramento Valley Central Valley Project (CVP) and SWP settlement contractors, and they allow Metropolitan to purchase water in drier years for delivery via the California Aqueduct to Metropolitan's service area.

Issues

Before the 1994 Bay-Delta Accord, SWP delivery reliability was deteriorating rapidly. To gain a clearer picture of the extent of the deterioration, Metropolitan carried out an analysis based on the State Water Resources Control Board's (SWRCB) draft water rights decision 1630. This analysis showed that by 2005, if the hydrologic conditions were comparable to those of the driest year on record, 1977, Metropolitan's SWP delivery would be reduced to 171 taf, which is only about 8.5 percent of its SWP contract entitlement.

The SWRCB later withdrew draft water rights decision 1630 and the Bay-Delta Accord established new operating criteria for the SWP. Metropolitan again analyzed these new criteria to estimate the potential water deliveries in critically dry years. Under these criteria, SWP deliveries to Metropolitan, not counting carryover storage, increased to 418 taf, which is about 21 percent of its SWP contract entitlement. Metropolitan's Board determined that while the new criteria established by the Bay-Delta Accord represented an improvement in SWP reliability, they were not, of themselves, sufficient to meet Metropolitan's overall supply reliability objectives. Moreover, DWR's most recent estimates of SWP delivery capability, which they released to SWP contractors in May 2005, show that SWP reliability under conditions similar to 1977 could be far worse than earlier modeling indicated. Based on these new DWR reliability projections, Metropolitan estimates that in a single-dry year similar to 1977, SWP deliveries to its service area would be about 175 taf rather than 418 taf of Table A water. Metropolitan estimates another 280 taf of carryover storage could be delivered, for a total delivery of 455 taf.

To achieve its overall supply reliability objectives, by 2010 Metropolitan would need to supplement its deliveries from the SWP with 300 taf of water from Central Valley storage and transfer programs during critically dry years.

Metropolitan believes that it now has in place Central Valley storage and transfer programs capable of reaching this target, and it has several other programs under development. Because yields from individual programs can vary widely depending on hydrologic conditions and CVP/SWP operations, the dry-year yields for the various programs reported in this section are expected values only. In any given year, actual yields could depart from the expected values. Despite that uncertainty, Metropolitan's models of these programs indicate that in the aggregate, they can meet the 2010 resource target under a wide range of hydrologic conditions and CVP/SWP operations.

Changed Conditions

Since the 2000 RUWMP, conditions affecting the development of Metropolitan's Central Valley storage and transfer programs have improved significantly. Metropolitan has dedicated more staff to identifying, developing, and implementing Central Valley storage and transfer programs. Such programs have served to demonstrate the value of partnering, and increasingly, Central Valley agricultural interests see partnering with Metropolitan as a sensible business practice beneficial to their local district and regional economy. In addition, Metropolitan staff has demonstrated the ability to work with California Department of Water Resources and US Bureau of Reclamation staff to facilitate Central Valley storage and transfer programs. Taken together, these positive changes enabled Metropolitan to reach the 2010 resource target by 2003.

Implementation Approach

Metropolitan currently has four Central Valley storage programs in operation that serve to increase the reliability of supplies received from the California Aqueduct. Metropolitan is also pursuing a new storage program with Mojave Water Agency, and it is currently under development. In addition, Metropolitan pursues Central Valley water transfers on an as needed basis. Table III-22 lists the expected yields from these programs. Figure III-5 shows the location within the Central Valley of each program listed in Table III-22.

Semitropic and Arvin-Edison Storage Programs

Metropolitan has entered into groundwater storage programs with Semitropic and Arvin-Edison Water Storage Districts, both of which are located in the southern part of the San Joaquin Valley. The combined storage of the two programs is approximately 600 taf. The specific amount of water Metropolitan can expect to receive from these programs depends upon hydrologic conditions and the demands placed on the Semitropic Program by other program participants. At full development, the storage programs can deliver 197 taf over 10 months. During wet years, Metropolitan has the discretion to use these programs to store portions of its SWP entitlement water that are in excess of the amounts needed to meet Metropolitan's service area demand. This water is either put in spreading basins or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the districts return Metropolitan's previously stored water to Metropolitan.

Table III-22
CVP/SWP Storage and Transfer Programs: 2025
(TAF)

Hydrology	**Multiple Dry Years (1990-1992)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs[1]			
Semitropic Program	107	107	0
Arvin Edison Program	90	90	0
San Bernardino Valley MWD Program	37	70	20
Kern Delta Program	50	50	0
Subtotal of Current Programs	***284***	***317***	***20***
Programs Under Development[1]			
Mojave Program[2]	35	35	0
Central Valley Transfer Programs	125	125	0
Subtotal of Proposed Programs	***160***	***160***	***0***
Maximum Supply Capability	**444**	**470**	**20**

Notes:
1. Central Valley Storage and Transfer Programs are shown in the California Aqueduct tables in Appendix A.3.
2. The Mojave Program is listed under development even though it already exists as a demonstration project because Metropolitan is investigating extending and expanding the program.
* Appendix A.3 includes Central Valley Storage and Transfer Programs supply projections for 2010, 2015, and 2020.

San Bernardino Valley MWD Storage Program

This program can deliver between 20 taf and 80 taf in dry years, depending on hydrologic conditions. The expected delivery for a single dry year similar to 1977 is 70 taf. The agreement with San Bernardino Valley MWD also allows Metropolitan to store up to 50 taf of transfer water for use in dry years. In wet years the program can produce up to 130 taf of water supply.

Kern-Delta Water District Storage Program

This groundwater storage program has 250 taf of storage capacity. When fully developed, it will be capable of providing 50 taf of dry-year supply.

Mojave Storage Program

Currently operated as a demonstration program, Metropolitan plans to extend and expand this groundwater storage program. The program will store SWP supply delivered in wet years for subsequent withdrawal during dry years. When fully developed, the program is expected to have a dry-year yield of 35 taf.

Central Valley Transfer Programs

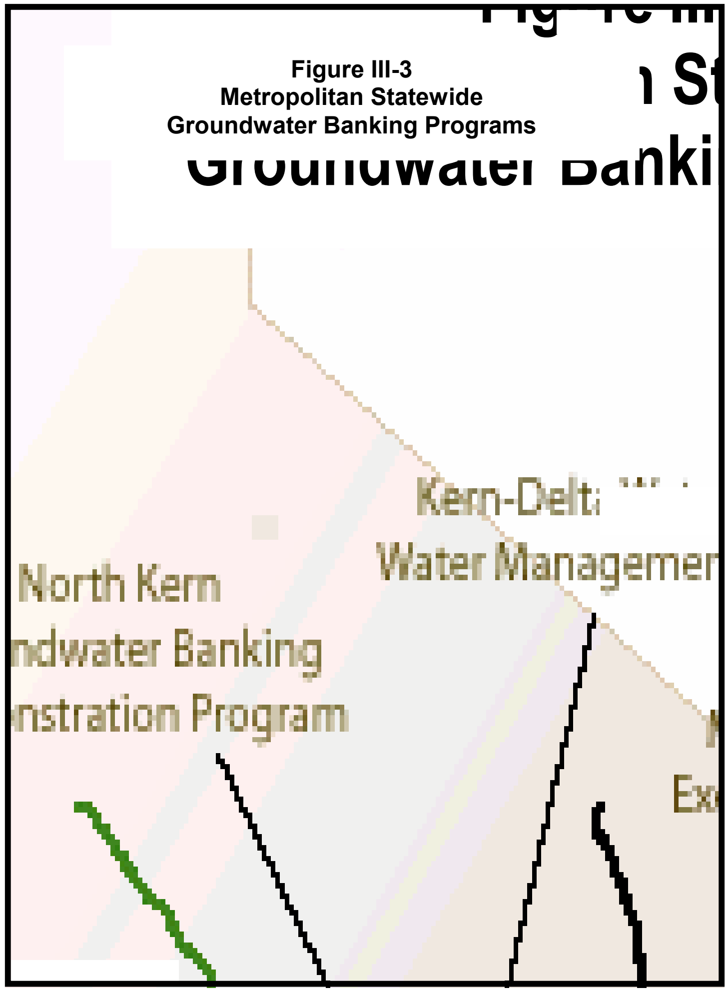


Figure III-3
Metropolitan Statewide
Groundwater Banking Programs

Metropolitan expects to secure Central Valley water transfer supplies via spot markets and option contracts to meet its dry-year resource targets when necessary. Hydrologic and market conditions will determine the amount of water transfer activity occurring in any year. Transfer market activity in 2003 and 2005 provide examples of how Metropolitan has used water transfer options as a resource to fill anticipated supply shortfalls needed to meet Metropolitan's service area demands.

In 2003, Metropolitan secured options to purchase approximately 145 taf of water from willing sellers in the Sacramento Valley during the irrigation season. These options protected against potential shortages of up to 650 taf within Metropolitan's service area that might arise from a decrease in Colorado River supply or as a result of drier-than-expected hydrologic conditions. Using these options, Metropolitan purchased approximately 125 taf of water for delivery to the California Aqueduct.

In 2005, Metropolitan, in partnership with seven other State Water Contractors, secured options to purchase approximately 130 taf of water from willing sellers in the Sacramento Valley during the irrigation season, of which Metropolitan's share was 113 taf. Metropolitan also had the right to assume the options of the other State Water Contractors if they chose not to purchase the transfer water. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not purchase these options.

Metropolitan's water transfer activities in 2003 and 2005 have demonstrated Metropolitan's ability to develop and negotiate water transfer agreements working directly with the agricultural districts who are selling the water. In critically dry-years or periods of prolonged drought, Metropolitan also anticipates working closely with DWR, USBR, and other water users to implement statewide programs similar to the Drought Water Banks operated by DWR in the early 1990s. Such statewide programs have a potential to secure large volumes of transfer water.

For example, in 1991 DWR's Drought Water Bank secured more than 800 taf of water transfer supplies within a short period from a limited group of sellers. Because of the complexity of cross-Delta transfers and the need to optimize the use of both CVP and SWP facilities, DWR and USBR are critical players in the water transfer process, especially when shortage conditions increase the general level of demand for transfers and amplify ecosystem and water quality issues associated with through-Delta conveyance of water. Therefore, Metropolitan views state-led programs to facilitate voluntary, market-based exchanges and sales of water as important parts of its overall water transfer strategy.

While the amount of water supply obtained through short-term transfer and storage programs is expected to vary year-to-year, Metropolitan's planning models indicate that on average these programs will yield about 125 taf for single and multiple dry-year scenarios.

Achievements to Date

Metropolitan has made rapid progress to date developing Central Valley storage and transfer programs. Most notably, by 2003, it was able to put in place sufficient storage and transfer programs to meet its 2010 dry-year resource target of 300 taf. This rapid progress may be attributed to several factors, including Metropolitan dedicating additional staff to identify, develop, and implement Central Valley storage and transfer programs; increased willingness of Central Valley agricultural interests to enter into storage and transfer programs with Metropolitan; and Metropolitan staff's ability to work with California Department of Water Resources and US Bureau of Reclamation staff to facilitate Central Valley storage and transfer programs.

III.7 COLORADO RIVER AQUEDUCT

IRP Goals

In the 1996 IRP, Metropolitan adopted a target for supplies from the Colorado River Aqueduct (CRA) of 1.2 million af per year. Since that time, a number of constraints have developed that restrict Metropolitan's access to Colorado River supplies. As a result, Metropolitan's goals for Colorado River deliveries and programs to attain the goals have been changed from the previous IRP. The IRP Update adopted a revised policy of utilizing the fill capacity of the CRA when needed through the basic apportionment and various water banking and water transfer programs. This water will help Metropolitan manage regional storage conditions and water quality.

System Description

Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. Under its contract with the federal government, Metropolitan has a basic entitlement of 550 taf per year of Colorado River water. Over time, however, this amount will be reduced slightly. Metropolitan also holds a priority for an additional 662 taf per year. Metropolitan can obtain water under this priority from:

- water unused by the California holders of priorities 1 through 3
- water conserved by the water conservation program with Imperial Irrigation District.
- water saved by the Palo Verde fallowing and forbearance program, or
- when the U.S. Secretary of the Interior determines that either one or both of the following exists:
    - surplus water;
    - water is apportioned to, but unused by, Arizona and/or Nevada.

Issues

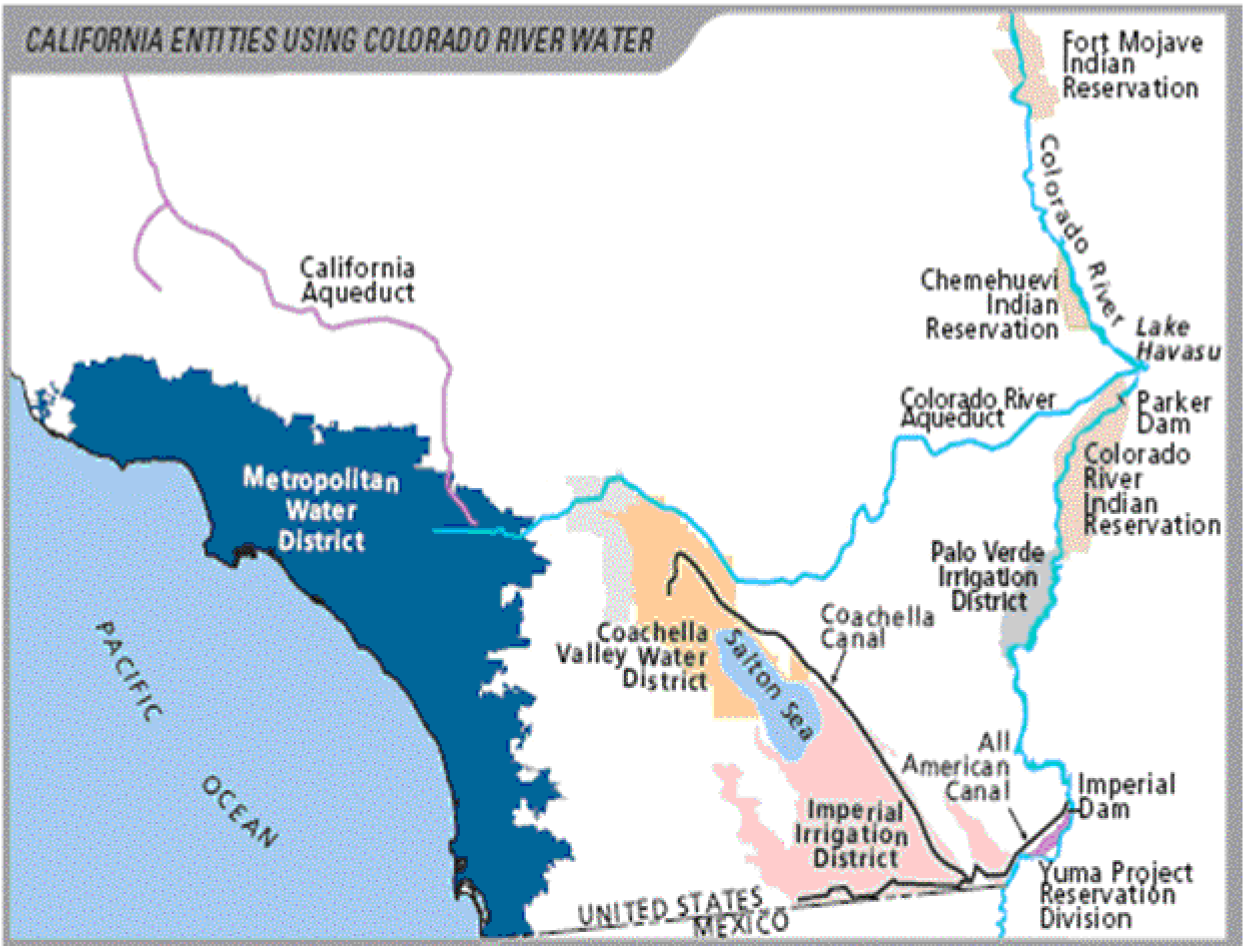
Over the years, a number of factors have affected the levels of Colorado River water available to Metropolitan.

- The 1964 U.S. Supreme Court decree in *Arizona v. California* reduced Metropolitan's dependable supply of Colorado River water to 550 taf per year. The reduction in dependability occurred with the commencement of Colorado River water deliveries to the Central Arizona Project in 1985.
- In 1979, the U.S. Supreme Court quantified present perfected rights (PPRs) to the use of Colorado River water by certain Indian reservations and other users. Since 1985, these PPR holders have used less than 20 taf annually. Because over 5.362 maf of Colorado River water were already allocated, it was not clear which rights would be affected by the use of these PPRs.

At that time, no formal guidelines existed to determine whether surplus water would be available. Decisions regarding surplus water availability were to be made at the discretion of the Secretary of Interior. As a result, the issues surrounding Colorado River water rights remained the subject of disagreement and litigation for many years.

The following figure shows the major aqueducts within southern California including those from the Colorado River, and the entities within the state having rights to the use of more than 5.362 maf of water from the Colorado River.

Figure III-4



Changed Conditions

Over time, Metropolitan and the State of California acknowledged that they would obtain less water from the Colorado River in the future than they had in the past, but the lack of clearly quantified water rights hindered efforts to promote water management projects. The U.S. Secretary of Interior asserted that California's users of Colorado River water had to limit their use to a total of 4.4 maf per year, plus any available surplus water. Under the auspices of the state's Colorado River Board, these users developed a draft approach to the problem, which was known as "California's Colorado River Water Use Plan" or the "California Plan." It characterized how California would develop a combination of programs to allow the state to limit its annual use of Colorado River water to 4.4 million af per year plus any available surplus water. The 2003 Quantification Settlement Agreement (QSA) among Imperial Irrigation District, Coachella Valley Water District and Metropolitan is the critical component of the

California Plan. It establishes the baseline water use for each of the agencies and facilitates the transfer of water from agricultural agencies to urban uses.

The recent extended drought in the Colorado River basin has stressed the water supply in this region more severely than had been foreseen. As a result of this experience, agencies from the Colorado River states are embarking on a negotiating process to develop guidelines to managing shortage on the Colorado River system. Until this process is completed (expected by December, 2007) the only guideline to allocations of this water is the existing priority system. Under this system, Metropolitan's base supply has higher priority than Arizona's or Nevada's supply, so Metropolitan has assumed (and current modeling demonstrates) that this supply is unlikely to be interrupted.

The San Diego County Water Authority has begun two projects that will provide Colorado River water to that agency.[1] These projects will result in increased Colorado River water being diverted into the Colorado River Aqueduct in Lake Havasu for delivery by Metropolitan to San Diego. Although these are not Metropolitan projects, they will increase water supplies to the region and decrease San Diego's demands on Metropolitan water supplies.

Implementation Approach

The 1996 IRP recognized explicitly that program development would play an important part in reaching the target level of deliveries from the CRA and other Colorado River user service areas. The implementation approach explored a number of water conservation programs with water agencies that took water from the Colorado or were located in close proximity to the CRA. Implementing the QSA was a necessary first step for all of these programs. On October 10, 2003, after lengthy negotiations, representatives from Metropolitan, the Imperial Irrigation District (IID), and Coachella Valley Water District (CVWD) executed the QSA and other related agreements. Parties involved also included the San Diego County Water Authority (SDCWA), the California Department of Water Resources (DWR), the California Department of Fish and Game, the U.S. Department of the Interior, and the San Luis Rey Indian Water Rights Settlement Parties.

Metropolitan has identified a number of programs that could be used to achieve the regional long-term development targets for the CRA, and it has entered into or is exploring agreements with a number of agencies. Table III-23 summarizes these programs and describes whether the programs are being implemented, are deferred, or under investigation.

[1] These projects, the San Diego County Water Authority/Imperial Irrigation District transfers and the lining of the Coachella and All-American canals will be discussed in that Authority's Urban Water Management Plan.

Table III-23
Colorado River Aqueduct Deliveries: 2025
(TAF)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977	Average Year (1922-2004)
Existing Projects			
Base Apportionment[1]	503	503	503
IID/MWD Conservation Program	85	85	85
PVID Land Management Program	110	110	110
Future Projects			
Hayfield Storage Program[2,3]	100	100	0
Lower Coachella Storage Program[3]	150	150	0
Chuckwalla Storage Program[3]	150	150	0
Storage in Lake Mead[4]			

1. Basic apportionment less Present Perfected Rights.
2. Program has been implemented with approximately 73 taf in storage, and construction of extraction facilities was started but then deferred for two years because of drought in the Colorado River basin.
3. Storage programs have been deferred pending greater availability of surplus on the Colorado River.
4. Under investigation

Colorado River Water Management Programs

IID/MWD Conservation Program

Under a 1988 agreement, Metropolitan has funded water efficiency improvements within IID's service area in return for the right to divert the water conserved by those investments. Under this program, IID implemented a number of structural and non-structural measures, including the lining of existing earthen canals with concrete, constructing local reservoirs and spill-interceptor canals, installing non-leak gates, and automating the distribution system. Other implemented programs include the delivery of water to farmers on a 12-hour rather than a 24-hour basis and improvements in on-farm water management through the installation of tailwater pumpback systems, drip irrigation systems, and linear-move irrigation systems. Through this program, Metropolitan initially obtained an additional 109 taf per year. Execution of the QSA and amendments to the 1988 and 1989 agreements resulted in changes in the availability of water under the program, extending the term to 2078 and guaranteeing Metropolitan at least 80 taf per year. The remainder of the conserved water is available to CVWD.

Palo Verde Land Management and Crop Rotation Program

In May 2004, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with the Palo Verde Irrigation District. Under the program, participating farmers in PVID will be paid to reduce their water use by not irrigating a portion of their land. A maximum of 29 percent of lands within PVID can be fallowed in any given year. Under the terms of the QSA, water savings within the PVID service area will be made available to Metropolitan. Partial implementation of the program began in January 2005, with deliveries in that year of 85 taf. When fully implemented, the program is estimated to provide up to 111 taf per year. The agreement also states that when fully implemented the program will supply a minimum of 26 taf per year.

Hayfield Groundwater Storage Program
Metropolitan's board approved the Hayfield Groundwater Storage Program in June 2000. The program will allow CRA water to be stored in the Hayfield Groundwater Basin in east Riverside County (about 50 miles east of Palm Springs) for future withdrawal and delivery to the CRA. As of 2003, there were 73 taf in storage. At that time, construction of facilities for extracting the stored water began, but it was then deferred for two years because drought conditions in the Colorado River watershed resulted in a lack of surplus supplies for storage. When the drought ends, Metropolitan will pursue this program and develop storage capacity of about 500 taf.

Chuckwalla Groundwater Storage Program
Under this proposed program, Colorado River water would be stored in the Upper Chuckwalla Groundwater Basin for future delivery to the CRA. The basin is located in Riverside County about 70 miles east of Palm Springs. Metropolitan has also decided to defer this program until water becomes more plentiful in the Colorado River Basin.

Lower Coachella Valley Groundwater Storage Program
Metropolitan, the Coachella Valley Water District, and the Desert Water Agency are investigating the feasibility of a conjunctive use storage program in the Lower Coachella groundwater basin. The basin, which is currently in an over-drafted condition, has the potential to provide a total storage capacity of 500 taf for Metropolitan. The Lower Coachella Program would have the advantage of using the All American and Coachella canals to deliver water for storage, preserving capacity in the CRA for service area demands.

The groundwater storage programs (Hayfield, Chuckwalla and Lower Coachella) all depend on the availability of surplus water supplies from the Colorado. This water could come from a number of sources: when supplies above 4.4 maf are available for California use; when other California agencies use less than their allotted CRA water supplies; or if Metropolitan were to obtain water transfers from agencies in other Colorado River states. However, the recent drought in the Colorado River basin means that little additional water is likely to be available from these sources in the immediate future, so Metropolitan has deferred future expenditures on these programs until surplus water is more likely to be available.

Salton Sea Restoration Transfer
State legislation passed in 2003 requires the development of a plan to restore the Salton Sea. The Resources Secretary is required to submit to the Legislature a plan that identifies a preferred alternative no later than December 31, 2006. Implementation of the plan would be funded from the Salton Sea Restoration Fund (Restoration Fund). Part of the income to the Restoration Fund would include the proceeds from a DWR-facilitated transfer of IID conserved water to Metropolitan.

This transfer would consist of up to 1.6 million af of water that would be conserved by IID and made available to Metropolitan with the net proceeds being placed in the Restoration Fund. DWR is to help facilitate the transfer. This potential transfer is composed of two blocks of water: (1) 800 taf new water to be conserved by IID; and (2) 800 taf of water presently scheduled to be conserved by IID under the QSA to provide salinity management water for the Salton Sea. Conserved water could be available as soon as 2007 through 2017.

DWR is in the initial stages of preparing a Program Environmental Impact Report (PEIR) for the plan. A Draft PEIR is scheduled for release to the public in December 2005. The Final PEIR is scheduled for release in November 2006 with a Notice of Determination to be filed in December 2006. Metropolitan expects to call on this water in the medium term (around 2010), but does not expect to rely on it in the long term.

Lake Mead Storage

Metropolitan is also exploring other options for water storage including the potential to store water in Lake Mead. While this project appears promising, the likely benefits are too speculative to include in the reliability analysis.

Achievements to Date

Metropolitan recognizes that in the short-term, programs are not yet in place to provide the full target, even with the adoption of the QSA. The QSA provides a solid foundation for developing future programs that will help accomplish the long-term CRA target.

The execution of the QSA also reinstated the Interim Surplus Guidelines (ISG), which were suspended when the original agreement deadline passed. Under these guidelines, California can receive any surplus water available from the river through 2016. The amount of water available under this program would vary from year to year depending on the amount of water in storage in Lake Mead. Because of a five-year drought in the Colorado River watershed, the amount of surplus water available to Metropolitan has been substantially reduced from earlier projections. Additionally, if Metropolitan chooses to divert any special surplus water, a shortage-sharing program with the State of Arizona may be necessary. Because of the risks associated with this shortage-sharing, Metropolitan did not divert the special surplus water that was available through the ISG in 2003 or 2004. No surplus water is available in 2005.

Because of the uncertainties associated with this supply source, Metropolitan's current plans for resource development do not rely on them and the program is not included in this regional plan. However, this source may become more useful in future.

IV. Water Quality

IRP Goal

Metropolitan's planning efforts have recognized the importance of the quality of its water supplies. To the extent possible, Metropolitan responds to water quality concerns by concentrating on maintaining the quality of the source water and developing water management programs that protect and enhance water quality. Contaminants that cannot be sufficiently controlled through protection of source waters must be handled through changed water treatment protocols or blending. These practices can increase costs and/or reduce operating flexibility. In addition, Metropolitan has developed enhanced security practices and policies in response to national security concerns.

Implementing the major components of Metropolitan's planning efforts – groundwater storage, recycled water, and minimized impacts on the Delta – requires meeting specific water quality targets for imported water. Metropolitan has two sources of water: the Colorado River and the State Water Project. Each source has specific quality issues, which are summarized below. To date, Metropolitan has not identified any water quality risks that cannot be mitigated. As described below, the only potential effect of water quality on the level of water supplies could result from increases in the salinity of water resources. If diminished water quality caused a need for membrane treatment, Metropolitan could experience losses of up to 15 percent of the water processed. However, Metropolitan would only process a small proportion of the affected water and would reduce total salinity by blending the processed water with the remaining unprocessed water. Thus Metropolitan anticipates no significant reductions in water supply availability from these sources due to water quality concerns over the study period.

Colorado River

High salinity levels represent the most serious current problem associated with Colorado River supplies. In addition, Metropolitan is working to protect threats from uranium, perchlorate and hexavalent chromium, which are discussed later in this chapter. As noted above, high salinity levels on the Colorado could require membrane treatment, which could slightly reduce supply levels. Metropolitan fully expects its source protection efforts to be successful, so the only foreseeable water quality constraint to the use of Colorado River water will be the need to blend (mix) it with State Water Project supplies to meet the adopted salinity standards.

State Water Project

The key water quality issues on the State Water Project are total organic carbon, bromides and salinity. Metropolitan is working to protect the water quality of this source, but it has needed to upgrade its water treatment plants to deal adequately with disinfection byproducts. These byproducts result from total organic carbon and bromide levels in the source water, and they may place some near term restrictions on Metropolitan's ability to use State Water Project water. Metropolitan expects this treatment restriction to be overcome in the next few years, and other than this, Metropolitan does not expect any water quality restrictions on available water supplies from this source over the study period.

Local Agency Supplies and Groundwater Storage

Emerging standards for contaminants such as arsenic may add costs to the use of groundwater storage and may affect the availability of local agency groundwater sources. These contaminants are not expected to affect the availability of Metropolitan supplies, but they may affect the availability of local agency supplies, which could in turn affect the level of demands on Metropolitan supplies if local agencies abandon supplies in lieu of treatment options. Metropolitan has not analyzed the effect these water quality issues could have on local agency supply availability.

The major regional concerns are:

- perchlorate
- methyl tertiary butyl ether (MTBE) and tertiary butanol (TBA) in groundwater and local surface reservoirs[1]
- arsenic
- radon
- uranium
- N-nitrosodimethylamine (NDMA) in groundwater and treated surface waters
- hexavalent chromium in groundwater
- pharmaceuticals and personal care products.

Metropolitan has adopted programs to address the potential for contaminants that might influence water supply. These programs are discussed below, by contaminant.

Salinity

Imported water from the Colorado River has high salinity levels, so it must be blended (mixed) with lower-salinity water from the SWP. Higher salinity levels in either Colorado River water or groundwater would increase the proportion of SWP supplies required to meet the adopted imported water salinity objectives. Metropolitan adopted the imported water salinity standards because higher salinity could increase costs and reduce operating flexibility.

1. If diminished water quality causes a need for membrane treatment, the process typically results in losses of up to 15 percent of the water processed. These losses result both in an increased requirement for additional water supplies and environmental constraints related to brine disposal. In addition, the process is costly. However, only a portion of the imported water would need to be processed, so the possible loss in supplies is small.
2. High total dissolved solids (TDS) in water supplies leads to high TDS in wastewater, which lowers the usefulness and increases the cost of recycled water.
3. Degradation of imported water supply quality could limit the use of local groundwater basins for storage because of standards controlling the quality of water added to the basins.

In addition to the link between water supply and water quality, Metropolitan has identified economic benefits from reducing the TDS concentrations of water supplies. Estimates show that

[1] To date, no MTBE problems have been identified in Metropolitan's source water.

a simultaneous reduction in salinity concentrations of 100 milligrams per liter (mg/L) in both the Colorado River and SWP supplies will yield economic benefits of $95 million per year within Metropolitan's service territory. This estimate has added to Metropolitan's incentives to reduce salinity concentrations within the region's water supplies.

For all of these reasons, Metropolitan's Board approved a Salinity Management Policy on April 13, 1999. The policy set a goal of achieving salinity concentrations in delivered water of less than 500 mg/L TDS. At the same time, the Board adopted an Action Plan consisting of the following four components:

1. Imported water source control and salinity reduction actions;
2. Distribution system salinity management actions;
3. Collaborative actions with other agencies;
4. Local salinity management actions to protect groundwater and recycled water supplies.

Within Metropolitan's service area, local water sources account for approximately half of the salt loading, and imported water accounts for the remainder. All of these sources must be managed appropriately to sustain water quality and supply reliability goals. The following sections discuss the current salinity situation for each of Metropolitan's major supply sources.

Colorado River

Water imported via the Colorado River Aqueduct (CRA) has the highest level of salinity of all of Metropolitan's sources of supply, averaging around 630 mg/L since 1976. Concern over salinity levels in the Colorado River has existed for many years. To deal with the concern, the International Boundary and Water Commission approved Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River in 1973, and the President approved the Colorado River Basin Salinity Control Act in 1974. High TDS in the Colorado River as it entered Mexico and the concerns of the seven basin states regarding the quality of Colorado River water in the United States drove these initial actions. To foster interstate cooperation on this issue, the seven basin states formed the Colorado River Basin Salinity Control Forum (Forum).

The salts in the Colorado River System are indigenous and pervasive, mostly resulting from saline sediments in the Basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. The Colorado River Basin Salinity Control Program is designed to prevent a portion of this abundant salt supply from moving into the river system. The program targets the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs.

The Forum proposed, the states adopted, and the Environmental Protection Agency approved water quality standards in 1975, including numeric criteria and a plan for controlling salinity increases. The standards require that the plan ensure that the flow-weighted average annual salinity remain at or below the 1972 levels, while the Basin states continue to develop their 1922 Colorado River Compact-apportioned water supply. The Forum selected three stations on the main stream of the lower Colorado River as appropriate points to measure the river's salinity. These stations and numeric criteria are (1) below Hoover Dam, 723 mg/l; (2) below Parker Dam, 747 mg/l; and (3) at Imperial Dam, 879 mg/l. The numeric criteria are flow-weighted average annual salinity values.

During the high water flows of 1983-1986, salinity levels in the CRA dropped to a historic low of 525 mg/L. However, during the 1987-1992 drought, higher salinity levels of 600 to 650 mg/L returned. Once again, the current drought has seen a return to higher levels, with TDS in Lake Havasu measured at 674 mg/L in June 2005.

State Water Project

Water supplies from the SWP have significantly lower TDS concentrations than the Colorado River, averaging 250 mg/L in water supplied through the East Branch and 325 mg/L on the West Branch.[2] Because of this lower salinity, Metropolitan blends SWP water with high salinity CRA water to reduce the salinity concentrations of delivered water. However, both the supply and the TDS concentrations of SWP water can vary significantly in response to hydrologic conditions in the Sacramento-San Joaquin watersheds.

The TDS concentrations of SWP water can also vary widely over short periods of time. These variations reflect seasonal and tidal flow patterns, and they pose an additional problem for use of blending as a management tool to lower the higher TDS from the CRA supply. For example, in the 1977 drought, the salinity of SWP water reaching Metropolitan increased to 430 mg/L, and supplies became limited. During this same event, salinity at the SWP's Banks pumping plant exceeded 700 mg/L. Under similar circumstances, Metropolitan's 500 mg/L salinity objective could only be achieved by reducing imported water from the CRA. Thus, it may not always be possible to maintain both the salinity objective and water supply reliability unless salinity concentrations of source supplies can be reduced.

TDS objectives in Article 19 of the SWP Water Service Contract specify a ten-year average of 220 mg/L and a maximum monthly average of 440 mg/L. These objectives have not been met, and Metropolitan is working with DWR and other agencies on programs aimed at reducing salinity in Delta supplies. These programs aim to improve salinity on the San Joaquin River through modifying agricultural drainage and developing comprehensive basin plans. In addition, studies are underway to evaluate the benefits in reduced salinity of modifying levees in Franks Tract and other flooded islands in the Delta.

Recycled Water

Wastewater flows always experience significantly higher salinity concentrations than the potable water supply. Typically, each cycle of urban water use adds 250 to 400 mg/L of TDS to the wastewater. Salinity increases tend to be higher where specific commercial or industrial processes add brines to the discharge stream or where brackish groundwater infiltrates into the sewer system.

Where wastewater flows have high salinity concentrations, the use of recycled water may be limited or require more expensive treatment. Landscape irrigation and industrial reuse become

[2] The higher salinity in the West Branch deliveries is due to salt loadings from local streams, operational conditions, and evaporation at Pyramid and Castaic Lakes.

problematic at TDS concentrations of over 1,000 mg/L. Some crops are particularly sensitive to high TDS concentrations, and the use of high-salinity recycled water may reduce yields of these crops. In addition, concern for the water quality in groundwater basins may lead to restrictions on the use of recycled water on lands overlying those basins.

These issues are exacerbated during times of drought, when the salinity of imported water supplies increases because of increased salinity in wastewater flows and recycled water. Basin management plans and recycled water customers may restrict the use of recycled water at a time when its use would be most valuable. To maintain the cost-effectiveness of recycled water, therefore, the salinity level of the region's potable water sources and wastewater flows must be controlled.

Groundwater Basins

Increased TDS in groundwater basins occurs either when basins near the ocean are overdrafted, leading to seawater intrusion, or when agricultural and urban return flows add salts to the basins. Much of the water used for agricultural or urban irrigation infiltrates into the aquifer, so where irrigation water is high in TDS or where the water transports salts from overlying soil, the infiltrating water will increase the salinity of the aquifer. In addition, wastewater discharges in inland regions may lead to salt buildup from fertilizer and dairy waste. In the 1950s and 1960s, Colorado River water was used to recharge severely overdrafted aquifers and prevent saltwater intrusion. As a result, the region's groundwater basins received more than three million acre-feet of this high-TDS imported water, significantly impacting salt loadings.

In the past, these high salt concentrations have caused some basins within Metropolitan's service area to be unsuitable for municipal uses if left untreated. The Arlington Basin in Riverside and the Mission Basin in San Diego required demineralization before they could be returned to municipal service. The capacity of the larger groundwater basins makes them better able to dilute the impact of increasing salinity. While most groundwater basins within the region still produce water of acceptable quality, this resource must be managed carefully to minimize further degradation. Even with today's more heightened concern regarding salinity, approximately 600,000 tons of salts per year accumulate within the region, leading to ever-increasing salinity concentrations in many groundwater basins. Table IV-1 shows the salinity from existing productive groundwater wells within the region, and Figure IV-1 shows the distribution of those salinity concentrations.

To protect the quality of these basins, regional water quality control boards often place restrictions on the salinity concentrations of water used for basin recharge or for irrigation of lands overlying the aquifers. Those situations may restrict water reuse and aquifer recharge, or they may require expensive mitigation measures.

Table IV-1
Salinity Levels at Productive Groundwater Wells

TDS Concentration (mg/L)	Annual Production (Million Acre-Feet)	Percent of Production
Less than 500	1.06	78
500 to 1,000	0.15	11
Greater than 1,000	0.15	11
Total	1.36	100

Source: Metropolitan Water District of Southern California, Salinity Management Study, Final Report, June 1999.

The Salinity Action Plan

The Salinity Management Policy adopted by Metropolitan's Board specified a salinity objective of 500 mg/L for blended imported water. It also identified the need for both local and imported water sources to be managed comprehensively to maintain the ability to use recycled water and groundwater. To achieve these targets, the Board adopted an Action Plan that relies in part on blending SWP water with supplies from the Colorado River. Using this approach, the salinity target could be met in seven out of ten years. In the other three years, hydrologic conditions would result in increased salinity and reduced volume of SWP supplies. Metropolitan has alerted its local agencies that such conditions are inevitable, and that despite its best efforts, high salinity could be a concern at such times. Metropolitan has also urged its member agencies to structure the operation of their local projects and groundwater so they are prepared to mitigate the effect of higher salinity levels in imported waters. In addition, Metropolitan will concentrate on obtaining better quality water in the spring/summer months (April through September) to maximize the use of recycled water in agriculture.

In the near term, Proposition 13 and the CALFED Bay-Delta Program call for actions and provide funding to improve the quality of water originating in the Bay-Delta. Proposition 13 (Water Bond 2000), which was approved by 65 percent of California voters in March 2000, authorizes the State of California to sell $1.97 billion in general obligation bonds to support safe drinking water, water quality, flood protection, and water reliability projects throughout the state. Of these funds, $355 million are earmarked for statewide clean water and water recycling programs, and $155 million will go to water conservation programs.

Metropolitan has obtained Proposition 13 funding for two water quality programs:

<u>The Water Quality Exchange Partnership.</u> The $20 million that has been awarded is being used to develop new water infrastructure that will enhance and optimize the water supply, water quality, and water management capabilities of agricultural and urban interests in the eastern San Joaquin Valley and urban Southern California. These projects are designed for agencies that have access to high quality water from Sierra watersheds. Metropolitan is working with these agencies to institute programs to exchange their higher quality water for SWP water.

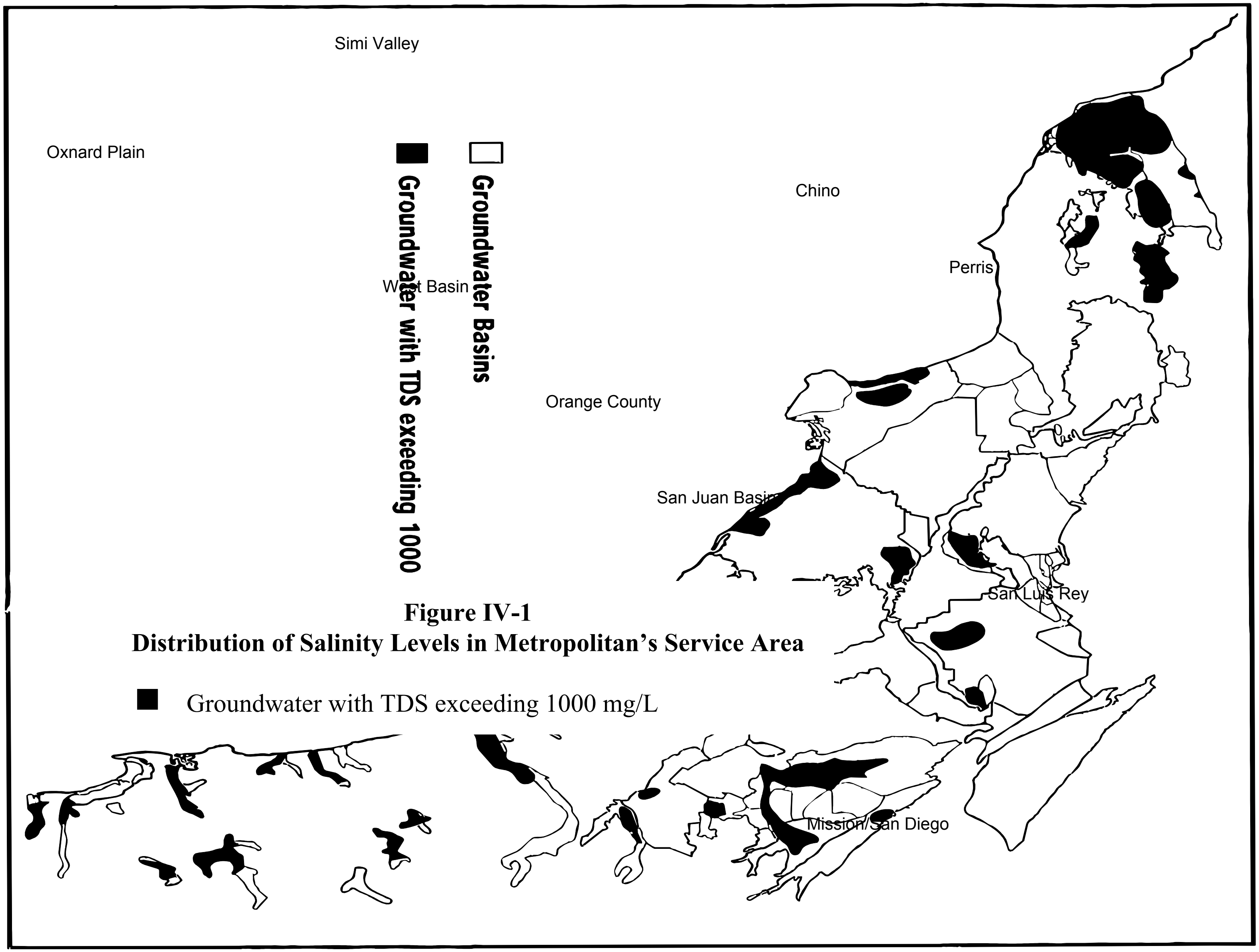


Figure IV-1
Distribution of Salinity Levels in Metropolitan's Service Area

- The Desalination Research and Innovation Partnership (DRIP). This $4 million award will help develop cost-effective advanced water treatment technologies for the desalination of Colorado River water, brackish groundwater, municipal wastewater, and agricultural drainage water.

Actions during the first seven years of the CALFED Bay-Delta Program include: improved salt management in the San Joaquin Valley, upstream source control, other desalination demonstration projects, and measures to control storm runoff into the California Aqueduct.

In the longer term, implementation of the CALFED Bay-Delta Program over the next thirty years is expected to reduce both the long-term average and short-term salinity variations in SWP water supplies. Even if these reductions are not achieved, Metropolitan could consider desalination of Colorado River water to maintain salinity objectives, but given current technologies, this option is very expensive. It also would cause a 10 to 15 percent reduction in the amount of water that could be delivered from the Colorado River because part of the treated water supply would be lost in the concentrated waste brine. In addition, there would be significant cost and environmental issues related to the disposal of this brine. For these reasons, large-scale Colorado River water desalination may not be viable at this time, but it could be in the future. To overcome the uncertainties, the Salinity Management Action Plan calls for an aggressive research and development program for a more efficient and cost-effective desalination technology. Near-term research is nearly completed through DRIP, a consortium of California water agencies and other interested parties.

Developing the Plan

The release of Metropolitan's Salinity Management Action Plan marked the culmination of a three-year process that began in August of 1996. At that time, Metropolitan and the U.S. Bureau of Reclamation (USBR) agreed to cooperate on and jointly fund a study of the sources of salinity in the water supply, problems associated with that salinity, and management options to overcome these problems. To ensure a broad level of input for the analysis, Metropolitan formed a task force of interested water, groundwater and wastewater agencies, state and local government agencies, and interested associations.

The Salinity Summit

As the Salinity Management Study neared completion, Metropolitan convened a Salinity Summit in January 1999. At this conference, 100 senior managers and technical experts representing 60 agencies discussed regional salinity issues. They considered implementation issues surrounding a regional salinity management plan, and they discussed how the region’s agencies could work together to attain salinity management goals.

Perchlorate

Ammonium perchlorate is used as a main component in solid rocket propellant, and it can also be found in some types of munitions and fireworks. Ammonium perchlorate and other perchlorate salts are readily soluble in water, dissociating into the perchlorate ion (ClO_4^-), which is highly mobile in the groundwater. The perchlorate ion does not readily interact with the soil matrix or degrade in the environment.

The primary human health concern related to perchlorate is its effects on the thyroid. Perchlorate interferes with the thyroid gland's ability to produce hormones required for normal growth and development. Currently, the California Department of Health Services (CDHS) has adopted a notification level of 6 μg/L for perchlorate and is in the process of developing a drinking water regulation. If the current notification level is exceeded, CDHS requires that utilities inform their governing bodies. It also recommends they notify consumers of perchlorate's presence in the drinking water supply and its potential adverse health effects, and it strongly recommends that untreated source supplies be removed if perchlorate levels exceed 60 μg/L.

Perchlorate has been detected at low levels in Metropolitan's CRA water supply and in a number of the regional groundwater basins. No perchlorate has been detected in Metropolitan's SWP supply.

The Perchlorate Action Plan

Because of growing concerns over perchlorate levels in drinking water, Metropolitan adopted a Perchlorate Action Plan in 2002.[3] The Plan's objectives are to: (1) expand monitoring and reporting programs, (2) assess the impact of perchlorate on local groundwater supplies, (3) continue tracking health effects studies, (4) continue tracking remediation efforts in the Las Vegas Wash, the source of perchlorate contamination of the Colorado River, (5) initiate modeling of perchlorate levels in the Colorado River, (6) investigate the need for additional resource management strategies, (7) pursue legislative and regulatory options for cleanup activities and regulatory standards, (8) include information on perchlorate into outreach activities, and (9) provide periodic updates to Metropolitan's board and member agencies.

Metropolitan began monitoring for perchlorate in June 1997 when it was detected in the Colorado River Aqueduct and the Lake Mead outlet at Hoover Dam. Extensive sampling within the Colorado River watershed in July and August of the same year indicated that the perchlorate originated in the Las Vegas Wash, and the most likely source was the Kerr-McGee chemical manufacturing site located in Henderson, Nevada. In August 1997, a quarterly monitoring program began for water in Lake Mead, and Metropolitan began monthly monitoring the water in its system in October 1997. The Nevada Division of Environmental Protection manages a comprehensive groundwater remediation program in the Henderson area. The amount of perchlorate entering the Colorado River system from Henderson has been reduced from approximately 900 lb/day in 1997 to 103 lb/day as of May, 2005.[4] This number has fluctuated

[3] This was presented to the Board at the June 11, 2002 Board meeting.
[4] As reported at http://ndep.nv.gov/bca/perchlorate05.htm. This site reports real-time monitoring results for perchlorate just above the confluence of the Las Vegas Wash and Lake Mead.

during 2005, probably as a result of higher runoff caused by unusual amounts of local precipitation. The concentrations of perchlorate in Colorado River Water are now less than California's detection limit for reporting purposes of 4 parts per billion (ppb).[5]

Perchlorate has also been found in groundwater basins within Metropolitan's service area. As of May 2002, the following Metropolitan agencies reported closures of wells due to perchlorate: Anaheim, Central Basin MWD, Foothill MWD, Pasadena, San Marino, Three Valleys MWD, Western MWD, and Upper San Gabriel Valley MWD. Total lost production due to well closures is estimated at 57 taf annually. Member and sub-agencies are considering various options for removing or reducing perchlorate concentrations, including blending and treatment, to recover some or all of lost production.[6]

Perchlorate in local groundwater basins is thought to be largely from local sources that tested and manufactured solid rocket engines. The closed wells are typically located near rocket testing and manufacturing facilities (such as Aerojet in Azusa in the Main San Gabriel Basin and the Jet Propulsion Laboratory/NASA in the Raymond Basin). In the Raymond Basin, one City of Pasadena well was shut down because of perchlorate concentrations of approximately 100 to 125 μg/L. In the Main San Gabriel Basin, several wells have been shut down, and the La Puente County Water District has the highest concentrations of perchlorate, at approximately 200 μg/L.

Metropolitan also conducted applied research to investigate technologies to mitigate perchlorate contamination. Perchlorate cannot be removed using conventional water treatment. Nanofiltration and reverse osmosis do work effectively but at a very high cost. Aerojet has implemented fluidized bed biological treatment in Rancho Cordova and is re-injecting the treated water into the ground. Local companies have also conducted work on this topic. A number of companies have developed an ion exchange process that removes perchlorate but creates a hazardous waste brine. Nevertheless, a number of sites in Southern California have successfully installed ion exchange systems. The City of Pasadena is using ion exchange treatment at one well site and is considering biological treatment for another. The City of Santa Clarita is studying the use of fixed-bed biological treatment.

Thus, research is showing that treatment options are available to recover groundwater supplies contaminated with perchlorate. However, it is impossible to predict whether treatment will be pursued to recover all lost production since local agencies will make those decisions based largely on cost considerations, ability to identify potentially responsible parties for cleanup, and the availability of alternative supplies.

Total Organic Carbon and Bromide

When source water containing high levels of total organic carbon (TOC) and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts (DBPs) form. Studies have shown a link between certain cancers and DBP exposure. In addition, some studies have shown an association between reproductive and developmental effects and chlorinated water. In December 1998, the U.S. Environmental Protection Agency (EPA) adopted more stringent

[5] See the measurements from Willow Beach, reported at the NDEP website provided in the previous footnote.
[6] As reported in the Perchlorate Action Plan, June, 2002.

regulations for DBPs. Water agencies began complying with those new regulations in January 2002, and the EPA is expected to promulgate even more stringent regulations in the near future.

Existing levels of total organic carbon (TOC) and bromide in Delta water supplies present significant concern for Metropolitan's ability to maintain safe drinking water supplies. Levels of these constituents in SWP water increase several fold due to agricultural drainage and seawater intrusion as water moves through the Delta. One of Metropolitan's primary objectives for the CALFED Bay-Delta process is protection and improvement of the water quality of its SWP supplies to ensure compliance with current and future drinking water regulations. Although exact future drinking water standards are unknown, significant source water protection of SWP water supplies will almost certainly be a necessary component of meeting these requirements cost effectively.

On August 17, 1999, Metropolitan's Board of Directors adopted a Statement of Needs for the CALFED Bay Delta Program. The drinking water quality and salinity targets component states that Metropolitan requires a safe drinking water supply from the Bay-Delta to meet current and future regulatory requirements for public health protection. This objective is to be achieved through reduced levels of TOC, bromide, pathogens, and other as yet unknown constituents in SWP water supplies. Implementation of the CALFED program should:

- Ensure the ability to meet anticipated more stringent regulations on disinfection byproducts and pathogens to protect public health, either through water quality improvements for Delta water supplies or through a cost-effective combination of alternative source waters, source improvement, and treatment facilities. Water quality improvements need to be implemented in a timely manner to allow compliance with the effective date of the regulations.

- Identify and commit to projects tied to the establishment of water quality performance milestones as an element of Stage 1 of CALFED's implementation plan to ensure compliance with anticipated and future more stringent regulations.

The CALFED Record of Decision released in August 2000 adopted the following water quality goals for TOC and bromide:

- average concentrations at Clifton Court Forebay and other southern and central Delta drinking water intakes of 50 µg/L bromide and 3.0 mg/L total organic carbon, or
- an equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, and treatment technologies.

CALFED's Bay-Delta Program calls for a wide array of actions to improve Bay/Delta water quality, ranging from improvements in treatment technology to safeguarding water quality at the source. These actions include conveyance improvements, alternative sources of supply, changes in storage and operations, and advanced treatment by water supply agencies. These conceptual actions do not completely conform to the specific requirements as outlined by Metropolitan's Board. Metropolitan would like to see CALFED adopt water quality improvement milestones that would assure Southern California's ability to comply with pending more stringent regulations.

Source water quality improvements must be combined with cost-effective water treatment technologies to ensure safe drinking water at a reasonable cost. Metropolitan has five treatment plants: two that receive SWP water exclusively, and three that receive a blend of State Project and Colorado River water. In December 2001, Metropolitan's board committed to installing ozone treatment systems at the two plants that treat SWP water only. This ozonation process avoids the production of regulated disinfection byproducts that would otherwise form in the chlorine treatment of SWP water. The plants producing blended water meet federal guidelines for these byproducts through managing the blend of State Project and Colorado River water. To maintain the byproducts at a level consistent with federal law, Metropolitan currently limits the percentage of water from the State Water Project used in each plant. Metropolitan's Board has also adopted plans to install ozonation at the blending plants by 2011 at a cost of approximately $850 million.[7] This improvement will lift the restrictions on the mix of water used at the plants.

For short periods, Metropolitan can manage TOC levels in SWP supplies by blending with water withdrawn from water banks. For example, during a 2003 outage at Lake Mathews, Metropolitan extracted water from the Arvin-Edison and Kern Water Bank groundwater storage programs to reduce organic carbon levels in the California Aqueduct. The low-TOC groundwater reduced the TOC load in the California Aqueduct deliveries by more than 20% during the extraction period.

Other Issues of Concern

Four other chemicals have been identified as being of concern in Metropolitan's water supplies. These are MTBE, arsenic, radon and uranium. The following sections detail the reasons for Metropolitan's concerns and the plans for addressing them. Other emerging contaminants, such as NDMA and hexavalent chromium, could impact the region's water supplies; they have been identified, but the full extent of problems associated with them remains uncertain.

Methyl Tertiary Butyl Ether and Tertiary Butanol

Until recently, MTBE was the primary oxygenate in virtually all the gasoline used in California. In January 2004, the Governor's executive order to remove MTBE from gasoline became effective, and now ethanol is the primary oxygenate in use. The use of MTBE (and other oxygenates) in gasoline was mandated to achieve reductions in air pollution, including emissions of benzene, a known human carcinogen. However, this reduction in air pollution has been achieved at the expense of creating a serious groundwater and surface water contamination problem. MTBE is very soluble in water and has low affinity for soil particles, so it moves quickly into the groundwater. It is introduced into surface water bodies from the motor exhausts of recreational watercraft. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components.

CDHS has adopted a primary maximum contaminant level (MCL) of 13 μg/L for MTBE based on carcinogenicity studies in animals. MTBE also has a California Secondary Drinking Water Standard of 5 μg/L, which was established based on taste and odor concerns. In addition,

[7] This plan was authorized by Metropolitan's Board on July 8, 2003.

tertiary butanol (TBA) is often found in water where MTBE is present, so the CDHS has adopted a provisional action goal for TBA of 12 μg/L.

Metropolitan regularly monitors its water supply for contamination from MTBE and other oxygenates. In the past years, MTBE testing results have ranged from of non-detection to as high as 3.9 μg/L in the treatment plant effluents, and as high as 6.4 μg/L in the source water.

At Diamond Valley Lake and Lake Skinner, Metropolitan has taken steps to reduce the potential for MTBE contamination from recreational watercraft. The Board authorized a non-polluting boating program for these reservoirs that calls for specific boat requirements (MTBE-free fuel and clean burning engines) and a monitoring program that will show if MTBE or other gasoline contaminants appear at the lake.

Metropolitan has supported federal and state legislation aimed at reducing the impacts of MTBE in its drinking water supply, and it is investigating treatment options. In 1999, then-Governor Gray Davis issued Executive Order D-5-99, which phased out MTBE as a gasoline additive by December 31, 2003. California has requested a waiver to the oxygenate requirement from USEPA. The request was originally denied, but it is currently being reconsidered. Since other oxygenates are being used and many of these compounds have properties similar to those of MTBE, Metropolitan will continue to monitor for fuel oxygenates in reservoirs that are exposed to motorized watercraft.

MTBE presents a significant problem to local groundwater basins. Leaking underground storage tanks and poor fuel-handling practices at local gas stations may provide a large source of MTBE. Only one gallon of gasoline (11% MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 μg/L. Within Metropolitan's service area, local groundwater producers have been forced to close some of their wells due to MTBE contamination. For example, the city of Santa Monica lost about fifty percent of its production wells as a result of MTBE.

Improved underground storage tank requirements and monitoring, and the phase-out of MTBE as a fuel additive, will probably decrease the likelihood of MTBE groundwater problems in the future. However, it is difficult to estimate the magnitude of the problem when a small amount of MTBE can contaminate such a large volume of water.

A combination of an advanced oxidation process (typically ozone and hydrogen peroxide) followed by granular activated carbon has been found to be effective in reducing the levels of these contaminants by 80 to 90 percent.[8] Member agencies may therefore be able to treat their groundwater sources to comply with water quality standards. However, if the cost increases are sufficient, some member agencies may choose to increase their use of imported water to avoid this treatment cost.

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[8] See Liang, S., L. S. Palencia and R. L. Wolfe (1999). "Oxidation of MTBE by ozone and peroxone processes." *Journal of the American Water Works Association* 91(6): 104, and Liang, S., R. S. Yates, D. V. Davis, S. J. Pastor, L. S. Palencia and J. M. Bruno (2001). "Treatability of MTBE-contaminated groundwater by ozone and peroxone." *Journal of the American Water Works Association* 93(6): 110-120.

Arsenic

The new federal MCL for arsenic in domestic water supplies is 10 μg/L, with an effective date of 2006. The standard will impact both groundwater and surface water supplies. Metropolitan's water supplies have low levels of this contaminant and will not require treatment changes or capital investment to comply with this new standard. However, some investment will be needed to manage arsenic in the solids resulting from treatment.

The California Legislature required the Department of Health Services to adopt a new drinking water standard for arsenic by June 30, 2004. In advance of this requirement, the Office of Environmental Health Hazard Assessment set a public health goal for arsenic of 0.004 μg/L, based on lung and urinary bladder cancer risk. Monitoring results submitted to CDHS in 2001-2003 show that arsenic is ubiquitous in drinking water sources, reflecting its natural occurrence. They also show that considerably more sources have arsenic detections above the federal 10 μg/L MCL compared to the current MCL of 50 μg/L. Southern California drinking water sources that contain concentrations of arsenic over 10 μg/L include San Bernardino (61 sources), Los Angeles (50 sources), Riverside (24 sources), Orange (4 sources), and San Diego (4 sources).[9]

Some member agencies may face greater problems with arsenic compliance. A 1992 study for Central Basin Municipal Water District, for example, indicated that some of the Central Basin wells could have difficulty in complying with a lowered standard.[10] Water supplies imported via the Los Angeles Aqueduct also contain some arsenic. The cost of arsenic removal from these supplies could vary significantly.

At this time, it appears likely that the new treatment standards will increase costs but not necessarily decrease local water supplies. However, if the cost increases are sufficient, some member agencies may choose to increase their use of imported water to avoid this treatment cost.

Radon

U.S. EPA has proposed a radon MCL of 300 pCi/L, with an alternative standard of 4,000 pCi/L if the state has an approved Multimedia Mitigation program to reduce the indoor radon risk from soil and rocks underneath homes and buildings. Radon levels in Metropolitan's water supplies have been well below the proposed MCL of 300 pCi/L.[11] Where radon is a problem, air-stripping through aeration is the cost-effective treatment option. However, stripping results in outgassing of radon to the air. Currently the U.S. EPA has determined that the risk posed by this outgassing is less than that posed by radon in the water.

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[9] From the CDHS web site: http://www.dhs.ca.gov/ps/ddwem/chemicals/arsenic/monitoringresults.html. Note that the numbers reported there may change because the website is frequently updated.

[10] *Summary Review on the Occurrence of Arsenic in the Central Groundwater Basin, Los Angeles County, California*, prepared by Richard C. Slade & Associates, Sept. 7, 1993.

[11] Metropolitan's annual water quality report (Consumer Confidence Report, CCR). is a public document which reports the presence of regulated contaminants in Metropolitan's water supply. Radon is a regulated contaminant, so it would be included it in the Consumer Confidence Report if it were to be detected. Radon is not reported in the CCR, so it is not detected in the source water.

Uranium

A ten-and-a-half-million-ton pile of uranium mine tailings at Moab, Utah lies 600 feet from the Colorado River. Rainwater has been seeping through the pile and contaminating the local groundwater, causing a flow of contaminants into the river. It also has the potential to wash millions of tons of material containing uranium into the Colorado River as a result of a flood or other natural disaster. Public perception of drinking water safety is a particular concern with uranium.

Operations and maintenance activities at the site include intercepting some of the contaminated groundwater before it discharges into the river. The interim action system became fully operational in September 2003 and is currently being evaluated. Uranium in the concentration range of 950 to 1,190 picoCuries per liter (pCi/L) has been measured at the seepage site in the river. Uranium levels in the Colorado River at Metropolitan's intake range from 1 to 5 pCi/L. The California drinking water standard is 20 pCi/L.

At the recommendation of the National Research Council, the Department of Energy conducted a study to evaluate remediation actions and released an environmental impact statement (EIS) in July 2005.[12] The Department of Energy has agreed to move the tailings, but remediating the site will require Congressional appropriations, and maintaining congressional support for a cleanup will require close coordination and cooperation with other Colorado River users.

Other Emerging Contaminants

A number of other emerging contaminants, most notably N-nitrosodimethylamine, chromium VI, and pharmaceutical products, may also impact groundwater supplies.

N-nitrosodimethylamine (NDMA) contamination of groundwater was initially believed to be the result of chemical contamination from liquid rocket fuels when it was detected in some California groundwaters at concentrations exceeding California's notification level of 0.010 μg/L. Further investigations have shown NDMA to be a disinfection by-product of water and wastewater treatment. Recent studies indicate that chlorine and monochloramine can react with organic nitrogen precursors to form NDMA. Some NDMA control measures or removal technologies may be required to avoid impacts on Southern California drinking water supplies. Current test results for the presence of NDMA in Metropolitan's system range from non-detect (reporting limit of 0.002 μg/L) to 0.012 μg/L. The presence of NDMA is not limited to Metropolitan waters but is believed to be widespread.

Chromium VI is a possible contaminant in groundwater and surface water. Chromium is an inorganic chemical used in electroplating, leather tanning, wood treatment, pigments manufacture, and cooling tower treatment for corrosion control. Chromium can enter drinking water sources through discharges from industries, leaching from hazardous waste sites, and erosion of natural deposits. The California Legislature required that the California Department of Health Services set a maximum contaminant level for chromium VI by January 1, 2004. This level has not yet been achieved because the California Office of Health Hazard Assessment must

[12] This can be found at http://gj.em.doe.gov/moab. This site also provides updated information on the status of this project.

first establish a chromium VI-specific public health goal, which is the first step in the regulatory process. The current California MCL for total chromium is 0.05 mg/L (which includes chromium VI), but the CDHS is currently reviewing that MCL. Metropolitan is participating in a Consultative Technical Work Group that reviews monitoring results and remediation plans for groundwater contaminated with chromium VI at a site adjacent to the Colorado River near Topock, California.

Local agencies are concerned that Chromium VI may be found to be a health hazard, yet there are no proven technologies for reducing Chromium VI in water supplies to low levels. Although concentrations in local water supplies are below federal and state water quality standards, a number of cities[13] teamed with the American Water Works Association Research Foundation to initiate a research program into chromium removal. The program consists of three phases: bench scale, pilot scale and demonstration scale testing. Bench and pilot scale testing have been completed, and they have identified promising technologies. The City of Glendale is currently conducting a Phase 3 bridge project to fine-tune the treatment technologies identified in the earlier phases and develop cost estimates. The most cost-effective treatment technology will be chosen for the demonstration-scale project, and the city will submit an application for an EPA grant for that phase of the project. Metropolitan is a member of the Project Advisory Committee for this project, as are staff from Glendale, Los Angeles, U.S. EPA and the California Department of Health Services.

<u>Pharmaceuticals and personal care products</u> in source water and recycled water have led to growing expressions of concern. The extent that these contaminants are found to require mitigation may increase the cost of recycled water and wastewater treatment, and they may require broad controls on runoff into source water. However, the effect of this concern is difficult to predict with the current state of knowledge.

Other Water Quality Actions

In addition to monitoring for and controlling specific identified chemicals in the water supply, Metropolitan has undertaken a number of programs to protect the quality of its water supplies. These programs are summarized below.

Source Water Protection

Source water protection is important for all of California. The California Department of Health Services requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to examine possible sources of drinking water contamination. These surveys include suggestions for how to protect water quality at the source. The most recent sanitary surveys for Metropolitan's water sources were completed in 2000 and 2001.[14]

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[13] Los Angeles, Burbank, Glendale and San Fernando.

[14] Metropolitan Water District of Southern California, *Colorado River Watershed Sanitary Survey, 2000 Update*. For the State Water Project, the sanitary survey report was undertaken by the California Department of Water Resources, Division of Planning and Local Assistance, in 2001, and was titled *Sanitary Survey Update Report, 2001*.

A similar requirement from EPA calls for utilities to complete a Source Water Assessment. Information collected in the sanitary surveys is used to evaluate the vulnerability of water sources to contamination and to help determine the need for additional protective measures. Metropolitan completed its source water assessment in December 2002.[15] Water from the Colorado River is considered to be the most vulnerable to contamination by recreation, urban/storm-water runoff, increasing urbanization in the watershed, wastewater, and past industrial practices. Water supplies from Northern California are most vulnerable to contamination by urban/storm-water runoff, wildlife, agriculture, recreation, and wastewater.

Support SWP Water Quality Programs

Metropolitan supports DWR policies and programs aimed at maintaining or improving the quality of SWP water delivered to Metropolitan. In particular, Metropolitan supported the DWR policy to govern the quality of non-project water conveyed by the California Aqueduct, and it continued funding DWR's Municipal Water Quality Investigations Program that monitors and studies conditions affecting the quality of water in the Bay-Delta system.

Metropolitan also supports the Sacramento River Watershed Program, which was founded in 1996 to encourage interest groups to work together to address water quality problems in the watershed. Metropolitan provides funds to the program to help finance public service announcements to educate the public about the need to protect water quality in the watershed. Metropolitan also provides input to the development and implementation of water quality monitoring in the watershed.

Water Quality Exchanges

Metropolitan has developed and fostered water quality exchange partnerships with the Friant Water Users Authority and the Kings River Water Association. Under these partnerships, Metropolitan will invest in local infrastructure in the partners' service areas, which will provide the physical capability for the partners to exchange high-quality water from the Sierra Nevada mountains for a portion of Metropolitan's SWP supplies.

In addition, Metropolitan has implemented selective withdrawals from the Arvin-Edison storage program and the Kern Water Bank to improve water quality. Although these programs were initially designed to provide dry-year supply reliability, they can also be used to store SWP water at periods of better water quality so the stored water may be withdrawn at times of lower water quality, thus diluting SWP water deliveries.

[15] Metropolitan Water District of Southern California, Water Quality Section. *Drinking Water Source Assessments for the Colorado River and State Water Project: System 1910087*. 2002

Water Supply Security

The change in the national and international security situation has led to increased concerns about protecting the nation's water supply. In coordination with its member agencies, Metropolitan added new security measures in 2001 and continues to upgrade and refine procedures. Changes have included an increase in the number of water quality tests conducted each year (more than 300,000), as well as contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
REGIONAL URBAN WATER MANAGEMENT PLAN 2005
APPENDICES AND ATTACHED DOCUMENTS

APPENDIX A.1
DEMAND FORECAST

A.1 DEMAND FORECAST

Forecast Overview

Retail M&I demands represent the full spectrum of urban water use within a region, including residential, commercial, industrial, institutional and un-metered uses. Within the water industry, numerous approaches exist for projecting future retail M&I water demands. These approaches include per capita projections, trend extrapolation, land use build-out estimates, and econometric models.

To forecast urban water demands, Metropolitan uses the MWD-MAIN Water Use Forecasting System. MWD-MAIN features statistical models that have been adapted to conditions in Southern California. The model incorporates projections of demographic and economic variables from regional planning agencies (the Southern California Association of Governments, or SCAG, and the San Diego Association of Governments, or SANDAG) into statistically estimated water demand models to produce forecasts of water demand. The retail demand projections from MWD-MAIN are reduced by projected conservation savings developed in a separate conservation model.

The MWD-MAIN system features a separate model for each sector. Similarly, in the nonresidential sector, water use per employee is combined with forecasts of employment to yield an estimate of total nonresidential water demand. Table A.1-1 depicts these key relationships in the MWD-MAIN model. In the residential sector, the forecasts of water demand per dwelling unit are combined with the forecasts of dwelling units from the regional planning agencies to yield an estimate of total sector water demand.

In addition to accounting for future demographic trends, Metropolitan's water demand forecasts also incorporate current and future water demand management (conservation) efforts. In 1991, Metropolitan signed a *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU.) The MOU has been amended over time, and it commits Metropolitan to implementing a number of long-term water conservation measures referred to as Best Management Practices (BMPs). Section III.1 contains a more detailed discussion of Metropolitan's efforts at implementing the BMPs. A copy of the amended memorandum can be found at http://www.cuwcc.org/memorandum.lasso .

The forecasting approach embeds a detailed accounting of water conservation, distinguishing between:

- *Code-Based Conservation* – Water saved as a result of changes in water efficiency requirements for plumbing fixtures in plumbing codes. Thus, this form of conservation would occur without any water agency action.
- *Active Conservation* – Water saved directly as a result of conservation programs by water agencies (includes implementation of Best Management Practices.) This form of conservation is unlikely to occur without agency action.
- *Price-effect Conservation* – Water saved by retail customers attributable to the effect of changes in the real (inflation-adjusted) price of water. There may be some overlap between this form of conservation and the previous two. For example, increased water prices might

induce a consumer to take part in one of the active conservation programs run by the providing agency.

Because Metropolitan is fully committed to the implementation of the BMPs, the retail M&I demand projections account for the effects of the conservation BMPs, including projected changes in the price of water.

Table A.1-1
MWD-MAIN Demand Model Variables

Demand Sector	Projected Demographic	Dependent Variable	Explanatory Variables
Single Family Residential	Number of Single Family Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Multifamily Residential	Number of Multifamily Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Commercial, Industrial, Institutional (CII)	Total Urban Employment	Water use per employee	Climate Price and Conservation Industrial / Service employment Share
Unmetered Use			Percentage of total use

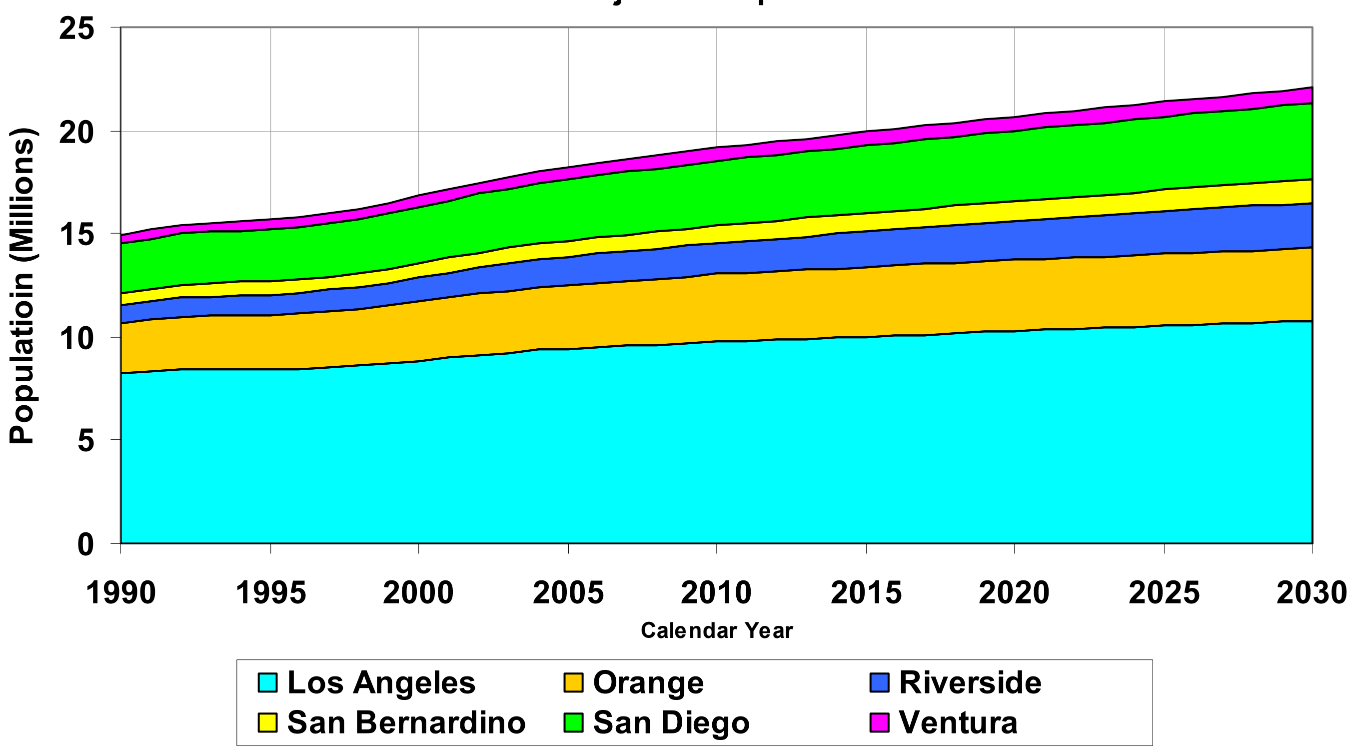
Trends in Southern California

Population

Population is a key indicator of regional growth. In the mid-1990s, population growth in Metropolitan's service area slowed during the recession, which disproportionately affected Southern California. An estimated 400,000 jobs were lost between 1990 and 1995, reducing Metropolitan's average population growth to less than 150,000 people per year. During the economic recovery from 1995 to 2000, average population growth rebounded to 230,000 people annually. Since 2000, population within Metropolitan's service area has grown to over 275,000 per year on average, approaching the boom levels of the 1980s. According to recent growth forecasts, population in Metropolitan's service area will average just over 150,000 people per year, from an estimated 18.2 million in 2005 to 22.0 million in 2030.

These new population projections are lower than prior estimates. The 1996 IRP projection reached nearly 22 million by 2020, and the IRP Update projection reaches about 21.4 million by that time. More conservative projections of employment growth and lowered estimates of future birth rates are partly responsible for the lower growth projections. Another factor is the 2000 Census, which provided population counts 0.48 million lower than the best estimates from the DOF for the six counties containing Metropolitan's service area. Figure A.1-1 compares the population projections for this study to the 1996 IRP and the IRP Update. Table A.1-2 on pageA.1-10 shows the populations by county.

Figure A.1-1
Actual and Projected Population



Employment

Economic trends are important drivers of water demand in Metropolitan's service area. Metropolitan captures economic trends by tracking regional employment growth and the changing mix of industries.

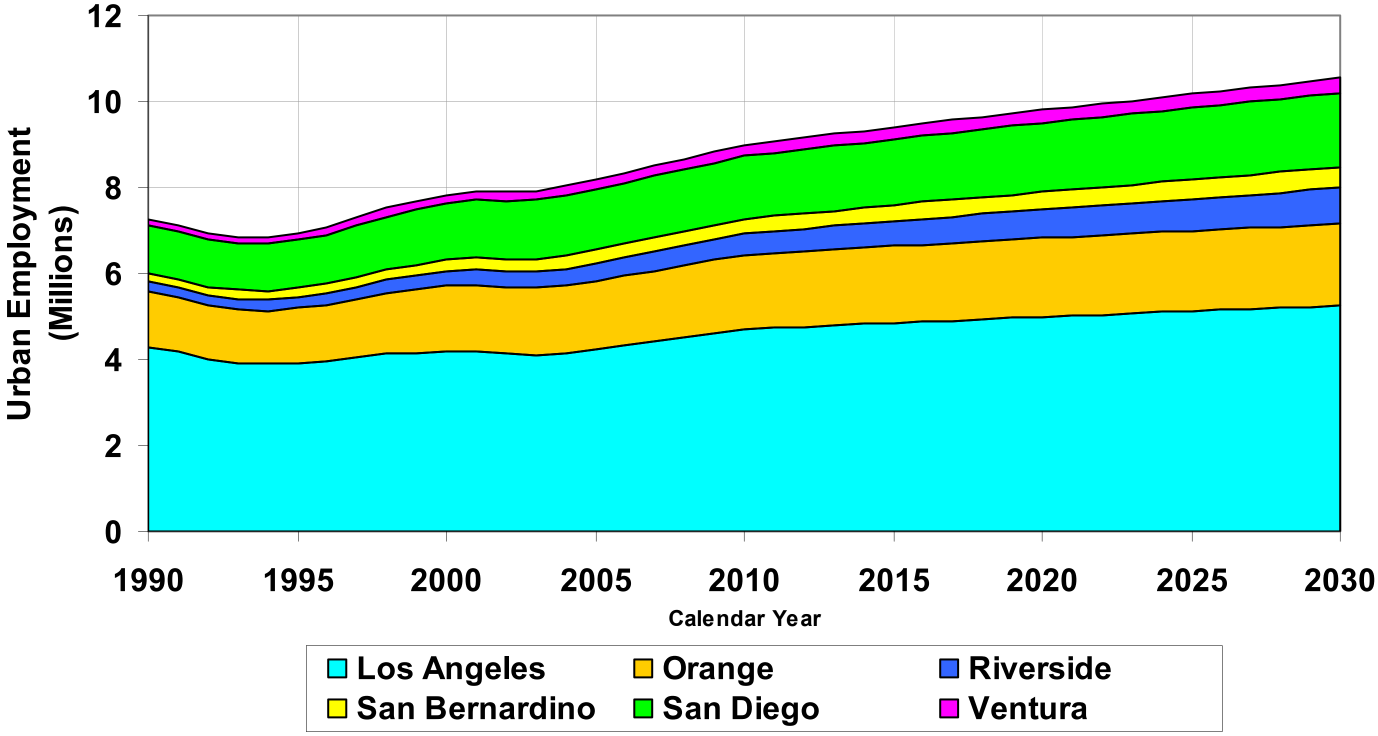
The recession in the 1990s cost Southern California 400,000 jobs and caused a major shift in the region's industry base. Almost 300,000 manufacturing jobs were lost by 1995, many of them in the aerospace and defense industries. Los Angeles and Orange Counties were especially hard hit by this trend. While manufacturing and other sectors of the economy suffered, service employment held steady and experienced modest growth in Riverside and San Bernardino Counties.

The economic recovery of the late 1990s included growth in high-tech and computer-related industries and a rapid expansion of the service-related economy. Job growth in the late 1990s approached levels of the late 1980s. Since 2000, job growth in the region has slowed as a result of the currently mild economic downturn. Southern California weathered the recession better than Northern California, which was adversely affected by the decline in the Bay Area's high-technology economy.

Within Metropolitan's service area, employment growth will not occur at the same rate across the six counties. Over the 25-year period between 2005 and 2030, the greatest employment increases are expected to occur in Los Angeles County, with over one million additional jobs expected. Relative to existing employment, Riverside and San Bernardino counties are expected to have the highest percent increases at 96 and 55 percent respectively, followed by Ventura County at 44 percent.

Figure A.1-2 and Table A.1-3 summarize the projections of commercial, industrial and institutional employment in Metropolitan's service area. The number of people employed in commerce and industry is expected to increase from 8.2 million in 2005 to about 10.5 million in 2030. This increase of about 29 percent is greater than the projected population (21 percent) and housing growth (27 percent), suggesting that a somewhat greater proportion of the population will be employed over time.

Figure A.1-2
Actual and Projected Employment



Residential Consumers

Regional planning agencies — SCAG and SANDAG — have forecast growth in residential housing in all geographic areas of the Metropolitan service area. These forecasts are shown in Figure A.1-3 and Table A.1-4. The total occupied housing stock is expected to increase more than 27 percent from 2005 to 2030, growing from 5.8 to 7.4 million housing units. Much of this growth is forecasted to occur in inland areas. Although small changes in geographic service area are expected to occur from annexations, no major increase in the total geographic service area is expected at this time. Within the service territory, the household occupancy size (household population divided by total occupied dwelling units) is projected to decline from about 3.08 persons per unit currently to 2.94 persons per unit by 2030.

Permits for the construction of residential housing constitute another indicator for water demand growth. Figure A.1-4 provides an historical picture of residential housing permits in the six-county region from 1970 to 2004. The effect of economic cycles can clearly be seen over time.

Figure A.1-3
Actual and Projected Households

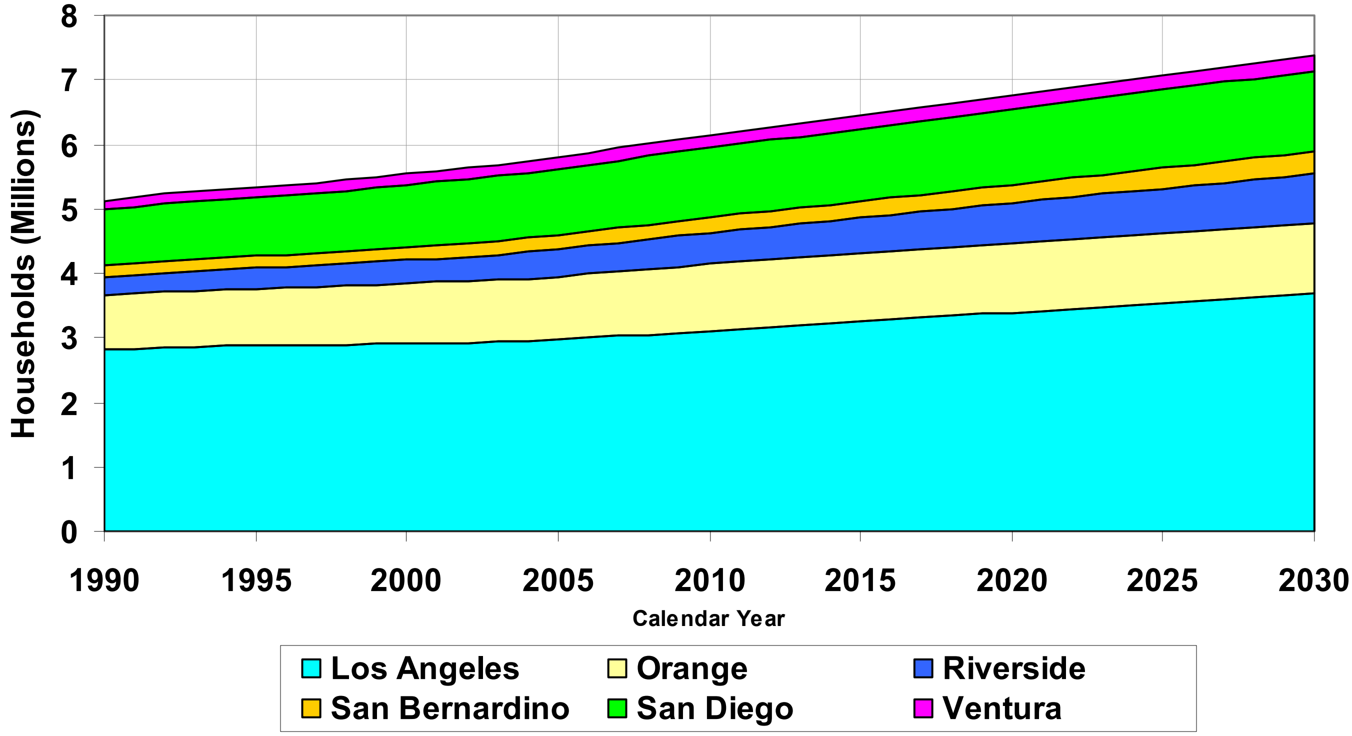
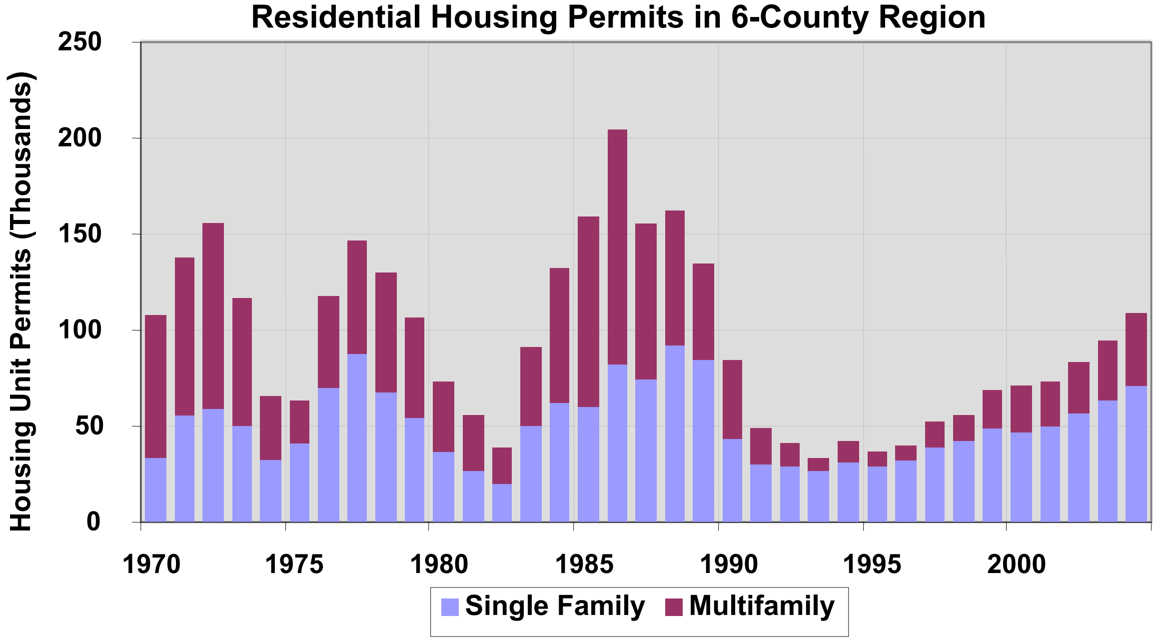


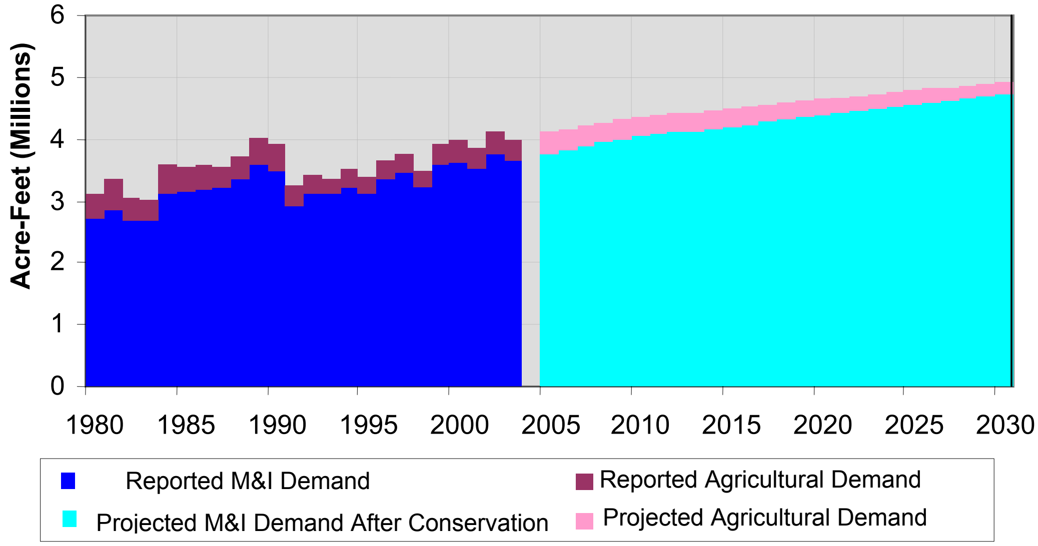
Figure A.1-4
Residential Housing Permits in 6-County Region



Water Demands

As shown in Figure A.1-4 and Table A.1-5, historical retail water demands in Metropolitan's service area have increased from 2.7 million acre-feet (af) in 1980 to 3.4 million af in 1995. Due to the recession, wet weather, conservation efforts, and lingering drought impacts, water use was lower for several years in the mid-1990s. Of the 3.2 million af used in 1998, 3.0 million af (91 percent) were used for municipal and industrial purposes (M&I), and 0.2 million af (9 percent) were used for agricultural purposes. The relative share of M&I water use to total water use has been increasing over time as agricultural water use has declined due to urbanization and market factors. Agricultural water use accounted for 14 percent in 1980, 11 percent in 1990, 9 percent in 1995, and 8.3 percent in 1997.

Figure A.1-5
Actual and Projected Retail Water Demand



*** Actual includes estimated demands for some agencies from 2000 to 2003**
**** Projections includes future IRP Active Conservation Target.**

Total M&I water use is forecast to grow from an average-year estimate of 3.8 million af in 2005 to 4.7 million af in 2030. All water demand projections begin in the year 2010 and reflect demands under normal weather conditions. The water demand forecasts account for water savings resulting from plumbing codes, price effects, and actual implementation of Best Management Practices. The reported sector-level projections do not account for the impacts of future active conservation to reach the IRP target, which are reflected in the total Metropolitan demands used in the analysis underlying this report The Metropolitan total M&I water demand projections show 11 percent savings (measured from 1990 usage levels) resulting from conservation and pricing policies in 2000, 14.4 percent savings in 2010, 16.5 percent savings in 2020, and 19.3 percent savings in 2030, compared to demands without conservation.

By County – M&I water demand is not expected to grow uniformly across counties. Following the pattern of the demographic projections, the largest absolute increases in urban water demands are expected to occur in Los Angeles and Riverside counties, with increases of 272,600 and 220,200 af per year respectively between 2005 and 2030. However, relative to current water demands, demands in Riverside County are expected to increase at the fastest rate (38 percent between 2005 and 2030). The counties with the smallest percent increases in population are also projected to experience the smallest percent increase in water demand (Los Angeles and Orange).

By Sector - Water use can also be broken down by sector. Between 2000 and 2020, single-family residential water use is expected to increase by 27 percent (Table A.1-8), while multifamily water use is expected to increase by 43 percent (Table A.1-9). This trend generally follows the projection of housing units shown in Table A.1-4. Similarly, as shown in Table A.1-10, nonresidential water use between 2000 and 2020 is expected to increase by 27 percent. Water use projections for the nonresidential sector generally follow the employment projections shown in Table A.1-3. An additional sector accounts for unmetered demand, presented in Table A.1-11.

Residential Water Use

Although single-family homes account for about 55 percent of the total occupied housing stock, they account for about 70 percent of total residential water demands. This variation occurs because single-family households tend to use more water than households living in multifamily structures (such as duplexes, triplexes, apartment buildings) on a per housing-unit basis. Single-family households tend to have more persons living in the household; they are likely to have more water-using appliances and fixtures; and they tend to have more landscaping per home.

Nonresidential Water Use

Nonresidential water use represents about 25 percent of the total M&I demands in Metropolitan's service area. This nonresidential sector represents water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In Southern California, the major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process.

Conservation Savings

Table A.1-12 presents the estimated conservation savings that result from active conservation programs (“Active”), ongoing conservation from natural replacement of plumbing fixtures, and conservation induced by a projected increase in the real price of water (“Price’). The combined conservation savings resulting from these three sources are compared to the targets derived from the IRP processes.

Per Capita Demand

Table A.1-13 provides the water demand forecasts expressed in per capita form, or water demand per person. The projected per capita demands show less variation than the historical per capita estimates that incorporate the effects of weather in specific years.

Projected M&I Demand by Sector

Table A.1-14 provides the summary of municipal and industrial demands broken down by sector, as well as the percentage share of each sector

Table A.1-2
Population Growth in Metropolitan's Service Area (July)

County	Actual				Projected					% Change
	1990	1995	2000	2005*	2010	2015	2020	2025	2030	2005-30
Los Angeles	8,268,200	8,457,700	8,862,400	9,425,000	9,752,000	10,018,700	10,279,900	10,524,900	10,760,000	14.2%
Orange	2,412,000	2,604,500	2,863,600	3,078,200	3,291,500	3,369,800	3,433,600	3,494,500	3,552,900	15.4%
Riverside	851,400	993,600	1,129,600	1,371,600	1,506,500	1,693,600	1,872,300	2,039,100	2,197,200	60.2%
San Bernardino	564,800	636,800	708,200	800,900	839,700	910,900	981,200	1,048,500	1,113,100	39.0%
San Diego	2,407,100	2,518,800	2,737,800	2,966,000	3,113,500	3,261,700	3,414,100	3,554,800	3,703,200	24.9%
Ventura	451,000	477,600	541,600	592,100	634,800	659,900	683,500	705,700	726,800	22.7%
Metropolitan Total	14,954,500	15,689,000	16,843,200	18,233,800	19,138,000	19,914,600	20,664,600	21,367,500	22,053,200	20.9%

Source: US Census, CA Department of Finance, SCAG RTP-04, SANDAG 2030 Forecast
* Interpolated

Table A.1-3
Urban Employment Growth in Metropolitan's Service Area
(Calendar Year Average)

County	Actual				Projected					% Change
	1990	1995	2000	2005*	2010	2015	2020	2025	2030	2005-30
Los Angeles	4,294,600	3,925,500	4,203,700	4,216,800	4,690,500	4,846,000	4,991,200	5,123,300	5,245,300	24.4%
Orange	1,282,000	1,268,000	1,504,000	1,603,600	1,733,400	1,785,900	1,831,900	1,870,900	1,904,800	18.8%
Riverside	232,600	257,900	333,500	423,400	498,600	579,900	661,500	744,200	830,300	96.1%
San Bernardino	188,400	211,600	265,100	309,900	344,500	378,600	412,300	446,200	481,000	55.2%
San Diego	1,118,600	1,117,600	1,317,500	1,403,200	1,458,000	1,528,700	1,598,600	1,663,300	1,744,900	24.4%
Ventura	152,100	157,700	211,100	229,300	266,400	283,500	299,600	315,100	331,300	44.5%
Metropolitan Total	7,268,300	6,938,300	7,834,900	8,186,200	8,991,400	9,402,600	9,795,100	10,163,000	10,537,600	28.7%

Source: US Census, CA Employment Development Department, CCSCE, SCAG RTP-04, SANDAG 2030 Forecast
* Interpolated

Table A.1-4
Occupied Housing Growth in Metropolitan's Service Area
in Metropolitan's Service Area (July)

County	Actual				Projected					% Change
	1990	1995	2000	2005*	2010	2015	2020	2025	2030	2005-30
Los Angeles	2,824,700	2,875,500	2,911,200	2,966,000	3,112,300	3,252,500	3,394,800	3,535,400	3,675,200	23.9%
Orange	831,700	880,800	938,500	981,700	1,033,800	1,046,300	1,064,000	1,081,300	1,098,400	11.9%
Riverside	283,200	322,400	357,400	424,800	481,500	554,200	627,700	700,500	772,900	81.9%
San Bernardino	175,000	190,400	202,800	219,600	237,200	263,500	290,800	318,200	346,000	57.6%
San Diego	862,800	912,600	965,800	1,028,200	1,083,200	1,120,100	1,155,100	1,211,000	1,244,300	21.0%
Ventura	142,600	151,400	170,300	183,500	197,100	208,000	218,700	229,200	239,600	30.6%
Metropolitan Total	5,120,000	5,333,100	5,546,000	5,803,800	6,145,100	6,444,600	6,751,100	7,075,600	7,376,400	27.1%

Source: US Census, CA Employment Development Department, CCSCE, SCAG RTP-04, SANDAG 2030 Forecast

* Interpolated

Table A.1-5
Total Retail Demand in Metropolitan's Service Area with Conservation
(Acre-Feet)

County	Reported					Projected					
	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030
Los Angeles	1,526,000	1,703,700	1,743,500	1,593,200	1,733,400	1,776,800	1,885,900	1,917,400	1,977,200	2,023,400	2,049,400
Orange	520,100	593,900	651,500	587,900	694,500	672,700	713,900	721,900	735,400	748,600	761,000
Riverside	348,000	375,600	480,200	403,700	515,300	573,400	618,100	656,900	704,600	751,900	793,600
San Bernardino*	166,200	188,000	209,700	184,300	242,000	257,000	276,000	287,200	300,000	322,900	345,100
San Diego	476,400	579,600	678,400	522,000	658,800	673,800	699,100	711,700	730,500	734,900	754,600
Ventura	96,500	115,800	141,900	110,300	133,700	162,000	179,300	186,700	195,100	202,900	210,300
Total	3,133,200	3,556,600	3,905,200	3,401,400	3,977,700	4,115,700	4,372,300	4,481,800	4,642,800	4,784,600	4,914,000

NOTE: Projected Data from Sales Model, not MWD-MAIN, County totals do not include future active conservation (post 2004).

* Year 2000 retail M&I demand for San Bernardino county estimated from fiscal year data.

Table A.1-6
Total Retail M&I Demand in Metropolitan's Service Area with Conservation
(Acre-Feet)

County	Reported					Projected					
	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030
Los Angeles	1,519,700	1,698,400	1,739,800	1,583,800	1,728,400	1,775,300	1,884,600	1,916,200	1,976,200	2,022,500	2,048,700
Orange	481,100	549,400	625,200	571,400	671,100	656,600	704,200	715,400	731,800	745,900	758,300
Riverside	141,000	173,600	279,400	243,500	324,800	384,300	442,200	493,200	552,200	610,200	662,000
San Bernardino	120,100	150,300	172,500	152,100	212,000	226,600	246,700	267,200	289,900	312,800	335,000
San Diego	364,600	469,200	549,000	463,300	566,600	582,300	615,100	636,400	664,900	692,800	722,200
Ventura	77,100	93,800	114,500	96,000	119,600	142,900	160,700	168,300	177,300	185,400	193,200
Total	2,703,600	3,134,700	3,480,400	3,110,100	3,622,500	3,768,000	4,053,500	4,196,700	4,392,300	4,569,600	4,719,400

NOTE: Projected Data from Sales Model.

Table A.1-7
Total Retail Agriculture Demand in Metropolitan's Service Area
(Acre-Feet)

County	Reported					Projected					
	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030
Los Angeles	6,300	5,300	3,700	9,400	5,000	1,500	1,300	1,200	1,000	900	700
Orange	39,000	44,500	26,300	16,500	23,400	16,100	9,700	6,500	3,600	2,700	2,700
Riverside	207,000	202,000	200,800	160,200	190,500	189,100	175,900	163,700	152,400	141,700	131,600
San Bernardino	46,100	37,700	37,200	32,200	30,000	30,400	29,300	20,000	10,100	10,100	10,100
San Diego	111,800	110,400	129,400	58,700	92,200	91,500	84,000	75,300	65,600	42,100	32,400
Ventura	19,400	22,000	27,400	14,300	14,100	19,100	18,600	18,400	17,800	17,500	17,100
Metropolitan Total	429,600	421,900	424,800	291,300	355,200	347,700	318,800	285,100	250,500	215,000	194,600

Table A.1-8
Single Family Retail Demands in Metropolitan's Service Area
(Acre-Feet)

County	Model Estimate	Projected Average Year					
	2000	2005	2010	2015	2020	2025	2030
Los Angeles	753,600	780,400	808,900	820,000	850,000	868,400	874,200
Orange	321,900	331,600	349,200	353,400	362,500	368,500	374,800
Riverside	213,500	257,500	293,300	326,500	366,200	403,200	434,500
San Bernardino	127,000	139,800	148,600	160,600	173,800	186,500	198,800
San Diego	232,600	244,900	267,000	276,800	290,500	300,900	311,200
Ventura	79,700	85,600	94,100	98,000	103,000	107,100	110,500
Metropolitan Total	1,728,300	1,839,800	1,961,100	2,035,300	2,146,000	2,234,600	2,304,000

Note: Projected demands do not include savings from future active conservation programs.

Table A.1-9
Multifamily Retail Demands in Metropolitan's Service Area
(Acre-Feet)

County	Model Estimate	Projected Average Year					
	2000	2005	2010	2015	2020	2025	2030
Los Angeles	385,300	401,200	426,000	450,500	465,400	475,100	495,800
Orange	107,600	112,400	124,300	129,400	132,400	134,700	137,000
Riverside	32,200	38,700	45,300	53,800	60,100	66,500	75,500
San Bernardino	28,200	31,600	35,300	39,300	43,300	47,200	51,600
San Diego	121,000	128,500	136,200	145,500	157,100	169,100	182,800
Ventura	14,000	15,100	16,700	18,300	19,400	20,300	21,700
Metropolitan Total	688,300	727,500	783,800	836,800	877,700	912,900	964,400

Note: Projected demands do not include savings from future active conservation programs.

Table A.1-10
Commercial, Industrial and Institutional Retail Demands in Metropolitan's Service Area
(Acre-Feet)

County	Model Estimate 2000	Projected Average Year 2005	2010	2015	2020	2025	2030
Los Angeles	511,700	450,800	507,500	506,100	519,500	526,700	521,200
Orange	169,000	161,500	179,200	181,800	185,900	188,100	189,900
Riverside	45,600	52,800	64,400	70,200	78,500	86,700	93,000
San Bernardino	36,300	37,500	44,300	47,800	51,700	55,500	59,100
San Diego	175,400	163,700	167,200	169,400	171,400	172,600	174,500
Ventura	32,000	31,000	37,800	39,700	42,100	44,100	46,300
Metropolitan Total	970,000	897,300	1,000,400	1,015,000	1,049,100	1,073,700	1,084,000

Note: Projected demands do not include savings from future active conservation programs.

Table A.1-11
Unmetered Use in Metropolitan's Service Area
(Acre-Feet)

County	Model Estimate 2000	Projected Average Year 2005	2010	2015	2020	2025	2030
Los Angeles	141,400	139,700	149,100	152,000	156,900	159,900	161,700
Orange	50,600	51,200	55,200	56,200	57,600	58,500	59,400
Riverside	28,200	33,800	39,000	43,500	48,700	53,600	58,000
San Bernardino	16,200	17,700	19,300	20,900	22,700	24,500	26,200
San Diego	44,000	44,700	47,500	49,300	51,600	53,600	55,800
Ventura	10,600	11,100	12,600	13,200	13,900	14,500	15,100
Metropolitan Total	291,000	298,200	322,700	335,100	351,400	364,600	376,200

Table A.1-12
Conservation Savings in Metropolitan's Service Area - 1980 Base Year
(Acre-Feet)

County*	Estimate			Projected					
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030***
Los Angeles	0	108,900	223,900	268,400	329,900	369,200	399,900	436,500	474,000
Orange	0	30,500	68,600	89,900	109,700	119,600	126,400	135,000	144,300
Riverside	0	11,100	24,700	34,000	48,900	63,400	76,100	89,800	104,000
San Bernardino	0	1,600	4,100	10,500	17,600	24,500	30,600	35,900	41,600
San Diego	0	28,800	69,200	71,400	92,300	108,100	121,100	133,400	145,200
Ventura	0	3,300	7,400	11,700	16,800	20,600	23,500	26,200	29,100
Active, Code and Price	**0**	**184,200**	**397,900**	**485,900**	**615,200**	**705,400**	**777,600**	**856,800**	**938,200**
Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Total Conservation Target	**250,000**	**434,200**	**647,900**	**735,900**	**865,200**	**955,400**	**1,027,600**	**1,106,800**	**1,188,200**

Note: County totals do not include savings from future active conservation programs.

*The 2030 IRP Conservation Target is derived from the 2003 IRP Update forecast projections for 2030; it is not an official target for 2030.

Table A.1-13
Per Capita M&I Retail Demands in Metropolitan Service Area

County	(Dry) 1990	(Wet) 1995	(Average) 2000*	Projected 2005	2010	2015	2020	2025	2030
Los Angeles	188	167	174	168	173	171	172	172	170
Orange	231	196	209	190	191	190	190	191	191
Riverside	293	219	257	250	262	260	263	267	269
San Bernardino	273	213	267	253	262	262	264	266	269
San Diego	204	164	185	175	176	174	174	174	174
Ventura	227	179	197	215	226	228	232	235	237
Metropolitan Total	208	177	192	184	189	188	190	191	191

* Estimated

Table A.1-14
Projected Municipal and Industrial Demands by Sector

County	Model Estimate 2000	Projected 2005	2010	2015	2020	2025	2030
Single-Family	1,728,300	1,839,800	1,961,100	2,035,300	2,146,000	2,234,600	2,304,000
Multifamily	688,300	727,500	783,800	836,800	877,700	912,900	964,400
Non-Residential	970,000	897,300	1,000,400	1,015,000	1,049,100	1,073,700	1,084,000
System Losses/Unmetered	291,000	298,200	322,700	335,100	351,400	364,600	376,200
Metropolitan Total	3,677,600	3,762,800	4,068,000	4,222,200	4,424,200	4,585,800	4,728,600
Single-Family	47.0%	48.9%	48.2%	48.2%	48.5%	48.7%	48.7%
Multifamily	18.7%	19.3%	19.3%	19.8%	19.8%	19.9%	20.4%
Non-Residential	26.4%	23.8%	24.6%	24.0%	23.7%	23.4%	22.9%
System Losses/Unmetered	7.9%	7.9%	7.9%	7.9%	7.9%	8.0%	8.0%
Metropolitan Total	100%	100%	100%	100%	100%	100%	100%

Note: Projected demands do not include savings from future active conservation programs.

Appendix A.2
Existing Regional Water Supplies

A.2 Existing Regional Water Supplies

Water used in Metropolitan's service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled water. Sources of imported water include the Colorado River, the State Water Project (SWP), and the Owens Valley/Mono Basin. Local sources meet about 42 percent of the water needs in Metropolitan's service area, while imported sources supply the remaining 58 percent.

The city of Los Angeles imports water from the eastern Owens Valley/Mono Basin in the Sierra Nevada through the Los Angeles Aqueducts (LAA). This water currently meets about 10 percent of the region's water needs, but is dedicated for use by the City of Los Angeles. Contractually and for planning purposes, Metropolitan treats the LAA as a local supply, although physically its water is imported from outside the region. Other supplies come from local sources, and Metropolitan provides imported water supplies to meet the remaining 45 percent of the region's water needs. These imported supplies are received from Metropolitan's Colorado River Aqueduct (CRA) and the SWP's California Aqueduct. Table A.2-1 and Figure A.2-1 show the historical use of local and imported supplies within Metropolitan's service area.

Table A.2-2 shows the quantities of Metropolitan water used by member agencies during the last 20 years. Metropolitan's largest water customers are the San Diego County Water Authority (27 percent of Metropolitan's supplies in 2004), City of Los Angeles (16 percent) and Municipal Water District of Orange County (12 percent). The reliance on Metropolitan's water supplies varies by agency. For example, in recent years, Upper San Gabriel received as little as 15 percent of its total water supply from Metropolitan, while Beverly Hills received over 90 percent. However, this relative share of local and imported supplies varies from year to year based on supply and demand conditions.

The following sections describe the current supply sources in more detail. The main body of the Urban Water Management plan contains descriptions of planned future supplies.

Local Water Supplies

Local sources of water available to the region include surface water, groundwater, and recycled water. Some of the major river systems in Southern California have been developed into systems of dams, flood control channels, and percolation ponds for supplying local water and recharging groundwater basins. For example, the San Gabriel and Santa Ana rivers capture over 80 percent of the runoff in their watersheds. The Los Angeles River system, however, is not as efficient in capturing runoff. In its upper reaches, which make up 25 percent of the watershed, most runoff is captured with recharge facilities. In its lower reaches, which comprise the remaining 75 percent of the watershed, the river and its tributaries are lined with concrete, so there are no recharge facilities. The Santa Clara River in Ventura County is outside of Metropolitan's service area, but it replenishes groundwater basins used by water agencies within Metropolitan's service area. Other rivers in Metropolitan's service area, such as the Santa Margarita and San Luis Rey, are essentially natural replenishment systems.

Table A.2-1
Sources of Water Supply in the Metropolitan Service Area
(Acre-Feet)

Calendar Year	Local Supplies	L. A. Aqueduct	Colorado River Aqueduct[1]	State Water Project[2]	Totals
1976	1,365,639	430,305	794,620	638,051	3,228,615
1977	1,369,735	275,363	1,280,598	189,755	3,115,451
1978	1,251,051	472,330	713,816	575,545	3,012,742
1979	1,415,949	492,671	787,415	532,137	3,228,172
1980	1,446,520	514,636	794,824	559,611	3,315,591
1981	1,492,595	465,069	824,101	826,951	3,608,716
1982	1,384,712	482,953	689,516	856,996	3,414,177
1983	1,379,543	518,503	895,515	385,308	3,178,869
1984	1,616,253	516,258	1,237,230	501,682	3,871,423
1985	1,528,685	495,800	1,273,236	740,410	4,038,131
1986	1,505,120	520,565	1,303,276	756,142	4,085,103
1987	1,461,380	428,018	1,282,277	769,603	3,941,278
1988	1,519,197	369,439	1,203,571	957,276	4,049,483
1989	1,539,455	288,224	1,203,934	1,215,139	4,246,752
1990	1,481,724	106,188	1,218,321	1,457,676	4,263,909
1991	1,443,831	186,445	1,255,720	624,861	3,510,857
1992	1,539,424	176,918	1,156,687	746,991	3,620,020
1993	1,437,745	289,279	1,144,956	663,390	3,535,370
1994	1,561,649	132,541	1,266,439	845,305	3,805,934
1995	1,623,271	464,102	936,097	451,305	3,474,775
1996	1,749,198	424,994	1,092,089	642,871	3,909,152
1997	1,745,964	435,786	1,128,145	724,393	4,034,288
1998	1,725,420	466,836	943,841	521,255	3,657,352
1999	1,924,759	309,038	1,124,624	790,538	4,148,959
2000	1,740,274	255,183	1,230,700	1,442,615	4,668,772
2001	1,521,231	266,923	1,252,870	1,119,408	4,160,433
2002	1,983,920	179,338	959,248	1,413,745	4,536,251
2003	1,428,371	251,942	649,491	1,560,569	3,890,374
2004	1,667,660	202,547	697,478	1,792,246	4,359,931

[1] Colorado River Aqueduct supplies are total Colorado River Aqueduct deliveries less deliveries to Desert Water Agency and Coachella Valley Water District (DWCV).

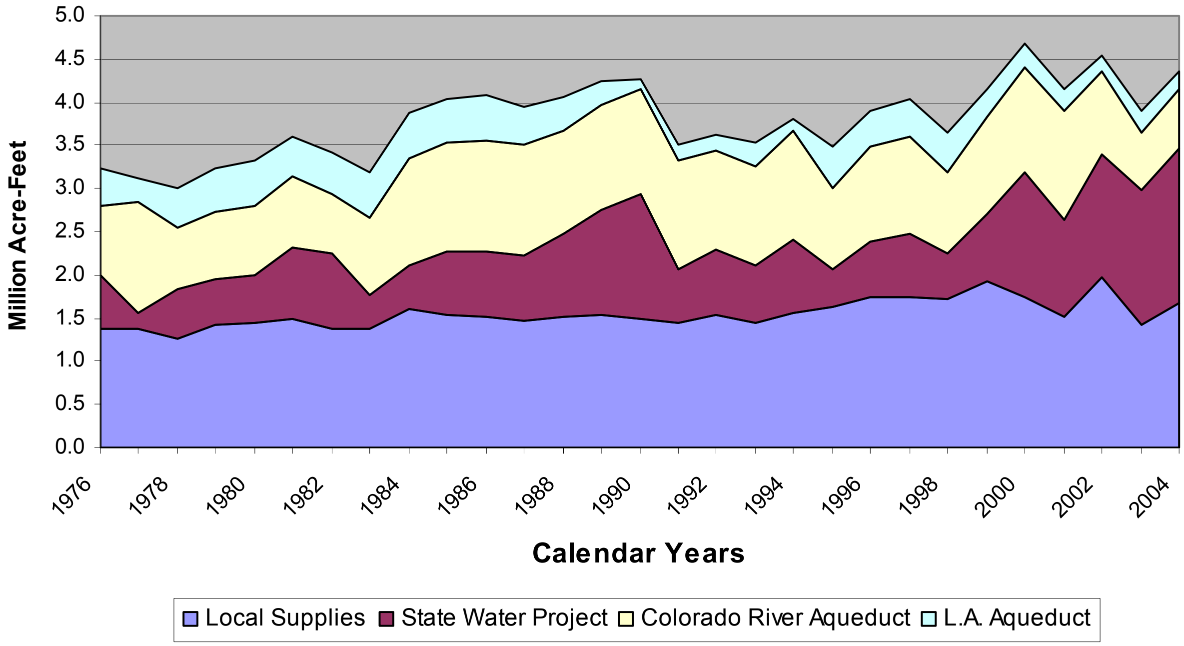
[2.] Entitlement, exchanges, wheeling, carryover, drought bank, etc. Excludes wheeling to Castaic Lake Water Agency and deliveries to storage outside of Metropolitan's service area.

[3.] 1999 Local Supplies value is estimated.

Table A.2-2
Historic Metropolitan Water Deliveries to Member Agencies

Agency	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Anaheim	14,075	19,835	18,440	15,534	19,184	24,503	16,063	22,576	21,327	26,357
Beverly Hills	12,473	13,253	14,102	13,124	13,737	13,940	13,166	13,787	12,286	12,355
Burbank	17,384	12,049	9,956	18,180	8,527	11,503	12,206	12,236	13,628	13,103
Calleguas	93,466	115,491	109,175	95,659	114,879	120,214	109,894	127,240	118,258	128,231
Central Basin	72,605	98,191	101,481	64,424	77,621	128,496	108,831	96,817	61,529	117,094
Coastal	38,599	42,404	38,736	25,288	28,204	18,924				
Compton	2,918	3,536	3,688	4,747	3,808	3,760	3,964	2,842	3,160	3,011
Eastern	53,043	54,151	57,745	51,503	72,755	86,264	79,663	101,405	90,476	114,487
Foothill	8,014	10,122	11,276	7,543	10,490	12,417	11,351	13,408	12,725	14,329
Fullerton	7,033	7,797	7,870	5,649	6,931	7,262	8,066	12,706	9,759	17,272
Glendale	26,345	27,561	28,397	25,379	27,531	29,237	28,459	22,830	22,838	24,180
Inland Empire	37,959	49,841	54,817	51,577	51,924	69,785	66,515	76,218	81,294	83,848
Las Virgenes	17,185	18,805	22,016	17,418	21,553	22,661	21,018	23,205	21,657	26,102
Long Beach	50,323	53,238	46,838	43,888	45,530	44,491	43,764	43,161	49,205	47,944
Los Angeles	71,163	81,288	92,206	53,018	160,591	330,021	304,345	403,293	318,237	392,196
MWDOC	159,611	222,967	276,297	186,265	228,850	302,055	263,686	340,031	276,851	297,944
Pasadena	12,076	17,427	18,417	14,146	20,194	24,212	18,779	29,053	22,763	24,251
San Diego	387,555	450,517	511,505	407,316	536,485	592,641	588,405	662,442	650,730	676,572
San Fernando	210	729	0		0		0	372	519	500
San Marino	1,461	1,306	1,873	1,004	577	760	474	511	941	1,851
Santa Ana	10,207	10,922	12,784	12,066	13,150	10,970	12,631	19,336	13,349	20,459
Santa Monica	4,507	9,276	11,783	11,418	11,799	12,122	11,535	12,828	13,835	14,401
Three Valleys	56,961	64,016	66,460	53,959	71,235	81,800	70,710	93,165	82,498	85,848
Torrance	22,216	22,232	22,372	20,696	21,308	20,628	22,012	21,375	20,860	20,665
Upper San Gabriel	7,464	53,958	49,297	14,688	23,125	59,955	30,600	54,326	72,214	45,160
West Basin	153,741	46,621	152,048	136,815	147,522	151,076	140,739	147,020	144,567	147,681
Western	56,173	70,913	74,357	55,513	83,074	85,498	82,158	98,972	96,686	103,109
Total	1,456,082	1,816,711	1,927,614	1,539,272	1,911,184	2,337,644	2,069,742	2,489,321	2,233,151	2,477,736

Figure A.2-1
Sources of Supply to Metropolitan's Service Area



Local supplies fluctuate in response to variations in rainfall. During prolonged periods of below-normal rainfall, local water supplies decrease. Conversely, prolonged periods of above-normal rainfall increase local supplies. Sources of groundwater basin replenishment include local precipitation, runoff from the coastal ranges, and artificial recharge with imported water supplies. In addition to runoff, recycled water provides an increasingly important source of replenishment water for the region.

Major Groundwater Basins

Groundwater sources account for about 90 percent of the natural local water supplies, which are found in many basins throughout the Southern California region and provide an annual average total production that ranges from 1.2 to 1.4 million acre-feet (af) per year. Figure A.2-2 shows the location of the major groundwater basins. The majority of groundwater yield comes from natural recharge, which is accomplished through the percolation of rainfall and stream runoff. In certain major drainage areas, runoff is retained in flood control reservoirs and released into spreading basins or ponds for additional percolation into the ground. The Los Angeles County Department of Public Works operates many groundwater recharge facilities located at the upper reaches of the Los Angeles River and San Gabriel River systems. In addition, the Orange County Water District operates a system of diversion structures and recharge basins along the Santa Ana River that captures most of the storm runoff, as well as water from reclamation facilities in Riverside and San Bernardino counties. This water, which would otherwise flow into the Pacific Ocean, is allowed to percolate into the underlying aquifers so it may be pumped for local use when needed. Groundwater basins are also recharged with imported supplies and recycled water, either by injection, by percolation in spreading basins, or in-lieu storage.

Almost all major groundwater basins in Southern California are either adjudicated or managed by special districts or agencies. The eight adjudicated basins in the region include: Raymond Basin, San Fernando Basins, Main San Gabriel Basin, Central Basin, West Coast Basin, Six Basins, Chino Basin, Cucamonga Basin, Rialto Basin, Colton Basin, and Bunker Hill Basin. The Orange County Groundwater Basin is managed by Orange County Water District; portions of the Ventura County Basins are managed by the Fox Canyon Groundwater Management Agency; and San Jacinto Basin is managed by Eastern Municipal Water District. In general, these basins have management plans that include protection from seawater intrusion, water quality deterioration, and excessive lowering of water levels.

Major River Systems and Reservoirs

Local surface water resources consist of runoff captured in storage reservoirs and diversions from streams. Reservoirs hold the runoff for later direct use, and diversions from streams are delivered directly to local water systems. As Table A2.3 shows, local water agencies currently own and operate 24 major reservoirs. These reservoirs provide a storage capacity of 745 taf. The historic average yield of these local surface supplies, which come from reservoir releases and stream diversions, is about 130 taf per year. The annual yield varies widely between wet and dry years, and most reservoirs that capture local surface runoff are operated with minimal carry-over storage. San Diego County has the greatest storage capacity for these types of reservoirs, with approximately two-thirds of the total local agency storage capacity in Metropolitan's service area.

In addition to the storage that is owned and operated by local agencies, Metropolitan operates Diamond Valley Lake, Lake Skinner and Lake Mathews. Diamond Valley stores water imported during years of ample supply. Of its 800-taf capacity, approximately one-third is dedicated to emergency storage, and the remainder will be available to augment supplies during dry years and for seasonal storage. In contrast, Lake Skinner and Lake Mathews are largely used for system operations rather than seasonal storage. Table A.2-4 lists Metropolitan-owned reservoirs.

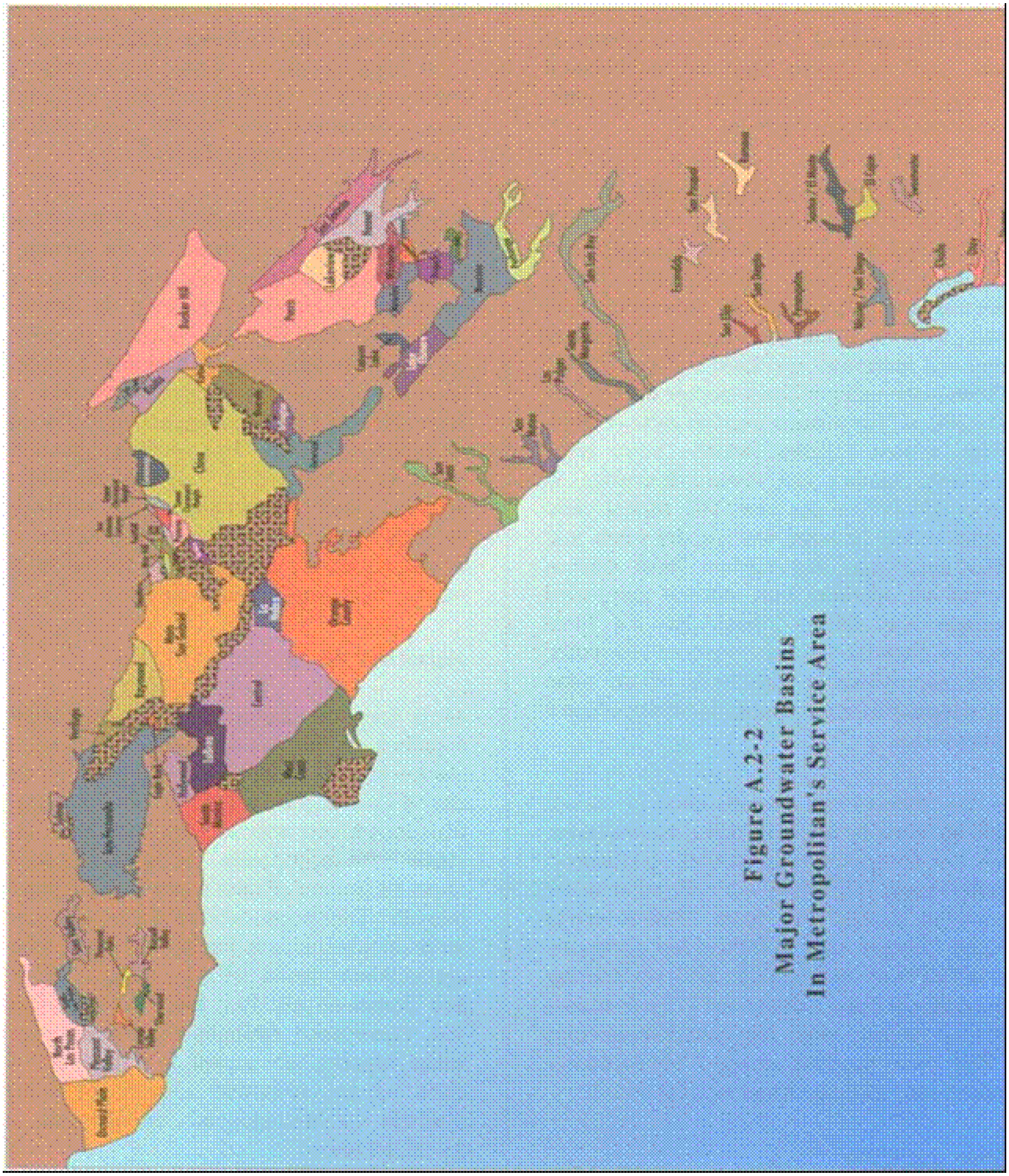


Figure A.2-2
Major Groundwater Basins
In Metropolitan's Service Area

Table A-2.3
Major Local Storage Reservoirs In Metropolitan' Service Area

Member Agency/Subagency	Reservoir	Storage Capacity (1000 af)
Calleguas MWD	Lake Bard	10.0
Eastern MWD		
Rancho California WD	Vail Lake	51.0
Lake Hemet MWD	Lake Hemet	14.0
Las Virgenes MWD	Westlake Reservoir	10.0
City of Los Angeles	Los Angeles	10.2
	Encino	9.8
	Stone Canyon	10.8
	Hollywood	4.2
MWD of Orange Co.		
Irvine Ranch WD & Serrano ID	Santiago	25.0
San Diego CWA		
	Olivenhain	24.8
Vista Irrigation District	Henshaw	51.8
Escondido	Lake Wohlford and Dixon	9.5
Helix ID	Cuyamaca Dam and Lake Jennings	18.0
City of San Diego	Barrett	38.0
	El Capitan	112.8
	Lake Hodges	33.6
	Morena	50.2
	Lower Otay	49.5
	San Vicente	90.2
	Sutherland	29.7
	Miramar	7.2
	Murray	4.8
Sweetwater Authority	Lake Loveland	25.4
	Sweetwater	30.1
Ramona MWD	Lake Ramona	12.0
Western MWD of Riverside		
Temescal Water Company	Railroad Canyon	12.0
Total		**744.6**

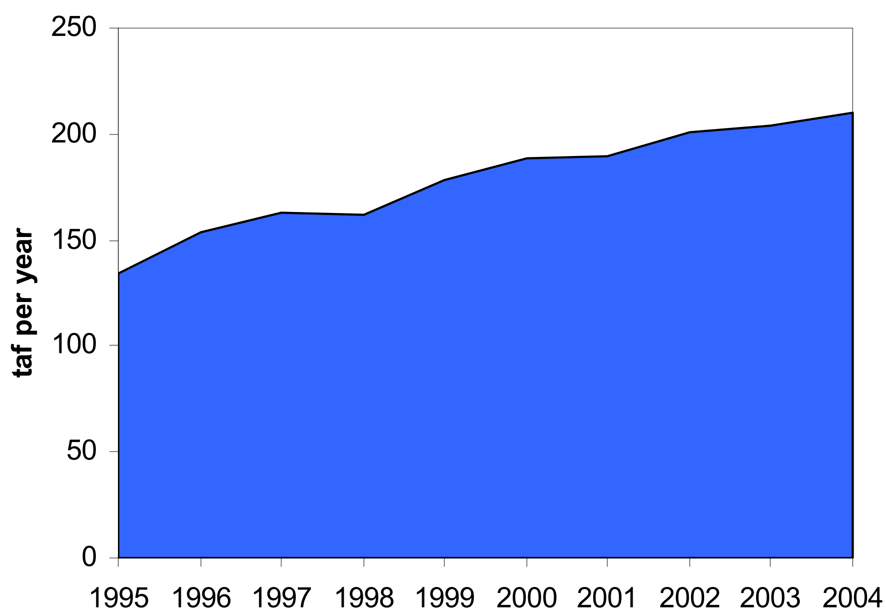
Table A.2-4 Regional Reservoirs In Metropolitan's Service Area	
Reservoir	**Capacity (taf)**
Diamond Valley	800
Lake Skinner[1]	182
Lake Mathews[1]	44

[1] These are used for operations and not primarily for storage.

Water Recycling and Groundwater Recovery

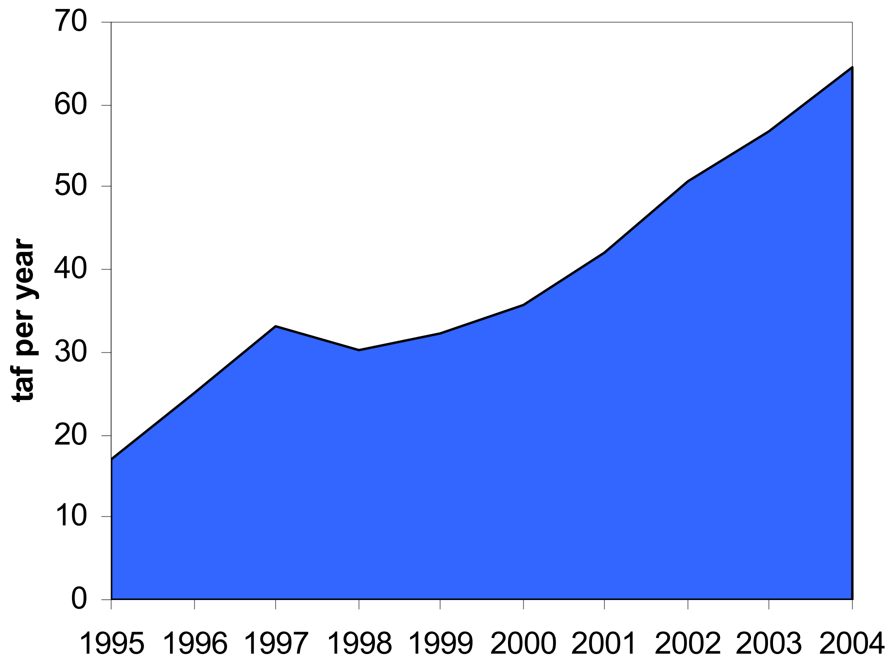
Water recycling projects involve treating wastewater to a level that is acceptable and safe for many nonpotable applications. This resource is providing an increasing level of local water. From 1980 to 2004, Metropolitan invested approximately $124 million in water recycling projects. Supplies from projects in which Metropolitan has invested have increased from just about 15 taf in 1980 to 75 taf in 2004. In 2004, local agency projects that did not receive financial assistance from Metropolitan produced an additional 134 taf, for a regional total of 209 taf. Figure A.2-3 demonstrates the increase in this regional supply for direct use.

Figure A.2-3
Recycled Water Production



In addition, local agencies have implemented several projects to recover contaminated or degraded groundwater for potable uses. The groundwater recovery projects use a variety of treatment technologies to remove nitrates, volatile organic compounds, perchlorate, color and salt. In 1991, Metropolitan began helping to fund its member agencies' groundwater recovery projects. Since that time, Metropolitan has invested approximately $41 million. In 2004 these groundwater recovery projects produced 43 taf. Other member agency projects that did not receive funding from Metropolitan produced another 21 taf, for a regional total of 64 taf. Figure A.2-4 shows this increase in supply.

Figure A.2-4
Recovered Groundwater Production



Since 1982, Metropolitan has committed to providing financial assistance to develop 75 water recycling and groundwater recovery projects throughout its service area. Since adopting the IRP in 1996, Metropolitan and its member agencies have made significant progress in achieving regional targets for recycling and groundwater recovery. Currently, Metropolitan has contracts to participate in 54 recycled water projects, of which 39 were in operation in 2004. For recovered groundwater projects, there are 20 contracts, and 18 of these projects are producing water.

Imported Water

Most member agencies and retail water suppliers depend on imported water for a portion of their water supply. For example, Los Angeles and San Diego (the largest and second largest cities in the state) have historically (1995-2004) obtained about 85 percent of their water from imported sources. These imported water requirements are similar to those of other metropolitan areas within the state, such as San Francisco and other cities around the San Francisco Bay. Figure A.2-5 shows the conveyance facilities for the state's imported water supplies. Descriptions of each of the imported sources of water available to Metropolitan's service area follow. Justification for projected water supplies from these sources, as required for retail water agencies to comply with Senate Bills 221 and 610, are provided in Appendix A.3.

Colorado River

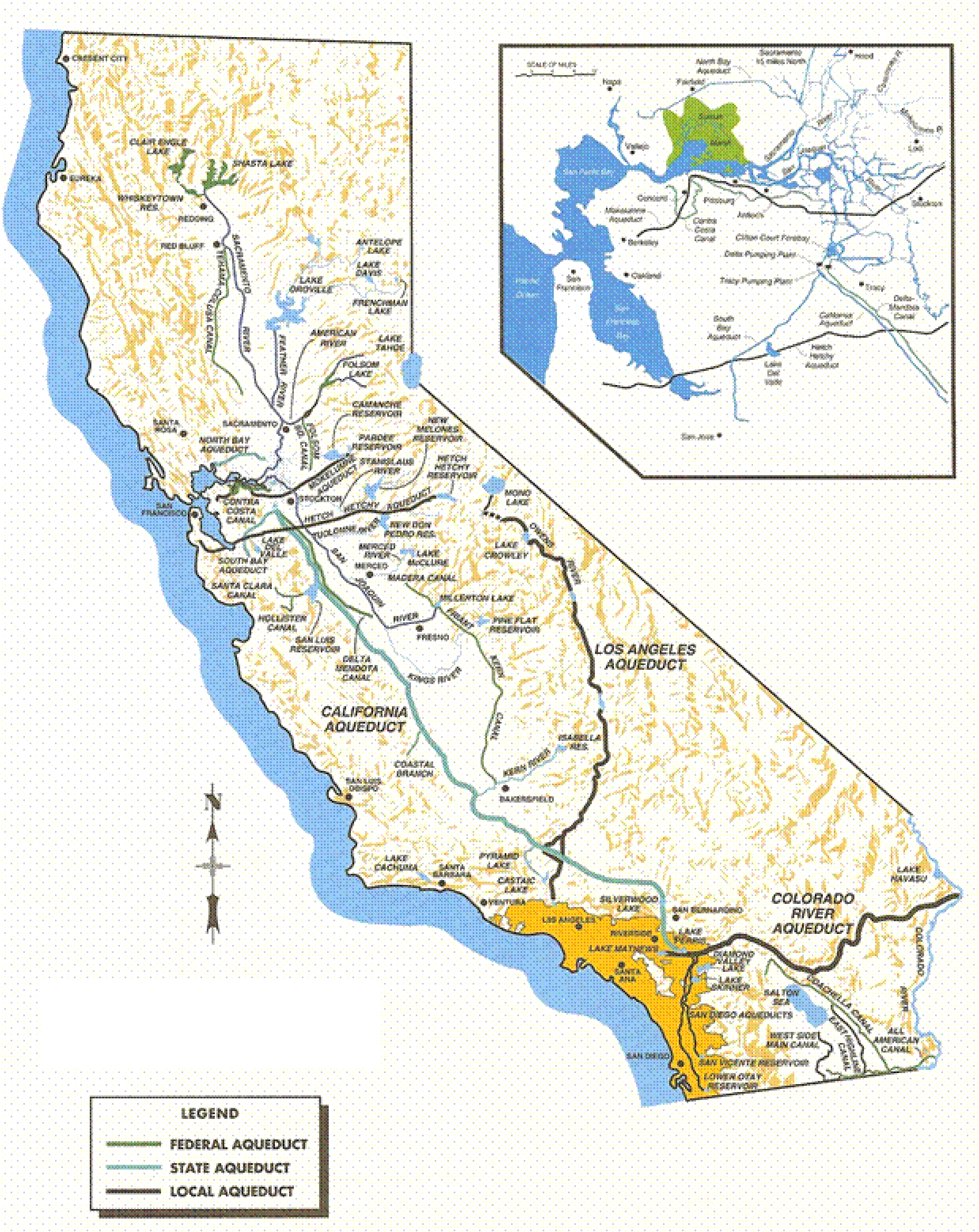
A number of water agencies within California have rights to divert water from the Colorado River. Through the Seven Party Agreement (1931), seven agencies recommended apportionments of California's share of Colorado River water within the state. Table A.2-5 shows the historic apportionment of each agency, and the priority accorded that apportionment.

Table A.2-5
Priorities in Seven-Party Agreement and Water Delivery Contracts

Priority	Description	TAF Annually
1	Palo Verde Irrigation District – gross area of 104,500 acres of land in the Palo Verde Valley	
2	Yuma Project (Reservation Division) – not exceeding a gross area of 25,000 acres in California	
3(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys[1] to be served by All American Canal	3,850
3(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	
4	Metropolitan Water District of Southern California for use on coastal plain	550
Subtotal: California's basic apportionment under 1964 Court Decree		**4,400**
5(a)	Metropolitan Water District of Southern California for use on coastal plain	550
5(b)	Metropolitan Water District of Southern California for use on coastal plain[2]	112
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys[1] to be served by the All American Canal	
6(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	300
7	Agricultural Use in the Colorado River Basin in California	--
	Total Prioritized Supply	**5,362**

[1] The Coachella Valley Water District now serves Coachella Valley.
[2] In 1946, the City of San Diego, the San Diego County Water Authority, Metropolitan, and the Secretary of the Interior entered into a contract that merged and added the City of San Diego's rights to store and deliver Colorado River water to the rights of Metropolitan. The conditions of that agreement have long since been satisfied.

Figure A.2-5
Major Water Conveyance Facilities



The water is delivered to Metropolitan's service area by way of the Colorado River Aqueduct (CRA), which has a capacity of 1,800 cubic feet per second, or 1.3 million af per year. The CRA conveys water 242 miles from its Lake Havasu intake to its terminal reservoir, Lake Mathews, near the city of Riverside. Conveyance losses along the Colorado River Aqueduct of 10 taf per year reduce the amount of Colorado River water received in the coastal plain.

Since the date of the original contract, several events have occurred that changed the dependable supply that Metropolitan expects from the CRA. The most significant event was the 1964 U.S. Supreme Court decree in *Arizona v. California* that reduced Metropolitan's dependable supply of Colorado River water to 550 taf per year. The reduction in dependable supply occurred with the commencement of Colorado River water deliveries to the Central Arizona Project. In 1987, Metropolitan entered into a contract with the Bureau of Reclamation for an additional 180 taf per year of surplus water. In addition, Metropolitan has obtained a minimum of 80 taf per year of Colorado River water through a conservation program with the Imperial Irrigation District.

In 1979, the Present Perfected Rights (PPRs) of certain Indian reservations, cities, and individuals along the Colorado River were quantified. These PPRs predate the Seven-Party Agreement, but the rights holders were not included in the Seven Party Agreement prioritizing California's use and storage of Colorado River water.

In 1999, the Colorado River Board of California developed "California's Colorado River Water Use Plan" (Plan). The Colorado River Board of California protects California's rights and interests in the resources provided by the Colorado River and represents California in discussions and negotiations regarding the Colorado River and its management. The overall purpose of the Plan is to provide Colorado River water users with a framework by which programs, projects, and other activities may be coordinated and cooperatively implemented. This framework specified how California would make the transition from relying on surplus water supplies from the Colorado to living within its normal water supply apportionment.

To implement these plans, a number of agreements have been executed. In October 2003 representatives from Metropolitan, IID, and Coachella Valley Water District (CVWD) executed the Quantification Settlement Agreement (QSA) and several other related agreements. Parties involved include the San Diego County Water Authority (SDCWA), the California Department of Water Resources (DWR), the California Department of Fish and Game, the U.S. Department of the Interior and the San Luis Rey Indian Water Rights Settlement Parties. The QSA quantifies the use of water under the third priority of the Seven Party Agreement and allows for implementation of agricultural conservation, land management, and other programs identified in Metropolitan's 1996 IRP. Quantification of the third priority provides the needed numeric baseline from which conservation and transfer programs may be measured. The QSA helps California reduce its reliance on Colorado River water above its normal apportionment.

Metropolitan is undertaking ongoing efforts to maintain and improve the flexibility and quality of its water supply from the Colorado. Section III-7 of this report describes current programs and plans related to flexibility, and Chapter IV describes water quality programs.

State Water Project

The State Water Project, which is owned by the state and operated by the California Department of Water Resources (DWR), is the second source of Metropolitan's imported water supplies. The SWP comprises 32 storage facilities (reservoirs and lakes), 662 miles of aqueduct, and 25 power and pumping plants.

The SWP conveys water from Northern California to areas south of the Bay Delta region. Water from the SWP originates at Lake Oroville, which is located on the Feather River in Northern California. That water, along with all additional unused water from the watershed, flows into the Sacramento/San Joaquin Delta. Water from the Delta is then either pumped to water users in the San Francisco Bay area or transported through the California Aqueduct to water users in Central and Southern California.

DWR contracted to deliver water in stages to 32 SWP contractors, with an ultimate delivery of 4.23 million af per year. Currently, DWR is delivering water to 29 of these SWP contractors. Metropolitan is the largest, with a contracted entitlement of 2.011 million af per year, or approximately 48 percent of the total contracted amount. Metropolitan receives deliveries of SWP supplies via the California Aqueduct at Castaic Lake in Los Angeles County, Devil Canyon Afterbay in San Bernardino County, and Box Springs Turnout and Lake Perris in Riverside County. The first delivery of SWP water to Metropolitan occurred in 1972.

The initial facilities of the SWP, completed in the early 1970s, were designed to meet the original needs of the SWP contractors. It was intended that additional SWP facilities would be built over time to meet projected increases in contractors' delivery needs. Each contractor's SWP contract provided for a buildup in entitlement over time, with most contractors reaching their maximum annual entitlement by the year 1990. Since the completion of the initial SWP facilities in the early 1970s, major improvements to the system have included: four new pumps added to the Banks Pumping Plant at the Delta, the completion of the Coastal Branch, and the East Branch enlargement. Even with these improvements, however, there are still significant capacity constraints within the SWP that limit the delivery capability of the full contracted entitlement. During the same time, the contractors' needs for water from the SWP have increased. As a result, the contractors' demands for SWP water currently exceed the dependable yield.[1] Metropolitan has developed groundwater storage programs with Semitropic Water Storage District and Arvin-Edison Water Storage District to supplement the available water supply.

The amount of entitlement DWR approves for delivery varies annually with contractor demands and projected water supplies from tributary sources to the Delta, based on snowpack in the Sierra Nevada, reservoir storage, operational constraints, and demands of other water users. Historically, the SWP has been able to meet all contractors' requests for entitlement water except during the drought years of 1977, 1990-92, and 1994. In many years, surplus water has been delivered to contractors. Deliveries to Metropolitan reached a high of 1.792 million af in calendar year 2004. Metropolitan experienced shortages in SWP supplies in fiscal years 1991 and 1992, with reduced deliveries of 391 taf and 710 taf, respectively.[2] Continued investments in conservation and recycling

[1] The dependable yield of the existing SWP facilities is considered to be the delivery capability during a critically dry seven-year period.
[2] These numbers are Metropolitan's allocated entitlement. Total water deliveries to Metropolitan's service area are

have allowed Metropolitan to reduce its requirements for SWP water. In 1998, Metropolitan's SWP deliveries of 410 taf were lower than any year since 1983.[3]

In recent years the listing of several fish species in the Sacramento/San Joaquin Delta (Delta) under both state and federal Endangered Species Acts has constrained SWP operations and created more uncertainty in SWP supply reliability. These listed species include Delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, and splittail. On August 28, 2000, the CALFED agencies concluded the CALFED planning process and launched a seven-year set of actions that, among other objectives, aims to improve water supply reliability and quality. However, in 2005 the abundance of many of the Delta fish has decreased. This issue is currently under investigation.

Metropolitan is undertaking ongoing efforts to maintain and improve the reliability and quality of its water supply from the State Water Project. Sections III-5 and III-6 describe current programs and plans for reliability, and Chapter 4 addresses water quality issues.

Los Angeles Aqueducts

The city of Los Angeles imports water from the eastern Sierra Nevada through the Los Angeles Aqueduct (LAA). The original Los Angeles Aqueduct, completed in 1913, imported water from the Owens Valley. In 1940, the aqueduct was extended to the Mono Basin. A second aqueduct, which parallels the original, was completed in 1970.

With the completion of the aqueduct system in 1970, an average of 470 taf of water was delivered annually through the LAA. Of this total, 380 taf originated from surface water and groundwater in the Owens Valley, while 90 taf came from surface water in the Mono Basin. In 1986, the aqueduct delivered a record 520 taf of water.

In the late 1980s, a series of court injunctions limited the amount of water that Los Angeles could receive from its aqueduct system. In 1990, these limitations, along with a persistent drought, limited the delivery from the aqueduct to only 106 taf. The Mono Lake Water Rights Decision (Decision) in September of 1994 ended the litigation in the Mono Basin, while negotiations continue with Inyo County on the fate of the Owens Valley water supply. In the Decision, the state ruled that Mono Lake should rise 17 feet over the next 25 years. During this time, Los Angeles would only be permitted to divert a fraction of its historical amounts. After the lake had risen, the city of Los Angeles would still be allowed only significantly reduced diversions. However, the high precipitation during the nineties allowed increased diversions of water to the LAA to occur at a much earlier time frame than had been foreseen at the time of the Decision.

More recently, the LAA diversions of water from the Owens Valley came under additional pressure. A long history of diversions of water from the Owens River had led to the drying up of Owens Lake by the end of the 1920s. This dry lakebed became a major source of windblown dust, resulting in EPA pressure to develop a State Implementation Plan to bring the region into compliance with federal air quality standards. In 1998, the Los Angeles Department of Water and Power entered into a Memorandum of Agreement with the Great Basin Air Pollution Control District that specified

shown in Table A.2-1.

[3] With the exception of the drought-constrained deliveries in 1991. These numbers do not correspond with those in Table A.2-1, because that Table includes water transfers delivered over the SWP system, as well as SWP deliveries.

actions needed to control the problem. These actions included shallow flooding and managed vegetation at various lakebed locations. An estimated 54 taf per year will be required to maintain the dust control measures, further restricting the water available for diversion through the LAA. More recently, the City has been required to restore portions of the Owens River, which could further restrict the water that can be provided from this source.

Historic Total Regional Water Supplies

The previous sections have presented the various sources of Metropolitan and the region's water supply. The amount of water supplied by each local and imported source from 1975 through 2004 appears in Table A.2-1. The imported supplies represent the amount of water imported into Metropolitan's service area, *not* the amount delivered to member agencies, which is shown in Table A.2-2. The difference between Metropolitan's imports and deliveries is water placed into or withdrawn from storage. The fluctuation in water supplies that occurred during this 1975-2004 period is the result of a number of factors. California experienced an extended drought during this period, which was particularly severe in 1991 and 1992. The long duration of this drought, which began in 1987, resulted in a decline in local supplies over the period due primarily to a reduction in groundwater availability. In addition, shortages in SWP supplies in 1991 and 1992 resulted in significant efforts to increase water conservation activities and, for part of that time, the imposition of water rationing. Water conservation activities in the region were already considerable before the 1991-92 shortage years, but these efforts were greatly expanded during those years and have stayed at similar levels even though adequate supplies have been available. Efforts at increasing water recycling have also continued. As a result of these efforts, consumers in Metropolitan’s service area have reduced their use of both imported and local supplies.

APPENDIX A.3
JUSTIFICATIONS FOR SUPPLY PROJECTIONS

A.3 Justifications for Supply Projections

Legislation authored by Senator Sheila Kuehl (SB221 – now Water Code §10613 *et seq.*) and Senator Jim Costa (SB610 – now Water Code §66473.7) requires water retailers to demonstrate that their water supplies are sufficient for certain proposed subdivisions and large development projects subject to the California Environmental Quality Act (CEQA). Although Metropolitan and other wholesalers do not have verification responsibilities under this legislation, information provided by Metropolitan may be useful to retailers in complying with these responsibilities. This Appendix provides the basis for the water availability contained in this report, by major source of supply. Such bases and proofs are required for supply verification under the legislation. Links to copies of the legislation can be found at http://www.groundwater.water.ca.gov/water_laws/index.cfm#otherleg.

Throughout this appendix, references are made to Metropolitan's operating budget and its long-term capital investment plan. The most recent operating budget (for Fiscal Year 2005-06) was adopted at the June 14, 2005 Board Meeting. A copy of the budget summary can be found at. http://www.mwdh2o.com/mwdh2o/pages/finance/Exec2005_web.pdf.
The most recent Capital Investment Plan can be found at
http://www.mwdh2o.com/mwdh2o/pages/finance/CIP2005_web.pdf.
Another document of interest related to Metropolitan's water supply planning is its annual report to the state legislature in compliance with Snate Bill 60 of 1999(Hayden).[1] This requires that Metropolitan report on it progress in increasing its emphasis on cost-effective conservation, recycling and groundwater recharge.

A.3.1 Colorado River Aqueduct Deliveries

A. Colorado River Supplies

Metropolitan obtains water from the Colorado River under two categories: its basic apportionment that is classified as Priority 4 water, and unused/surplus water that is classified as Priority 5 water. In addition, Metropolitan has entered into a number of agreements that allow it to receive supplies unused by agricultural districts for its own use and to store water surplus to immediate needs in groundwater basins adjacent to the Colorado River Aqueduct. This stored water may be withdrawn as needed during years in which insufficient supplies are available. Appendix A-2 describes the history of water supplies and the expected availability from this source, and Chapter III-7 describes the agreements for water supplies.

[1] Metropolitan Water District of Southern California, *Annual Progress Report to the California State Legislature: Achievements in Conservation, Recycling and GroundwaterRecharge* (February 2005), which can be found at
http://www.mwdh2o.com/mwdh2o/pages/yourwater/sb60_04/SB%2060%202005_web.pdf The legislation requiring this information is shown on page 40 of the 2005 report.
A similar report was filed with the legislature in February, 2004.

Rationale For Expected Supply

Historical Record

Water supply under Metropolitan's Priority 4 apportionment of Colorado River water has been delivered since 1939. By existing contract, it will continue to be available in perpetuity because of California's senior water rights to use of Colorado River water.

The historical record for available Colorado River water indicates that Metropolitan's fourth priority supply has been available in every year and can reasonably be expected to be available over the next 20 years.

Written Contracts or Other Proof

Metropolitan's entitlement to Colorado River water is based on a series of agreements and compacts collectively known as "The Law of the River,"[2] which govern the distribution and management of Colorado River water. The following documents specifically determine Metropolitan's dependable supplies:

- 1931 Seven Party Agreement.[3] The 1931 Agreement recommended California's Colorado River use priorities and has no termination date. California's basic annual apportionment is 4.4 million acre-feet. Palo Verde Irrigation District (PVID), Yuma Project (Reservation Division), Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and Metropolitan are the entities that hold the priorities. As shown in Appendix A-2, these priorities are included in the contracts that the Department of the Interior executed with the California agencies in the 1930s for water from Lake Mead. Metropolitan has the fourth priority to California's basic apportionment of Colorado River water and utilizes this water – 550 taf per year – every year. In addition, Metropolitan has access to additional Colorado River water – up to 662 taf per year – through its fifth priority in the California apportionment. Appendix A-2 describes the current status of water available under this priority.
- Metropolitan's Basic Contracts.[4] Metropolitan's 1930, 1931, and 1946 basic contracts with the Secretary of the Interior permit the delivery of 1.212 million acre-feet per year when sufficient water is available. Metropolitan's 1987 surplus flow contract with Reclamation permits the delivery of water to fill the remainder of the Colorado River Aqueduct when water is available. Other programs are also being planned and implemented that will increase the prospect of this water being available.
- 1964 Court Decree[5]. The 1964 U.S. Supreme Court Decree confirmed the Arizona, California, and Nevada basic apportionments of 2.8 million acre-feet per year, 4.4 million acre-feet per year and 300 taf per year, respectively. The Decree also permits the Secretary of the Interior to make water available that is unused by one of the states for use in the other two states. In addition, it permits the Secretary to make surplus water available.

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[2] A description of many of these agreements can be found at http://www.usbr.gov/lc/region/pao/lawofrvr.html.

[3] This agreement between the California contractors was dated August 18, 1931 and was codified in federal regulations promulgated by the Secretary of the Interior on September 28, 1931.

[4] Including contract number IIr-645 dated 04-09-1930, supplemented 09-28-1931.

[5] The 1964 decision in *Arizona v. California et al,* can be found at http://www.usbr.gov/lc/region/pao/pdfiles/supctdec.pdf

- 2003 Quantification Settlement Agreement (QSA) and several other related agreements were executed in October 2003.[6] The QSA quantifies the use of water under the third priority of the Seven Party Agreement. Although this agreement does not directly impact Metropolitan's entitlements, it provides the numeric baseline needed to measure conservation and transfer programs, and it allows for implementation of agricultural conservation, land management, and other programs identified in the 1996 IRP.

Financing

Metropolitan's operating budget (referenced at the beginning of this appendix) includes the cost of delivering fourth priority Colorado River water, which is paid from water sales revenue.

Federal, State, and Local Permits/Approvals

Metropolitan's fourth priority Colorado River water is currently available, and this priority assures delivery of the Basic apportionment.

B. IID - Metropolitan Conservation Program

Source Of Supply

The IID-Metropolitan Conservation Program provides an annual supply that is delivered to Metropolitan's service area via its CRA. In 1988, Metropolitan executed a Conservation Agreement to fund water efficiency improvements within the Imperial Irrigation District's (IID) service area in return for the right to divert the water conserved by those improvements. The program consists of structural and non-structural measures, including the concrete lining of existing canals, the construction of local reservoirs and spill-interceptor canals, installation of non-leak gates, and automation of the distribution system. Other implemented projects include the delivery of water to farmers on a 12-hour basis rather than a 24-hour basis and improvements in on-farm water management through the installation of tailwater pumpback systems, drip irrigation systems, and linear-move irrigation systems.

Expected Supply Capability

The IID-Metropolitan Conservation Program has been operational since 1990. It was initially expected to yield 106 taf per year of conserved water. This initial program agreement provided Coachella Valley Water District (CVWD) the option to call up to about 45 taf per year if needed to meet its demands under non-surplus conditions. Execution of the QSA has reduced CVWD's option to 20 taf. This water is available to Metropolitan if not required by CVWD, but the minimum supply to MWD has been increased to 80 taf.

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[6] These agreements can be found at http://www.crss.water.ca.gov/docs/crqsa/Parts/QSA_FE.pdf.

Rationale For Expected Supply

Historical Record

The IID-Metropolitan Conservation Program has been operational since 1990. Existing agreements have extended the initial term to at least 2041 or 270 days after the termination of the QSA, whichever is later, and they guarantee Metropolitan a minimum of 80 taf per year.

With operations beginning in 1990, the program has conserved as much as 109,460 acre-feet per year to date. The historical record indicates that Metropolitan's expected minimum supply of 80 taf per year has been available since 1996 and would be available over the next 36 years at least.

Written Contracts or Other Proof

Metropolitan's annual supply from the IID-Metropolitan Conservation Program is based on four agreements.

- 1988 IID-Metropolitan Conservation and Use of Conserved Water Agreement. This Agreement was executed in December 1988 by Imperial Irrigation District and Metropolitan for a 35-year term following completion of program implementation (1998– 2033).
- 1989 Approval Agreement. This Agreement secured the approval of the Palo Verde Irrigation District and Coachella Valley Water District to not divert an amount of water equal to the amount conserved except under limited circumstances. The Agreement was executed in December 1989.
- 1989 Supplemental Approval Agreement. This Agreement was executed in December 1989 between Metropolitan and Coachella Valley Water District to coordinate Colorado River diversions and the use of the conserved water provided by the Program.
- 2003 Amendments to 1988 Agreement and 1989 Approval Agreement. These amendments specify that Metropolitan will be guaranteed a minimum of 80 taf per year from this program. The remainder of the conserved water from this program would be available to CVWD. Any of this remaining water not used by CVWD would be available to Metropolitan.

Financing

The water efficiency improvements under this Program have already been funded, constructed, and put into operation. Metropolitan's 10-year capital and O&M budgets (referenced above) include the cost of operating, maintaining, and delivering the conserved water under the IID-Metropolitan Conservation Program.

Federal, State, and Local Permits/Approvals

A comprehensive environmental review process supported implementation.

- EIR for Program. The Imperial Irrigation District Board certified the final Environmental Impact Report for the Program in December 1986.[7]
- EIR for Supplemental Program. The Imperial Irrigation District Board certified the final Environmental Impact Report for the Completion Program in June 1994.[8]

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[7] Imperial Irrigation Distric*t, Draft EIR for Water Conservation Implementation in Imperial Irrigation District,* April, 1986. SCH Number: 1986012903.

- Program EIR for Quantification Settlement Agreement. Metropolitan's Board certified the final Program Environmental Impact Report for the QSA in June 2002.[9]
- Addendum to the QSA Final Program EIR. Metropolitan's Board adopted the Addendum to the QSA Final Program Environmental Impact Report in December 2002. Metropolitan's Board also adopted the Findings of Fact and Statement of Overriding Considerations, and Mitigation and Monitoring and Reporting Program at that time.

C. Hayfield Groundwater Storage Project

Source Of Supply

The Hayfield Groundwater Storage Project (Hayfield Project) is planned to supply up to 100 taf acre-feet annually during dry year or non-surplus Colorado River conditions. During wet and surplus years, Metropolitan would replenish the Hayfield Project from the CRA.

Expected Supply Capability:

It is estimated that the Hayfield aquifer can hold up to 500 taf of additional CRA water. This water could be extracted during dry year conditions at a rate of up to 100 taf per year. This supply would be available to Metropolitan in any year, but delivery is constrained by the existing capacity of the CRA. Incremental deliveries of water to the CRA from the Hayfield Project can be made during wet or average years depending on operating conditions along the CRA. For example, the Hayfield Project may provide operational efficiencies in meeting delivery obligations at Whitewater or other locations along the CRA.

Rationale For Expected Supply

As an integral part of the Colorado River resource strategy for storage programs, the Hayfield Project could be used by Metropolitan in meeting its demands in future dry years.

Program Facilities
The Hayfield Program would consist of facilities in two general areas:
- 390 acres of spreading basins,
- A well field consisting of 40 new wells to extract water from the aquifer, and pumps to return the water to the Colorado River Aqueduct;

Historical Record
Metropolitan's Board of Directors authorized implementation of the Hayfield Project in April 1999. Approximately 73,000 acre-feet of water have been stored in the Hayfield aquifer since that time.

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[8]Imperial Irrigation District *Draft EIR for Supplement To 86012903*, SCH Number: 1992071061.
[9]Multiple lead agencies, *Programmatic EIR for the Implementation of the Colorado River Water Quantification Settlement Agreement,* January 2002, SCH Number 2000061034.

Written Contracts or Other Proof

The Hayfield Project has been implemented as a component of California's Colorado River Water Use Plan. The following actions have occurred:

- 1998 Memorandum of Understanding (MOU) between Metropolitan and the U. S. Department of the Interior Bureau of Land Management (BLM). This MOU describes the intent of both Metropolitan and the BLM to exchange properties overlying the Hayfield Basin in order to support the implementation of the Hayfield Project. Approximately 3,800 acres of federally owned property in the Hayfield Valley would be exchanged with like properties held by Metropolitan. The purpose of this exchange of properties is to manage the underlying groundwater resource and protect water quality.
- April 1999 Board of Directors Adoption of the CEQA Document. Metropolitan's Board of Directors adopted the Mitigated Negative Declaration for the Hayfield Project at its regularly scheduled Board of Directors meeting in April 1999.
- June 2000 Board of Directors Approval of the Hayfield Project. Metropolitan's Board of Directors approved the Hayfield Project and appropriated an additional $7.35 million for land acquisition, preliminary design, continued water quality monitoring, additional aquifer testing and other tasks. The Board authorized storage of up to 800 taf of CRA water.
- December 2002 Board of Directors Appropriation of Design, Testing and Construction Funds**.** Metropolitan authorized expenditure of an additional $18 million to implement the Hayfield Project. This action increased the authorized funding to implement the Hayfield Project to more than $27 million. Because of the recent drought in the Colorado River basin, the Hayfield Program is currently on hold until 2006.

Financing

The capital cost of the Hayfield Project is estimated to be approximately $75 million. This cost is included in Metropolitan's 10-year capital budget (referenced above) and would be financed through a combination of bonds and water sales revenue.

Federal, State and Local Permits/Approvals

Metropolitan has applied for and requested all appropriate federal, state and local permits for construction. For example, Metropolitan is currently conducting long term water quality baseline monitoring in support of a possible Source Water Permit application from the Department of Health Services. Monitoring wells and test wells were completed in accordance with Riverside County permitting procedures. Necessary environmental permits would be acquired as needed.

D. Palo Verde Irrigation District Land Management, Crop Rotation And Water Supply Program

Source Of Supply

At its May, 11 2004 meeting, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with the Palo Verde Irrigation District. Under the program, participating farmers in PVID are being paid to reduce their water use by not irrigating a portion of their land. A maximum of 29 percent of lands within PVID can be fallowed in any given year. Under the terms of the QSA, water savings within the PVID service area will be made available to Metropolitan. PVID has the first priority for Colorado River water under the water delivery contracts with the U.S. Bureau of Reclamation. Partial implementation of the program began in January 2005, and when fully implemented, the program is estimated to provide up to 111 taf per year. The agreement also specifies that the program will provide a minimum of 26 taf per year.

Expected Supply Capability

It is estimated that the PVID/Metropolitan Program would provide up to 111 taf per year of additional Colorado River water. This water would be available in any year as needed and in accordance with the provisions described in the agreements with Palo Verde Valley landowners and PVID.

Rationale For Expected Supply

<u>Historical Record</u>
Metropolitan and PVID tested the concept of developing a water supply for Metropolitan by entering into an agreement in 1992.[10] Agreements were signed with landowners and lessees in the Palo Verde Valley to forego irrigation for a two-year period from August 1992 to July 1994. Water unused by PVID, in the amount of 186, taf was stored in Lake Mead for Metropolitan. Both PVID and Metropolitan signed approved Principles of Agreement in 2001. PVID issued the Final Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program in September 2002.[11]

Partial implementation of the final program began in January 2005. In 2005, the water savings in PVID are estimated to be 85 taf, and in 2006 a further 100 taf is expected.

<u>Written Contracts or Other Proof</u>
- <u>August 2004 Forbearance and Fallowing Program Agreement</u>. This agreement establishes the PVID/Metropolitan Program, which provides for a solicitation of and provisional approval of landowner participation offers, specifies the process for incorporating offers into agreements with landowners, and states the terms and conditions for fallowing, including payments made by Metropolitan.
- <u>Landowner Agreements for Fallowing in the PVID</u>. These agreements specify an escrow process to consummate the transaction, an easement deed to encumber land for fallowing, a tenant agreement to subordinate a tenant's lease to the agreement and easement, and an

[10] Presented to Metropolitan's Board at its regular meeting January 14, 1992.
[11] SCH Number 2001101149.

encumbrance agreement to subordinate any encumbrance (e.g. a mortgage) to the easement. These agreements also state the landowner's fallowing obligation, payments to be made by Metropolitan, and land management measures to be implemented.

- 2005 Interim Fallowing Agreements. Beginning as early as January 1, 2005, these bridge agreements were executed to permit landowners to fallow land on an interim basis through July 31, 2005, pending commencement of their participation in the PVID/Metropolitan Forbearance and Fallowing Program on August 1, 2005.
- July 2005 Interim Fallowing Agreements. These agreements were executed to permit landowners to fallow land on an interim basis pending commencement of their participation in the PVID/Metropolitan Program with the close of escrow after August 1, 2005.

Financing

Metropolitan's annual O&M budget (referenced above) includes the cost of the PVID/ Metropolitan Program.

Federal, State and Local Permits

A Notice of Preparation for the PVID/Metropolitan Program was published on October 29, 2001. PVID issued the Final Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation, and Water Supply Program in September 2002 (see reference above).

E. Lower Coachella Valley Groundwater Storage Program

Source Of Supply

Metropolitan has identified the feasibility of developing a conjunctive use storage program in the Lower Coachella groundwater basin. The basin is currently in an over-drafted condition. The Lower Coachella groundwater basin underlies the service area of the Coachella Valley Water District (CVWD). CVWD transports its Colorado River entitlement by way of the All American and Coachella Canal systems. The projected growth for the CVWD service area is expected to gradually increase through 2015, when the area is expected to be built out. This proposed program provides Metropolitan with the flexibility of being able to store water while continuing to keep the CRA full.

Expected Supply Capability

The Program has the potential to provide up to 500 taf of storage capacity. It is expected to produce 100 to 175 taf per year of dry year supplies. Initially, it had a scheduled on-line date by 2015; however, the Board has postponed work on this project for two years due to the current dry conditions in the Colorado River basin.

Rationale For Expected Supply

This Program is one of many identified in California's Colorado River Water Use Plan. If implemented, it would assist in positioning California to use only 4.4 million af of Colorado River water in years in which surplus water, or water apportioned to but not used by Arizona and Nevada, is not available. The storage and dry-year program capacity does not influence the ability to maintain a full Colorado River Aqueduct in the future. However, the use of Colorado River water to put water into the Lower Coachella Valley Storage Program may be influenced by other Colorado River related storage/transfer programs. Program storage and extraction capacities, as well as up-front payments and capital outlays for construction, may impact Metropolitan's budget.

Written Contracts or Other Proof
The terms of the proposed program agreement must be negotiated with CVWD.

Financing

This program would be funded through Metropolitan's annual budget.

Environmental Review

The implementation of a groundwater storage project in Coachella Valley could provide of additional Colorado River water to allow for a reduction in groundwater use and a subsequent reduction in the current rates of groundwater overdraft. The feasibility report identified the environmental checklist in accordance with CEQA guidelines.

F. Chuckwalla Groundwater Storage Program

Source Of Supply

The Chuckwalla Groundwater Basin was identified in Phase I investigations as a groundwater basin along the Colorado River Aqueduct having the potential to store available supplies of CRA water. The Upper Chuckwalla Valley is located near Metropolitan's Eagle Mountain Pumping Plant. Metropolitan initiated the Chuckwalla Study, which investigated the potential for such a program. During surplus years, Metropolitan would replenish the Upper Chuckwalla Basin with available deliveries from the CRA. Up to 150 taf per year would be returned to the CRA in non-surplus Colorado River conditions. Given current dry conditions in the Colorado River Basin, Metropolitan has deferred implementation of this program until further water supplies are available.

Expected Supply Capability

It is estimated that the Upper Chuckwalla groundwater basin could hold up to 500 taf of CRA water. This water would be extracted during non-surplus conditions at a rate of up to 150 taf per year. Delivery of this water is constrained by the existing capacity of the CRA.

Rationale For Expected Supply

As an integral part of the Colorado River resource strategy for storage programs, deliveries of water previously stored under the Chuckwalla Project could be used to assist in keeping the CRA full in 2015 and the following non-surplus years.

Program Facilities

The Chuckwalla Project would consist of facilities in three general areas, as follows:

- 400 acres of spreading basins;
- Water conveyance facilities, including approximately 10 miles of pipeline and a pumping station to pump water from the extraction wells to the Colorado River Aqueduct; and
- A well field, consisting of 40 new wells to extract water from the aquifer, and pumps to return the water to the Colorado River Aqueduct.

Historical Record

Metropolitan's Board of Directors approved the Chuckwalla Study in June 2000, and it is still being completed.

Written Contracts or Other Proof

The Chuckwalla Study has been initiated as a potential component of California's Colorado River Water Use Plan. The following actions have occurred:

- 1998 Phase I Feasibility Report for Off-stream Storage on the Colorado River Aqueduct. This Report identified the Upper Chuckwalla Basin as having the potential for off stream storage of CRA water.
- June 2000 Board of Directors Approval of the Upper Chuckwalla Feasibility Study. Metropolitan's Board of Directors approved the Upper Chuckwalla Feasibility Study, made a CEQA determination and appropriated $2 million to complete geophysical, hydrogeological, infiltration, water quality, and risk assessment investigations for the study.
- June 2001 Department of Water Resources Award. The Department of Water resources awarded Metropolitan an AB 303 Study Grant of $250,000 to conduct the Upper Chuckwalla Feasibility Investigations.
- March 2001 Consultant Contract Award. Metropolitan's Board of Directors approved a contract to conduct feasibility investigations.

The project is now on hold, pending review of other groundwater storage programs and conditions in the Colorado River basin.

Financing

The cost of the Upper Chuckwalla Feasibility Study is estimated to be approximately $2 million. This amount is included in Metropolitan's 10-year capital and O&M budget (referenced above). In addition, an AB 303 planning grant of $250,000 will be reimbursed to Metropolitan under the terms of a contract with the DWR.

Federal, State and Local Permits/Approvals

Metropolitan would acquire all appropriate federal, state and local permits for construction. Monitoring wells and test wells have been constructed in accordance with Riverside County permitting procedures. Additional necessary environmental permits would be acquired as needed.

G. Salton Sea Restoration Transfer

Source Of Supply

The source of supply for the Salton Sea Restoration Transfer is Colorado River water conserved by IID for transfer to Metropolitan.

Expected Supply Capability

The expected supply is up to 1.5 maf. This water would be made available during a period that could start as early as 2007 and will end after 2017.

Rationale For Expected Supply

The program is being developed in accordance with legislative direction to the Resources Secretary to facilitate implementation of the Colorado River transfers and other programs under the QSA. The Resources Secretary was directed to undertake a restoration study to determine a preferred alternative for the restoration of the Salton Sea ecosystem and the protection of wildlife dependent on that ecosystem. As part of this study, the Resources Secretary is to determine the availability to Metropolitan of up to 1.6 million acre-feet of water that would be conserved by IID and made available to Metropolitan, with the net proceeds placed in the Salton Sea Restoration Fund. By December 31, 2006, the Resources Secretary is required to submit a plan to the Legislature that identifies a preferred alternative for the restoration of the Salton Sea and the availability of water to Metropolitan. By the end of 2006, approximately 100,000 acre-feet of this water will have already been conserved to permit management of the salinity of the Salton Sea, leaving as much as 1.5 maf available for transfer to Metropolitan beginning in 2007.

<u>Program Facilities</u>
The existing CRA facilities would transport the water from Lake Havasu to Metropolitan. Currently, conserved water is being provided through land fallowing. Additional conservation facilities may be constructed by IID.

<u>Historical Record</u>
Metropolitan has existing contracts with the Secretary of the Interior for delivery of Colorado River water. Additionally, under separate 1988 and 1989 agreements and 2003 amendments, Metropolitan receives Colorado River water made available by IID through conservation activities within IID.

Written Contracts or Other Proof

- 2003 Quantification Settlement Agreement.[12] Umbrella agreement for the related agreements entered into by Metropolitan, IID, CVWD, and/or SDCWA, which together are intended to consensually settle longstanding disputes regarding the priority, use, and transfer of Colorado River water in California from agricultural to urban users. The QSA establishes the structure for the further distribution of Colorado River water among Metropolitan, IID, and CVWD for up to 75 years based upon the water budgets set forth in the agreement.
- 2003 Colorado River Water Delivery Agreement. Agreement among IID, CVWD, SDCWA, Metropolitan, and the Secretary of the Interior memorializing the agreement of the Secretary to deliver Colorado River water to California water users in accordance with the water budgets established by the QSA and related agreements.
- 2003 Agreement between the Imperial Irrigation and the Department of Water Resources for the Transfer of Colorado River Water. One of the QSA-related agreements that specifies IID's obligations to conserve water for transfer to Metropolitan and DWR's commitments and obligations to IID in facilitating the transfer.
- 2003 Agreement between The Metropolitan Water District of Southern California and the Department of Water Resources for the Transfer of Colorado River Water. One of the QSA-related agreements that specifies MWD's obligations to pay for water conserved by IID for transfer to Metropolitan as facilitated by DWR.
- 2003 Quantification Settlement Agreement Joint Powers Authority Creation and Funding Agreement. One of the QSA-related agreements, this agreement among the Department of Fish and Game, CVWD, IID, and SDCWA provides for the funding of a portion of the water that would be conserved by IID for transfer to Metropolitan.
- QSA Implementing Legislation. The 2003 State Legislature passed three bills to facilitate implementation of the QSA--Senate Bill 277 (Ducheny), Senate Bill 317 (Kuehl) as amended in the 2004 legislative session by Senate Bill 1214 (Kuehl), and Senate Bill 654 (Machado) that include provisions for the Salton Sea Restoration Transfer.
- Deadline for Report to Legislature. The QSA implementing legislation requires the Resources Secretary to submit the completed restoration study on or before December 31, 2006 that includes a Program EIR along with a determination of the availability of the Salton Sea Restoration Transfer water to Metropolitan.

Financing

- The Resources Secretary is undertaking the Salton Sea restoration study with $20 million appropriated from state Proposition 50 bond funds.
- Approximately 1/2 of the 1.5 million af transfer will be conserved by IID using funds managed by the QSA Joint Powers Authority with the remainder of the IID conservation funded by water transfer payments from Metropolitan.
- DWR will facilitate the transfer by making direct specified payments to IID and by collecting certain payments from Metropolitan, the proceeds of which would be deposited in the Salton Sea Restoration Fund.

[12] The documents related to the QSA-related agreements discussed in this section are referenced above.

Federal, State and Local Permits for Construction

Under the direction of the Resources Secretary, DWR is in the initial stages of preparing a Program EIR for the plan. A Draft PEIR is scheduled for release to the public in February 2006. The Final PEIR is scheduled for submittal to the Legislature in December 2006 after which the Legislature is expected to consider issuing a Notice of Determination. State legislation would be required before the transfers can take place.

A.3.2 California Aqueduct Deliveries

A. State Water Project Deliveries

Source Of Supply

The State Water Project provides imported water to the Metropolitan service area and has historically provided from 25 to 50 percent of Metropolitan's supplies. In accordance with its contract with the Department of Water Resources (DWR), Metropolitan has a Table A allocation of 2,011,500 acre-feet per year under contract from the State Water Project. Actual deliveries have never reached this amount because they depend on the availability of supplies as determined by DWR. The availability of SWP supplies for delivery through the California Aqueduct over the next 23 years is estimated according to the historical record of hydrologic conditions, existing system capabilities, requests of the state water contractors and SWP contract provisions for allocating Table A, Article 21 and other SWP deliveries to each contractor. As shown in this report, the estimates of SWP deliveries to Metropolitan are based on DWR's most recent SWP reliability estimates contained in its May 25, 2005 Notice to State Water Contractors, Number 05-08.

As part of its contract with DWR, Metropolitan pays both the fixed costs of financing SWP facilities construction and variable costs of operations, maintenance, power and replacement costs for water delivered each year. SWP water is delivered to Metropolitan through the East Branch at Devils Canyon Power Plant afterbay, along the Santa Ana Valley Pipeline, and at Lake Perris. Metropolitan takes delivery from the West Branch at Castaic Lake.

Expected Supply Capability

The Edmund G. Brown California Aqueduct is capable of transporting Metropolitan's full contract amount of 2,011,500 acre-feet per year. However, the quantity of water available for export through the California Aqueduct can vary significantly year to year. The amount of precipitation and runoff in the Sacramento and San Joaquin watersheds, system reservoir storage, regulatory requirements, and contractor demands for SWP supplies impact the quantity of water available to Metropolitan.

Prior to the execution of the Bay-Delta Accord in December 1994, significant uncertainties existed regarding how much of the water in the Sacramento San Joaquin Bay-Delta would be available for export and how much would be required to meet regulatory requirements for meeting water quality standards and sustaining endangered species. The Bay-Delta Accord and the subsequent CALFED process removed significant uncertainties associated with regulatory requirement, thus providing a base for the DWR and the SWP contractors to estimate available water supplies. As discussed in a subsequent section, actions being undertaken by the CALFED process and the Phase 8 water rights process should enhance the reliability of supplies in the future.

DWR estimates the water supply available for export to Metropolitan and the SWP contractors by using the regulatory standards in the Bay-Delta Accord, as well as historic precipitation and runoff data and reservoir levels.

Rationale For Expected Supply

Metropolitan and 28 other public entities have contracts with the State of California for State Water Project water. These contracts require the state, through its DWR, to use reasonable efforts to develop and maintain the SWP supply. The state has made significant investment in infrastructure. It has constructed 28 dams and reservoirs, 26 pumping and generation plants, and about 660 miles of aqueducts. More than 19 million California residents benefit from water from the SWP. To date, the project has delivered in excess of 56 million acre-feet with the single year deliveries exceeding 3.5 million acre-feet in 2000. DWR estimates that with current facilities and regulatory requirements, the project will deliver 3.1 million acre-feet per year on average. Under its contract Metropolitan may use 48 percent of this quantity.

Further, under the water supply contract, DWR is required to use reasonable efforts to maintain and increase the reliability of service to Metropolitan. As discussed in a subsequent section, DWR is participating in the CALFED process to achieve these requirements.

<u>Historical Record</u>
The historical record shows significant accomplishments by DWR in providing its contractors with SWP water supplies. Through 2002, the SWP has delivered more than 100 maf to its contractors. The maximum annual water supply was delivered in 2000, and totaled 4.9 maf. In 2002 the project delivered 4.1 maf. DWR has continued to invest in SWP facilities to deliver water to its contractors.

<u>Written Contracts or Other Proof</u>

- <u>1960 Contract between the State of California and the Metropolitan Water District of Southern California for a Water Supply</u>. This Contract, initially executed in 1960 and amended numerous times since, is the basis for SWP deliveries to Metropolitan. It requires the DWR to make reasonable efforts to secure water supplies for Metropolitan and its other contractors. The contract expires in 2035. At that time, Metropolitan has the option to renew the contract under the same basic conditions.

Financing

Metropolitan's payments for its State Water contract obligation are approved each year by its Board of Directors and currently constitute approximately 35 percent of the annual budget (referenced above).

Federal, State and Local Permit/Approvals

- <u>Operation of the SWP.</u> The DWR is responsible for acquiring, maintaining and complying with numerous Federal and State permits for operation of the SWP. Metropolitan has been active in monitoring the issues affecting its contract with DWR.
- <u>Environmental Impact Report for the East Branch Enlargement</u>. In April 1984 DWR prepared and finalized an Environmental Impact Report for the Enlargement of the East Branch of the Governor Edmund G. Brown California Aqueduct.
- <u>Environmental Impact Report for the Harvey O. Banks Pumping Plant</u>. In January 1986 DWR prepared and finalized an Environmental Impact Report for the Additional Pumping Units at Harvey O. Banks Delta Pumping Plant.

- Environmental Impact Report for the Mission Hills Extension. In 1990 DWR prepared and finalized an Environmental Impact Report for the State Water Project Coastal Branch, Phase II and Mission Hills Extension.
- East Branch Extension Project Phase 1. In 1998 DWR completed an EIR to extend the East Branch of the California Aqueduct to provide service to San Gorgonio Pass Water Agency. Phase 1 was completed in 2002.

B. Desert Water Agency/Coachella Valley Water District/Metropolitan Water Exchange Program

Source Of Supply

The Desert Water Agency (DWA) and Coachella Valley Water District (CVWD), both in Riverside County, have rights to State Water Project (SWP) deliveries but do not have any physical connections to the SWP facilities. Both agencies are adjacent to the Colorado River Aqueduct. For DWA and CVWD to obtain water equal to their SWP allocations, Metropolitan has agreed to exchange an equal quantity of its Colorado River water for DWA and CVWD's SWP water. DWA has a SWP Table A contract right of 38,100 acre-feet per year and CVWD has a SWP Table A contract right of 23,100 acre-feet per year, for a total of 61,200 acre-feet per year.

Expected Supply Capability

Under the existing agreements, Metropolitan provides water from its Colorado River Aqueduct to DWA and CVWD in exchange for SWP deliveries. Metropolitan can deliver additional water to its DWA/CVWD service connections permitting these agencies to store water. When supplies are needed, Metropolitan can then receive its full Colorado River supply as well as the State Water Project allocation from the two agencies, while the two agencies can rely on the stored water for meeting their water supply needs. The combined SWP Table A contract right of DWA and CVWD is 61,200 acre-feet. The amount of DWA and CVWD SWP Table A water available to Metropolitan depends on total SWP deliveries and varies from year-to-year.

Rationale For Expected Supply

The DWR estimates the amount of supplies that are available each year. Metropolitan uses a forecasting method for SWP deliveries based on historical patterns of precipitation, runoff and actual deliveries of water.

Historical Record
The DWA and CVWD Exchange Program is currently in operation. The Advance Delivery Agreement has been in place since 1967 and was modified in 1984. Since 1967 Metropolitan has been taking delivery of these agencies' SWP Table A water and providing equivalent water to those agencies from Metropolitan's supplies on the Colorado aqueduct. Metropolitan has also been delivering water in advance of the amount needed under the exchange agreement. This water can be called on by Metropolitan during dry years. By the end of 2005, Metropolitan expects to have 325 taf in the Advance Delivery account.

Written Contracts or Other Proof

- 1967 and 1983 Water Exchange Contract and Agreements. The DWA and CVWD Program is currently in operation. The DWA and CVWD water exchange contracts have been in place since 1967, amended in 1972 and were modified with execution of additional agreements in 1983.
- 1984 Advance Delivery Agreement. DWA, CVWD and Metropolitan executed an Advance Delivery Agreement. This Advance Delivery Agreement allows Metropolitan to supply DWA and CVWD with Colorado River water in advance of the time these agencies are entitled to receive water under the Exchange Agreement. In future years, Metropolitan can recover this water by reducing its deliveries under the exchange agreement.

Financing

The funds for deliveries under this Program are included in Metropolitan's O&M budget and Long-range Financial Plan (referenced above).

Federal, State, and Local Permits/Approvals

The DWR is responsible for acquiring, maintaining and complying with numerous Federal and State permits for operation of the SWP.

- July 26, 1983 CVWD Negative Declaration, Whitewater River Spreading Area expansion Phase 1.
- February 1983, DWA Final EIR for the proposed extension of time for utilizing Colorado River water to recharge the upper Coachella Valley groundwater basins to the year 2035, Volume I and II, April 1983 Volume III

C. Semitropic Water Banking And Exchange Program

Source Of Supply

The agreement between Semitropic Water Storage District (Semitropic) and Metropolitan was executed in February 1994. Semitropic obtains water from the SWP through its contracts with the Kern County Water Agency. SWP supplies irrigate an area of 161,200 acres within Semitropic's service area. When this surface water is not available, these growers withdraw water from the underlying aquifer. The agreement between Semitropic and Metropolitan allows Metropolitan to make use of 35 percent of the additional storage in Semitropic's groundwater basin. In years of plentiful supply, Metropolitan can deliver available SWP supplies to Semitropic through the California Aqueduct. During dry years, Metropolitan can withdraw this stored water. Four other banking partners participate in this Program and use the remaining 65 percent of the additional storage in Semitropic's groundwater basin.

Expected Supply Capability

The Semitropic-Metropolitan Program provides Metropolitan with the capacity to store up to 350 taf of water under the current agreement. During dry years, Metropolitan can recover its stored water through a combination of direct pumping of the groundwater and delivery of Semitropic's SWP Table A water in the California Aqueduct. Based on the terms and conditions of the program agreements, the return of water to Metropolitan ranges from a minimum of 31 taf acre-feet per year (peak 4-month summer period) up to 170 taf (over a 12-month period). The average annual supply capability for a single dry year similar to 1977 or multiple dry years similar to the period 1990-1992 is 107 taf.

Rationale For Expected Supply

Historical Record

The Semitropic-Metropolitan Water Banking & Exchange Program has been operational since 1994. With existing agreements, it will continue to operate over the term of 41 years (1994-2035). At the end of 2004, Metropolitan had 315 taf in its storage account. It expects to have 343 taf in its storage account by the end of 2005.

Written Contracts or Other Proof

- 1992 Turn-in/out Construction, Operation and Maintenance Agreement. This Agreement was executed in 1992 by the Department of Water Resources and Semitropic to allow construction, operation and maintenance of the Semitropic California Aqueduct Turn in/out.
- 1993 Temporary Semitropic-Metropolitan Water Banking Agreement. This Agreement was executed in February 1993 by Semitropic and Metropolitan to allow the storage of available Metropolitan supplies in advance of execution of the long-term agreement.
- 1994 Semitropic/Metropolitan Water Banking and Exchange Agreement. This Agreement was executed in December 1994 by Semitropic and Metropolitan to implement the program for a 41 year term (1994-2035).
- 1995 Point of Delivery Agreement. This agreement, with the Department of Water Resources, Kern County Water Agency and Metropolitan, allows Metropolitan to divert water from the California Aqueduct into Semitropic's service area.
- 1995 Introduction of Local Water into the California Aqueduct. This agreement, with the Department of Water Resources, Kern County Water Agency and Semitropic, allows Metropolitan to receive water from the program into the California Aqueduct.

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Semitropic Program.

Federal, State and Local Permits/Approvals

- Final EIR. Semitropic acting as the lead agency under CEQA and Metropolitan acting as a responsible agency jointly completed the Environmental Impact Report for the Program. The EIR was certified by Semitropic in July 1994 and adopted by Metropolitan in August 1994.
- Regulatory Approvals. All regulatory approvals are in place and the program is operational.

D. Arvin-Edison Water Management Program

Source Of Supply

The Arvin-Edison Water Storage District (Arvin-Edison) manages the delivery of local groundwater and water imported into its service area from the Central Valley Project's (CVP) Millerton Reservoir via the Friant-Kern Canal. The surface water service area consists of 132,000 acres of predominantly agricultural land, and to a minor degree, municipal and industrial uses. It is situated in Kern County. Arvin-Edison operates its supplies conjunctively, storing water in the underlying aquifer when imported supplies are available and withdrawing that water when the availability of imported supplies is reduced. In 1997, Metropolitan entered into an agreement with the Arvin-Edison Water Storage District. The agreement allows Metropolitan to store available water in Arvin-Edison's groundwater basin, either through direct spreading operations, or through deliveries to growers in Arvin-Edison's service area. Similar to Arvin-Edison's own usage, this previously stored water could be withdrawn when the availability of imported supplies to Metropolitan is reduced.

Expected Supply Capability

The Arvin-Edison/Metropolitan Program provides Metropolitan with the capacity to store up to 250 taf of water under the current agreement. It also provides an option to increase the storage capacity to 350 taf. During dry years, Metropolitan can recover its stored water either through direct pumping of the groundwater or through exchange. Based on the terms and conditions of the program agreement, the return of water to Metropolitan ranges from a minimum of 40 taf per year (peak 4-month summer period) up to 110 taf (over a 12-month period). The average annual supply capability for this program is 90 taf for either a single dry year similar to 1977 or for each year of a multiple dry year period similar to the period 1990-1992.

Rationale For Expected Supply

Historical Record

The Arvin-Edison/Metropolitan Water Management Program has been operational since 1997. With existing agreements, it will continue to operate over the term of 30 years (1997-2027) with a possible extension to 2035. After withdrawing 43 taf for delivery to its service area in 2004, Metropolitan had 207 taf in its storage account at the end of the year.

Written Contracts or Other Proof

- 1997 Arvin-Edison/Metropolitan Water Management Agreement. This Agreement was executed in December 1997 by Arvin-Edison and Metropolitan to implement the program for a 30-year term (1997-2027).
- 1998 Turn-in/out Construction and Maintenance Agreement. This Agreement was executed in 1998 by the Department of Water Resources, Kern County Water Agency, Arvin-Edison and Metropolitan to allow construction, operation and maintenance of the Arvin-Edison California Aqueduct Turn in/out.
- 1998-2002 Water Delivery and Return Agreements. These agreements, with the Department of Water Resources, Kern County Water Agency, Arvin-Edison and Metropolitan, allow Metropolitan to divert water from, and introduce water to, the California Aqueduct.

- 2004 Point of Delivery Agreement. This agreement, with the Department of Water Resources, Kern County Water Agency and Metropolitan, allows Metropolitan to divert water from the California Aqueduct into Arvin-Edison's service area.
- 2004 Introduction of Water into the California Aqueduct. This agreement, with the Department of Water Resources, Kern County Water Agency and Arvin-Edison, allows Metropolitan to receive water from the program into the California Aqueduct.

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Arvin-Edison Program.

Federal, State and Local Permits/Approvals

- All regulatory approvals are in place.
- Environmental Status: A Negative Declaration was completed in 1996.
- An Addendum to the 1996 Negative Declaration was completed in 2003.
- Regulatory Approvals. All regulatory approvals are in place and program is operational

E. San Bernardino Valley Municipal Water District Program

Source Of Supply

The San Bernardino Valley Municipal Water District Program allows Metropolitan to purchase a dependable annual supply, as well as, an additional supply for dry year needs. Under this program, Metropolitan purchases water provided to San Bernardino Valley Municipal Water District (Valley District) from its annual State Water Project (SWP) water allocation. Valley District delivers the purchased supplies to Metropolitan's service area through the coordinated use of facilities and interconnections within the water conveyance system of the two districts.

The purchased SWP supply is provided to Metropolitan as direct deliveries of annual SWP water through the California Aqueduct to Metropolitan's service area, as well as through deliveries of recaptured SWP water previously stored in the San Bernardino groundwater basin to Metropolitan's service area. Under this program, Metropolitan purchases a minimum of 20 taf per year of SWP allocation every year. In addition, Metropolitan has the option to purchase Valley District's additional SWP allocation, if available, and the first right-of-refusal to purchase additional SWP supplies available beyond the minimum and option amounts. In the event that Metropolitan's operational needs do not require all, or a portion of the minimum purchased water, that unused amount may be carried forward up to a total of 50 taf for later delivery. Finally, the program establishes a critical dry year supply account for Metropolitan that could provide additional amounts of dry year supplies. During any year designated by DWR as a critically dry year, Valley District could deliver from this account up to 50 taf of recaptured SWP water previously stored in the San Bernardino groundwater basin.

To facilitate the transfer, the program also provides the coordinated use of existing facilities, including the Valley District's Foothill Pipeline and the Inland Feeder, to improve the conveyance capabilities of the delivery of SWP water to the service areas of both districts. The intertie between the foothill Pipeline and existing segment of the Inland Feeder has been constructed and was operational as of December 2002. This intertie allows Metropolitan to move SWP water from the East Branch of the California Aqueduct through the Foothill Pipeline and Inland Feeder, into Diamond Valley Lake and the Colorado River Aqueduct. As a result of this intertie, the conveyance capacity into Metropolitan's system has been increased by 260 cfs, thus increasing Metropolitan's capability to refill and maintain storage in Diamond Valley Lake.

Expected Supply Capability

The average annual supply capability for a single dry year similar to 1977 is 70 taf; for multiple dry years similar to the period 1990-1992 expected supply capability is 37 taf.

Rationale For Expected Supply

Historical Record
The San Bernardino Valley Municipal Water District Program began operations in 2001 and is expected to be renewed continually in the future. Since its inception in 2001 this program has delivered 103 taf to Metropolitan. Deliveries in 2004 were 43 taf. Deliveries in 2005 will be a minimum of 20 taf.

Written Contracts or Other Proof
Metropolitan's dependable annual and dry-year supplies from the San Bernardino Valley Municipal Water District Program are based on Metropolitan Board actions and agreements.

- 2000 Board Approval of Coordinated Operating Agreement. In June 2000, Metropolitan's Board authorized entering into a Coordinated Operating Agreement between Metropolitan and Valley District to develop projects that could provide benefits to both districts through the coordinated use of facilities and SWP supplies.
- 2000 Coordinated Operating Agreement. The Coordinate Operating Agreement between Metropolitan and Valley District was executed in July 2000.
- 2001 Board Approval of the Coordinated Use Agreement. In April 2001, Metropolitan's Board authorized entering into the Coordinated Use Agreement for Conveyance Facilities and SWP Water Supplies between Metropolitan and Valley District for the purchase of dependable annual and dry year supplies by Metropolitan.
- 2001 Coordinated Use Agreement. The Coordinated Use Agreement for Conveyance Facilities and SWP Water Supplies between Metropolitan and Valley District for the purchase of dependable annual and dry year supplies by Metropolitan was executed May 2001. The Agreement is effective as of July 1, 2001, for an "evergreen" term (10-years with automatic annual extensions unless otherwise notified).

Financing

Metropolitan's O&M budget (referenced above) includes the funds to purchase Program water.

Federal, State, and Local Permits/Approvals

The Program became effective as of July 1, 2001. An environmental review process and regulatory approval supported implementation.

- Final EIR. Final Regional Water Facilities Master Plan Environmental Impact Report dated February 1, 2001 was certified by Valley District, as lead agency, and by Metropolitan, as responsible agency. Notices of determinations were filed by Valley District and Metropolitan on May 29, 2001 and April 18, 2001, respectively.
- State Water Contractors' Review. In May 2001 the State Water Contractors reviewed and issued a letter supporting the program.
- DWR Review. The California Department of Water Resources agreed to the program in December 2001.

F. Bay-Delta Improvements

Source Of Supply

Improving the water supply reliability of the State Water Project (SWP) is a primary focus of Metropolitan's long-term planning efforts. Metropolitan's strategy is to reduce its dependence on SWP supplies during dry years, when risks to the Bay-Delta ecosystem are greatest, and to maximize its deliveries of available SWP water during wetter years to store in surface reservoirs and groundwater basins for later use during droughts and emergencies.

Restoring and stabilizing the environmental health and supply reliability of the Bay-Delta through the implementation of CALFED's Bay-Delta Program and the Sacramento Valley Water Management Agreement are important steps to accomplishing this objective. These improvements are necessary for Metropolitan to attain its goal of 650 taf of supply yield from the Bay-Delta in dry years by 2020. This yield is 200 taf to 250 taf over estimates of existing available dry-year supplies, as described above. This goal means that Metropolitan will rely on only 32.5 percent of its total SWP contract amount of 2.0 million acre-feet per year in dry years. In addition, Metropolitan policy objectives for Bay-Delta improvements include an average of 1.5 million acre-feet of supply yield to Metropolitan over all year types.

The SWP conveys water from the western slope of the Sierra Nevada to water users both north and south of the Bay-Delta. Specifically, SWP is delivered to Metropolitan's service area through a system of reservoirs, the Bay-Delta, pumping plants and the California Aqueduct. Owned and operated by the California Department of Water Resources (DWR), the SWP provides municipal and agricultural water to 29 State Water Contractors. Annual deliveries for the SWP average about 2.5 million acre-feet. Municipal uses account for about 60 percent of annual deliveries, with the remaining 40 percent going to agriculture.

Delta Improvements Package and Phase 8 Settlement

CALFED is a process involving numerous stakeholders (federal and state resource agency representatives, water users, environmental entities, and other interests) to develop solutions for Bay-Delta problems. On August 28, 2000, CALFED's Bay-Delta Program was approved, and it laid out final implementation plans for the first phase – the first seven years – of what is conceived to be up to 30 years of improvements in the Bay–Delta. This Program would be implemented through 11 major elements.

Delta Improvements Package. The Delta Improvement Package is a set of linked actions designed to allow the SWP to operate the Banks Pumping Plant in the Delta at 8,500 cfs, provided all regulatory standards are met and water is available for export. The Banks Pumping Plant is currently limited by a Corps of Engineers permit to operate at 6,680 cfs, with provision to pump at higher levels only under very limited hydrologic conditions.

The key benefits of the proposed Delta Improvement Program for urban Southern California include:

- Increased water supply for regional groundwater and surface water storage initiatives (130 taf per year);
- Enhanced access to voluntary water transfers upstream of the Delta as foreseen in the Record of Decision;
- Continued Endangered Species Act assurances and supply reliability through implementation of a long-term Environmental Water Account;
- Achievement of SWP supply goals for 2020 adopted by the Metropolitan Water District Board in the Southern California IRP; and
- Enhanced operation of the diversified portfolio of supplies developed over the past decade in the IRP.

Metropolitan also has been working with Bay-Delta watershed users toward settling the question of how all Bay-Delta water users would bear some of the responsibility of meeting Delta flow requirements. In December 2002, all of the parties signed a settlement agreement known as "The Sacramento Valley Water Management Agreement" or "Phase 8 Settlement Agreement." The agreement resulted from the SWRCB Bay-Delta Water Rights Phase 8 proceedings. It includes work plans to develop and manage water resources to meet Sacramento Valley in-basin needs, environmental needs under the SWRCB's Water Quality Control Plan, and export supply needs for both water demands and water quality. The agreement specifies about 60 water supply and system improvement projects by 16 different entities in the Sacramento Valley. Its various conjunctive use projects will yield approximately 185 taf per year in the Sacramento Valley, and approximately 55 taf of this water would come to Metropolitan through its SWP allocation. The Agreement specifies a supply breakdown of 110 taf (60 percent) to the SWP and 75 taf (40 percent) to the CVP.

Based on the work plans for CALFED's Bay-Delta Program and the Sacramento Valley Management Agreement, expected dry-year supply capabilities are projected to be 55 taf for the period 2010 through 2015, and 110 taf beyond 2015.

Rationale For Expected Supply

Implementation Status
Expected supplies are projected in accordance with the approved implementation plan for CALFED's Bay-Delta Program and with the work plans for the Sacramento Valley Water Management Agreement.

Written Contracts or Other Proof
Metropolitan's projected dependable annual and dry-year supplies from planned Bay-Delta improvements are based on Metropolitan Board actions and agreements.

- CALFED's Bay-Delta Program.
  - Bay-Delta Accord approved in December 1994.[13]
  - Proposition 204 funds approved by voters in November 1996.
  - Metropolitan policy direction regarding CALFED's Bay-Delta Program adopted in July 1999. This policy direction established water supply goals.
  - Proposition 13 funds approved by voters in March 2000.
  - CALFED Framework announced in June 2000[14].
  - Final implementation plans for the first phase of CALFED's Bay-Delta Program approved in August 2000, in conjunction with the approval of the Program and conclusion of the environmental review process.
  - Proposition 50 funds approved by voters in November 2002.
  - Annual Federal appropriations.
- Sacramento Valley Water Management Agreement.[15]
  - Work plans detailing projects that could provide benefits by the 2002 and 2003 water years were developed in October 2001.
  - Statement of settlement policy principles recommended in December 2001 by negotiators for approval.
  - Statement of settlement policy principles approved by Metropolitan's Board in January 2002.
  - A Sacramento Valley Water Management Agreement was signed and approved by settlement parties in December 2002.

Financing

Funding for DIP will come from federal, state, and local water supplier sources. Final cost-sharing arrangements for DIP are still under negotiation. Metropolitan expects a funding proposal for DIP and related CALFED actions by the end of 2005.

Phase 8 funding is structured as follows. The agreement calls for 185 taf per year to be produced in below normal, dry and critical years with the ability of Central Valley water agencies to preclude delivery in above-normal years if it impairs their ability to perform in other years. The water is divided equally into two blocks: Block 1 is for local use in the Central Valley and if not

[13] A copy of this agreement can be found at http://calwater.ca.gov/Archives/GeneralArchive/SanFranciscoBayDeltaAgreement.shtml.
[14] California's Water Future: A Framework for Action can be found at http://calwater.ca.gov/Archives/GeneralArchive/adobe_pdf/new_final_framework.pdf.
[15] A copy of this agreement can be found at http://www.norcalwater.org/pdf/agreementfinal.pdf

needed, it becomes available to exporters (the predominant expectation of all); Block 2 is settlement water, available to meet flow standards/exports, except as noted above. Exporters have to buy an equal amount of Block 1 and Block 2 water if it is made available. Capital expenditures for infrastructure needed to deliver this water are assumed to be financed with public/bond funds. O&M expenses are shared for Block 2 on a 50-50 basis. For Block 1 water the price schedule is fixed at $50/af in above normal, $75 in below normal, $100 in dry and $125 in critical years. This price schedule is indexed to a cost-of-living index.

Federal, State, and Local Permits/Approvals

- CALFED's Bay-Delta Program.
  - Programmatic Environmental Impact Report/Statement finalized in July 2000.
  - Record of Decision issued in August 2000 for the final Programmatic Environmental Impact Report/Statement regarding the CALFED Bay-Delta Program.
- Sacramento Valley Water Management Agreement.
  - Settlement parties approved Sacramento Valley Management Agreement in December 2002.
  - Environmental review will be conducted by the applicable lead agencies on the various work plan projects to comply with the California Environmental Quality Act, and as appropriate the National Environmental Policy Act.

G. Kern Delta Water Management Program

Source Of Supply

In December 1999 Metropolitan advertised a request for proposals for participation in "The California Aqueduct Dry-year Transfer Program." As a result of this request for proposals, four programs, including one from the Kern Delta Water District (Kern Delta), were selected for further consideration. In 2001, Metropolitan entered into Principles of Agreement with Kern Delta for the development of a Dry-year supply program. Kern Delta serves 125,000 acres of actively farmed highly productive farmland located in the San Joaquin Valley portion of southern Kern County. Kern Delta has under contract 180 taf per year of good quality highly reliable pre-1914 Kern River water and 25.5 taf per year of SWP Table A contract right (under contract with Kern County Water Agency).

The dry-year supply program between Kern Delta and Metropolitan involves the storage of water with Kern Delta. In years of plentiful supply the agreement allows Metropolitan to store water in Kern Delta's groundwater basin, either through direct spreading operations or through deliveries to growers in Kern Delta's service area. Metropolitan has the ability to store up to 250 taf of water. Agreement provisions may allow for storage beyond this amount. When needed, Metropolitan can recover its stored water either through direct pumping of the groundwater or exchange at a rate of 50 taf per year. The program duration will be from 2002 to 2027 with provisions that allow the water to be withdrawn until 2033.

Expected Supply Capability

The Kern Delta/Metropolitan Program provides Metropolitan with the capacity to store up to 250 taf of water at any one time. When needed, Metropolitan can recover its stored water either through direct pumping of the groundwater or exchange at a rate of 50 taf per year.

Rationale For Expected Supply

<u>Implementation Status</u>
Expected supplies are projected in accordance with accepted detailed groundwater modeling that has been accomplished for the program. In addition, the Kern Delta/Metropolitan Water Management Program was operational and accepting water for storage by fall of 2003. Metropolitan had 42 taf in storage as of the end of 2004 and expects to add up to 20 taf during 2005.

<u>Written Contracts or Other Proof</u>
- <u>2001 Kern Delta/Metropolitan Principles of Agreement</u>. Principles of agreement were entered into between Kern Delta and Metropolitan in June 2001, covering program costs, operational aspects and risks/responsibilities.
- <u>2002 Kern Delta and Metropolitan Boards of Directors Approval.</u> These actions approved execution of the Long-term Agreement, which delineates program operations, costs, and risks/responsibilities

Financing

Metropolitan's O&M budget (referenced above) includes payments for the Kern Delta/Metropolitan Program.

Federal, State and Local Permits/Approvals

Kern Delta, acting as lead agency under CEQA has prepared a full Environmental Impact Report. As part of this EIR, Kern Delta published a Notice of Preparation, and held meetings with the general public, interested agencies and resource agencies. In November 2002 the Final EIR certified by Kern Delta and adopted by Metropolitan.

H. Central Valley Transfers

Source Of Supply

Up to 27 million acre-feet of water (80 percent of California's developed water) is delivered for agricultural use every year. Over half of this water is used in the Central Valley; and much of it is delivered by, or adjacent to, SWP and Central Valley Project (CVP) conveyance facilities. This allows for the voluntary transfer of water to many urban areas, including Metropolitan, via the California Aqueduct.

Recent events indicate that a portion of this water could be available to Metropolitan through mutually beneficial transfer agreements:

- The Governor's Water Bank (Bank) in 1991, 1992, and 1994 secured 140 to 820 taf per year of water supply. Further, the Department of Water Resource's (DWR's) Dry Year Water Purchase Program (Purchase Program) in 2001, 2002 and 2003 secured a total of 162 taf. The DWR established and administered the Bank and the Purchase Program by facilitating purchasing water from willing sellers and transferring the water to those with critical needs using the State Water Project (SWP) facilities. Sellers, such as farmers and water districts, made water available for the Bank and Purchase Program by fallowing crops, shifting crops, releasing surplus reservoir storage, and by substituting groundwater for surface supplies.
- Under the Central Valley Improvement Act, passed by Congress in October 1992, water agencies that are not contractors with the Central Valley Project (CVP), such as Metropolitan, may for the first time be able to acquire a portion of the CVP's 7.8 million acre-feet per year of supply.
- In 2003, Metropolitan secured options to purchase approximately 145 taf of water from willing sellers in the Sacramento Valley during the irrigation season. Using these options, Metropolitan purchased approximately 125 taf of water for delivery to the California Aqueduct.
- In 2005, Metropolitan, in partnership with three other State Water Contractors, secured options to purchase approximately 130 taf of water from willing sellers in the Sacramento Valley during the irrigation season, of which Metropolitan's share was 113 taf. Metropolitan also had the right to assume the other State Water Contractors options if they chose not to exercise their options. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not exercise these options.

Expected Supply Capability

Metropolitan's water transfer activities in 2003 and 2005 have demonstrated Metropolitan's ability to develop and negotiate water transfer agreements working directly with the agricultural districts that are selling the water. In critically dry-years or periods of prolonged drought, Metropolitan also anticipates working closely with DWR, USBR, and other water users to implement statewide programs similar to the Drought Water Banks operated by DWR in the early 1990s. Such statewide programs have a potential to secure large volumes of transfer water. For example, in 1991, DWR's Drought Water Bank secured over 800 taf of water transfer supplies within a short period from a limited group of sellers. On average, Metropolitan expects to be able to purchase 125 taf in dry years for delivery via the California Aqueduct.

Rationale For Expected Supply

<u>Historical Record</u>
Metropolitan has made rapid progress to date developing Central Valley transfer programs. This progress may be attributed to several factors, including Metropolitan dedicating additional staff to identify, develop, and implement Central Valley storage and transfer programs; increased willingness of Central Valley agricultural interests to enter into storage and transfer programs with Metropolitan; and Metropolitan staff's ability to work with California Department of Water Resources and US Bureau of Reclamation staff to facilitate Central Valley storage and transfer programs. The availability of dry year supplies from the Bank, Purchase Program, and/or Water Transfer Program has been demonstrated 1991, 1992, 1994, 2001,2002, 2003, and 2005.

The historical record for purchases from the Bank, Purchase Program, and Metropolitan-initiated Central Valley programs in 2003 and 2005, as well as the number of sellers and buyers participating in these Programs, are strong indicators that there are significant amounts of water that can be purchased through spot market water transfers during dry years. This historical record is summarized in the table below.

Table A.3-1
Historical Record of Central Valley Water Transfers

Program	Purchases (acre-feet per year)		Participants	
	Total	Metropolitan	Seller	Buyers
1991 Governor's Water Bank	820,000	215,000	351	13
1992 Governor's Water Bank	193,246	10,000	18	16
1994 Governor's Water Bank	220,000	100	6	15
2001 Dry-Year Purchase Program	138,000	80,000	9	8
2003 Water Transfer Program	167,200	167,200	11	1
2005 Water Transfer Program*	130,000	113,000	3	4

* Quantities denote options to purchase. Metropolitan chose not to exercise its options due to improved hydrologic conditions.

Written Contracts or Other Proof

- Executive Order. In response to the extended 1987-92 drought, Governor Wilson issued an executive order establishing a Drought Action Team. This team, made up of state and federal officials, developed an action plan to lessen the impacts of the continuing drought (State 1991). One of the proposed actions was the formation of an emergency water bank managed by DWR. The purpose of the bank would be to help California's urban, agricultural, and environmental interests meet their critical water supply needs.
- Agreements with Buyers. Preceding the implementation of the 1995 and 2001 Water Banks, contracts were executed between DWR and agencies interested in buying. The essential terms and conditions for negotiating purchases, including maximum offering price, quantity of water needed, and the timing of delivery, were established in these contracts.
- Agreements with Sellers. Purchases of water for the Bank and Purchase Program have been secured through written contracts signed by DWR and sellers. In addition, Metropolitan entered into agreements with sellers for its 2003 and 2005 Central Valley water transfer programs.
- 1999 Board Directive. Metropolitan's Board has authorized water transfers in accordance with the Water Surplus and Drought Management Plan (WSDM Plan) adopted in April 1999. The WSDM Plan is a comprehensive policy guideline for managing Metropolitan's water supply during periodic surplus and shortage conditions. During shortage conditions, the plan specifies the type, priority and timing of drought actions, including the purchase of transfers on the spot market that could be taken in order to prevent or mitigate negative impacts on retail demands.

Financing

Funds for Central Valley water transfers are included in the O&M budget.

Federal, State, and Local Permits/Approvals

- Environmental Impact Report for the Bank. In November 1993, DWR prepared and finalized a programmatic Environmental Impact Report for the operation of the drought water banks during future drought events.
- Individual CEQA and NEPA documents for Metropolitan's 2003 and 2005 Central Valley water transfer programs. Individual sellers prepared CEQA documentation to support their transfers. In addition, the U.S. Bureau of Reclamation prepared NEPA documentation for those transfers requiring federal approval.

A.3.3 In-Basin Storage Deliveries

A. Surface Storage

Source Of Supply

Surface storage is a critical element of Southern California's water resources strategy. Because California experiences dramatic swings in weather and hydrology, surface storage is important to regulate those swings and mitigate possible supply shortages. Surface storage provides a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. Since the early twentieth century the Department of Water Resources and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir and Metropolitan's recently completed Diamond Valley Lake. Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 acre-feet, are used solely for regulatory purposes. The remaining surface reservoirs are primarily used to meet emergency, drought and seasonal requirements. The total gross storage capacity for these larger remaining reservoirs is 1,768,100 acre-feet. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,669,100 acre-feet.

Expected Supply Capability

Surface storage reservoirs are an important tool that allows Metropolitan to meet the water needs of its service area. As discussed in the Final Environmental Impact Report for the Eastside Reservoir (DVL) Project dated October 1991, in Southern California's Integrated Resources Plan, dated March 1996, and in the IRP Update finalized in 2004, the allocation of available surface storage can be divided into two primary components: emergency, and drought/seasonal. As specified by Metropolitan's Board of Directors in the Final EIR for DVL, "Metropolitan shall maintain sufficient water reserves within its service area to supplement local production during an emergency, or severe water shortage." With DVL in operation, Metropolitan can now re-operate the surface reservoirs and meet the Board's stated objectives.

<u>Updated Emergency Storage Requirements</u>: Metropolitan's criteria for determining emergency storage requirements, which was approved by Metropolitan's Board, was established in the Final EIR for DVL and further discussed in the IRP. Emergency Storage requirements are based on the potential for a major earthquake to damage the Colorado River Aqueduct, Los Angeles Aqueduct, and both branches of the California Aqueducts that could force the aqueducts out of service for 6 months. During this period, all interruptible service deliveries would be suspended, a mandatory reduction in water use of 25 percent from normal-year demand levels would be instituted, water stored in surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available, and full local groundwater production would be sustained.

The storage reserved in system reservoirs for emergency purposes changes over the next 20 years in accordance with the projected demands on Metropolitan as shown below. The residual storage available to meet other needs, dry-year/seasonal, is also shown below and discussed in greater detail in this appendix.

TableA.3-2
Surface Storage Utilization

	Average Year Storage Projection				
	2010	**2015**	**2020**	**2025**	**2030**
Surface Storage in MWD Service Area	1,625,700	1,625,700	1,625,700	1,625,700	1,625,700
Emergency	651,000	639,000	688,000	735,000	784,000

Determined in accordance with Metropolitan Board policy objectives, the Integrated Resources Plan dated March 1996, and the IRP Update.

Updated Storage Requirements for Dry-Year Supply and Seasonal Needs: Storage capacity in system reservoirs, including DVL, is also earmarked for dry-year supply and system regulation purposes. Dry-year supply storage within Metropolitan's service area is required to meet the additional water demands that occur during single-year and extended droughts. As specified in the Final EIR for DVL and further discussed in the IRP, this storage requirement is defined as the difference between average-year demand and above average demand during dry years. In addition to dry-year storage, seasonal storage is required to meet seasonal peak demands, which are defined as the difference between average winter demands and average summer demands. The dry-year supply and seasonal storage also provides sufficient reserves to permit approximately 5 percent downtime for rehabilitation, repair and maintenance of raw water transmission facilities.

Historical Record
Metropolitan has a contract with the Department of Water Resources that allows use of DWR's terminal reservoirs, such as Lake Castaic on the West Branch and Lake Perris on the East Branch of the California Aqueduct. Metropolitan makes annual payments to the DWR based on the amount of water delivered, percentage of facilities actually used, power, operations, maintenance and other charges. In addition, Metropolitan owns and operates surface reservoirs such as Lake Skinner, Lake Mathews and Diamond Valley Lake to enhance water supply reliability for its Member Agencies.

Written Contracts or Other Proof of Usage
The Surface Reservoirs used by Metropolitan are available either by contract (in the case of the DWR terminal reservoirs) or by construction of its own facilities. The following historical record is provided:

- November 1960 Contract between the State of California Department of Water Resources and the Metropolitan Water District of Southern California for a Water Supply. This Contract and its numerous amendments describe Metropolitan's legal access to and obligations for the operation of the State Water Project for the benefit of its Contractors. Metropolitan has an entitlement to 2,050,000 acre-feet of water each year subject to availability. The terms of this Contract describe Metropolitan's rights to and obligations for the terminal surface reservoirs for water supply purposes.

- November 1974 Memorandum of Understanding and Agreement on Operation of Lake Skinner. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.
- November 1999 Memorandum of Understanding on Operation of Diamond Valley Lake. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.
- Elderberry Forebay Contract for Conditions for Use. Conditions for Use of storage are described in the Contract Between the Department of Water Resources, State of California, and the Department of Water and Power, City of Los Angeles, for Cooperative Development, West Branch, California Aqueduct; Amendment No. 1, July 3, 1969; and Amendment No. 4, June 27, 1985.
- June 2002 Division of Safety of Dams Certificate of Approval. The Department of Water Resources, Division of Safety of Dams issued the Certificate of Approval for operation of Diamond Valley Lake in early 2000, with three conditions. These conditions were: (1) Satisfactory operation of the butterfly valves and emergency gate in the inlet/outlet tower, (2) completion of the Tank Saddle Cutoff remediation and (3) completion of the Signal Spillway. Metropolitan completed these conditions in 2001 and the Diamond Valley Lake is currently operational in accordance with the Certificate of Approval.
- October 1991 Final Environmental Impact Report for the Eastside Reservoir Project (DVL). The EIR established criteria for integrating the operations of Metropolitan's reservoirs and DWR's southern reservoirs for emergency purposes. These criteria also provided that Metropolitan reservoirs could be expected to withdraw all drought storage water within a two-year period.

B. Flexible Storage Use Of Castaic Lake And Lake Perris

Source Of Storage

The flexible storage use of Castaic Lake and Lake Perris, SWP reservoirs, provides Metropolitan with dry-year supply. The State Water Project (SWP) contractors participating in repayment of the capital costs of Castaic Lake and Lake Perris have the contract right to withdraw SWP water from these reservoirs in addition to their allocated supply in any year on an as-needed basis. These contractors must replace the water withdrawn under this program within five years of the first withdrawal. This storage is referred to as "flexible storage". It is available in Castaic Lake to Metropolitan, Ventura County Flood Control and Water Conservation District, and to the Castaic Lake Water Agency. It is available in Lake Perris to Metropolitan only.

Expected Supply Capability

The dry year supply available to Metropolitan from the flexible storage use of Castaic Lake and Lake Perris totals 218, 940 af, made up of 153,940 af in Castaic Lake and 65,000 af in Lake Perris. Table A.3-3 shows the use of this available supply in accordance with Metropolitan's operating criteria:

TableA.3-3
Estimated Water Supplies Available for Metropolitan's Use
Under the Flexible Storage Use of Castaic Lake and Lake Perris *
(thousand acre-feet per year)

Year	Multiple Dry-Years (1990-1992)	Single Dry Year (1997)
2010	73	219
2015	73	219
2020	73	219
2025	73	219
2030	73	219

Source: Metropolitan's operating criteria.

Seismic concerns have arisen at the Lake Perris dam. In response, DWR plans to reduce the storage amount at Lake Perris by half until those concerns can be studied and addressed. In the long-term, the reduction in storage may potentially impact the amount of flexible storage available to Metropolitan from Lake Perris, and also impact the total amount of emergency storage available.

Rationale For Expected Supply

<u>Implementation Status</u>
Express provisions related to flexible storage have been incorporated in Metropolitan's SWP contract since 1995. The operating options have been available for use since that time and will continue to be in effect indefinitely as a part of the SWP contracts.

<u>Historical Record</u>
Metropolitan has exercised the flexible storage provision in 2000, 2001 and 2002. Its use is based on existing contract provisions.

- <u>DWR Bulletin 132-94</u>. The use of Castaic Lake and Lake Perris is determined in accordance with the proportionate use factors from Bulletin 132-94, Table B, upon which capital cost repayment obligations are based. Based on its capital repayment obligations, Metropolitan's proportionate use of Castaic Lake is 96.2 percent and of Lake Perris is 100 percent. Per its SWP contract, Metropolitan has express rights to use certain portions of the SWP southern reservoirs independently of DWR to supply water in amounts in addition to approved SWP deliveries.
- <u>Metropolitan's SWP Contract</u>. Metropolitan's SWP contract was amended in 1995 to include Article 54, "Usage of Lakes Castaic and Perris." This article provides flexible storage to contractors participating in repayment of the capital costs of Castaic Lake and Lake Perris. Each contractor shall be permitted to withdraw up to a Maximum Allocation from Castaic Lake and Lake Perris. These contractors may withdraw a collective Maximum

Allocation up to 160 taf in Castaic Lake and 65 taf in Lake Perris, which shall be apportioned among them pursuant to the respective proportionate use factors, as follows:

Table A.3-4
Flexible Storage Allocations

Participating Contractor	Proportionate Use Factor	Maximum Flexible Storage Allocation (acre-feet)
Castaic Lake		
Metropolitan	.96212388	153,940
Ventura County Flood Control and Water Conservation District	.00860328	1,376
Castaic Lake Water Agency	.02927284	4,684
Total Castaic Lake	**1.00000000**	**160,000**
Lake Perris		
Metropolitan	**1.00000000**	**65,000**

Financing

The cost associated with the withdrawal and replacement of water in the flexible storage is included in Metropolitan's annual payments under the State Water Contract.

Federal, State, and Local Permits/Approvals

The flexible storage provision became effective in 1995. DWR has the approval authority to affect changes in the operations and usage of existing SWP facilities, including Castaic Lake and Lake Perris.

C. Metropolitan Surface Reservoirs

Source Of Supply

Storage capacity in Metropolitan reservoirs, including Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir and Metropolitan's recently completed Diamond Valley Lake, is earmarked to meet emergency, dry-year/seasonal and system regulation needs, as these have been defined above.

Expected Supply Capability

The total available storage capacity for all Metropolitan-controlled surface reservoirs (Metropolitan-owned and DWR terminal reservoirs) is 1,625,700. As discussed earlier, approximately 651 taf in 2010 rising to 735 taf acre-feet in 2025 has been set aside to meet the emergency storage requirements of the service area. After accounting for emergency storage, the surface storage available in Metropolitan-owned reservoirs to meet dry-year/seasonal requirements is presented below:

Table A.3-5
Estimated Supplies Available From Metropolitan's Surface Storage
(thousand acre-feet)

Year	Multiple Dry-Years (1990-1992)	Single Dry Year (1977)
2010	244	733
2015	248	745
2020	232	697
2025	217	650
2030	200	601

Source: Metropolitan analysis

Rationale for Expected Supply

Program Facilities
Major facilities for Lake Mathews include an earthen dam to impound water and a recently completed new outlet tower. Major facilities for Lake Skinner include an earthen dam to impound water, an outlet tower, a inlet from the San Diego Canal to deliver water into the reservoir, a water treatment filtration facility, and recreational facilities consisting of a marina, parks, swimming areas, golf course, and hiking trails. Major facilities at Diamond Valley Lake include three earthen dams to impound water, an inlet/outlet tower, a secondary inlet from the Inland Feeder, a large pumping station to deliver water into the reservoir, and power generating facilities. Recreational facilities consisting of a marina, parks, swimming areas, golf course, hiking trails, equestrian trails and lodging are planned.

Historical Record
The Diamond Valley Lake is currently operational and is essentially full. Lake Mathews and Lake Skinner have been service for over 30 years and are currently available for full operations.

- November 1974 Memorandum of Understanding and Agreement on Operation of Lake Skinner. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.
- October 1991 Final Environmental Impact Report for the Eastside Reservoir Project (DVL). The EIR established criteria for integrating the operations of Metropolitan's reservoirs and DWR's southern reservoirs for emergency purposes. These criteria also provided that Metropolitan reservoirs could be expected to withdraw all drought storage water within a two-year period.

- November 1999 Memorandum of Understanding on Operation of Diamond Valley Lake. This MOU, signed by Metropolitan and other affected parties, governs Metropolitan's operations of Lake Skinner in Riverside County. The DWR Division of Safety and Dams also reviews monitoring data on the safety of the dam annually.
- June 2002 Division of Safety of Dams Certificate of Approval. The Department of Water Resources, Division of Safety of Dams issued the Certificate of Approval for operation of Diamond Valley Lake in early 2000, with three conditions. These conditions were: (1) Satisfactory operation of the butterfly valves and emergency gate in the inlet/outlet tower, (2) completion of the Tank Saddle Cutoff remediation and (3) completion of the Signal Spillway. Metropolitan completed these conditions in 2001 and the Diamond Valley Lake is currently operational in accordance with the Certificate of Approval.

Financing

The capital cost of Diamond Valley Lake, Lake Mathews and Lake Skinner was financed by a combination of revenue bonds and operating revenues. Annual operating costs, including maintenance and pumping, are included in Metropolitan's annual O&M budget (referenced above).

Federal, State, and Local Permits/Approvals

All necessary permits have been obtained. A permit to generate and sell power has been acquired from the Federal Energy Regulatory Commission. No further regulatory permits are required.

D. Groundwater Conjunctive Use Programs

Source Of Supply

The Integrated Resources Plan (IRP) approved by the Metropolitan Board established Metropolitan's strategy to store imported water that is most available during wet years in surface reservoirs or groundwater aquifers for later use during droughts and emergencies. In this way, Metropolitan can reduce its reliance on direct deliveries from the State Water Project (SWP) and the Colorado River during dry years when competing demands by other users and risks to the watershed ecosystems are greatest. During the development of the IRP and in cooperation with Metropolitan, the Association of Groundwater Agencies (AGWA) undertook a study to examine the potential for groundwater storage. AGWA, which is composed of representatives from six major basins in Southern California, was created to work collectively on groundwater issues, including conjunctive use of imported water. The findings of the AGWA study indicated that up to 1.5 million acre-feet of total storage capacity could be dedicated to regional storage of imported supplies.

Use of current facilities, along with some facilities improvements, could result in up to 350 taf of additional groundwater production as a result of storing imported water over the next 20 to 30 years. Based on the AGWA study, the 1996 IRP set a resource objective to develop about 275 taf per year of dry-year supply from in-basin groundwater storage by 2010 and 300 taf per year by 2020. These targets were maintained in the 2004 Update of the IRP. Groundwater conjunctive use capabilities are being developed in accordance with the IRP as described in the body of this report.

Rationale For Expected Supply

Implementation Status:
The status of implementation for the groundwater conjunctive use programs has been described in the body of this report.

Historical Record
- Long-term Replenishment Program. As a result of Metropolitan's Long-term Replenishment Program, local agencies are currently storing available imported water in order to maintain groundwater production during the summer season and dry years. Based on the historical record for replenishment deliveries, it is estimated that an average of 100 taf per year of groundwater supply is produced as a result of Metropolitan's existing Long-term Replenishment Program.
- The Main San Gabriel Cyclic Agreement. This was originally signed in 1979 for a term of five years. It has since been renewed five times, each time for a five-year term. It currently expires in 2009, but is expected to be renewed repeatedly in future.
- North Las Posas Groundwater Storage Program. Two phases of the program's ASR wells have been constructed, providing approximately 8 taf per year of replenishment capacity and 12 taf per year of withdrawal capacity. As of June 30, 2005, 48 taf are in storage. Upon completion of the Moorpark pipeline pumpstation by Calleguas MWD in 2007, the wellfield will be fully operational and able to pump 47 taf per year of stored water from the basin. This agreement is in place for forty years, through 2035.

As of August 1, 2005, approximately 125 taf of water has been stored in contractual dry-year storage programs in the North Las Posas, Chino, Orange County, Live Oak, Central, and Raymond groundwater basins.

Written Contracts or Other Proof
Metropolitan's dry-year supply from the ground water conjunctive use programs is based on Metropolitan's Board actions and agreements.
- Approval of Long-term Replenishment Program. Beginning in fiscal year 1989-90, Metropolitan implemented the Long-term Replenishment Program. The continuation of this program was reaffirmed as part of the new rate structure that was approved by Metropolitan's Board in October 2001.
- Agreements for North Las Posas Groundwater Storage Program. An Agreement between Metropolitan and Calleguas Municipal Water District (Calleguas) was executed in June 1995 and amended in May 1998. The term of the Agreement extends to2035.
- Proposition 13 Groundwater Conjunctive Use Programs Operational by 2010.
  - AGWA study dated month 1994, identifying the potential storage capacity and return capabilities from groundwater conjunctive use programs.
  - Principles for groundwater storage adopted by the Metropolitan Board in January 2000.
  - Resolution for Proposition 13 Funds adopted by the Metropolitan Board in October 2000.
  - Agreement executed with the California Department of Water Resources for Interim Water Supply Construction Grant Commitment Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection (Proposition 13, Chapter 9, Article 4)

providing for Metropolitan to administer $45 million in state Proposition 13 grant funds for groundwater reliability programs; October 2000
  - Agreement executed for Long Beach Conjunctive Use Project, July 2002
  - Agreement executed for Live Oak Conjunctive Use Project, October 2002
  - Agreement executed for Foothill Area Groundwater Storage Project, February 2003
  - Agreement executed for Chino Basin Programs, June 2003
  - Agreement executed for Orange County Groundwater Storage Program, June 2003
  - Agreement executed for Compton Conjunctive Use Program, February 2005
  - Agreement executed for Long Beach Conjunctive Use Project—Expansion in Lakewood, July 2005

All of these programs have an initial 25 year term, with provision for renewal or extension after that period.

Financing

Financing has been supplied from multiple sources as discussed below:

- <u>Financing for Long-term Replenishment Program</u>. No capital or O&M costs are associated with the implementation of the Long-term Replenishment Program. Rather, Metropolitan provides a discounted water rate to encourage member agencies to take delivery of surplus water for storage purposes.
- <u>Financing for North Las Posas Groundwater Storage Program</u>.
  - Metropolitan's Board appropriated $6 million to construct wells and appurtenant facilities in Phase 1 of the program in June 1995.
  - Metropolitan's Board appropriated $25 million to construct wells and appurtenant facilities Phase 2 of the program in January 1998.
  - Metropolitan has reimbursed Calleguas MWD for over $28 million for capital facilities for this program.

- <u>Financing for Proposition 13 and Additional Groundwater Storage Programs.</u>
  - Metropolitan's Board appropriated $210,000 to conduct initial environmental, engineering and planning studies for the Raymond Basin storage program in January 2000.
  - Proposition 13 funds ($45 million) were allocated to Metropolitan by the state in May 2000 for the development of local groundwater storage projects.
  - Metropolitan has executed groundwater storage funding agreements committing over $39 million of the Proposition 13 funds for seven storage programs and has appropriated over $35 million of Metropolitan capital funds for the storage programs in the Orange County and Chino groundwater basins. For these seven Proposition 13 programs, over $30 million of Prop 13 and Metropolitan capital funds have been expended for design and construction of program facilities.
  - Metropolitan's long-term capital program (referenced above) includes $210 million to implement groundwater conjunctive use programs through 2020.

Table A.3-6 provides details of funding for specific groundwater storage programs.

Table A.3-6
Metropolitan's In-Region Groundwater Storage Programs
June 21, 2005

Program	Metropolitan Agreement Partners	Agreement Execution Date	Max Storage AF	Dry-Year Yield AF/Yr	Capital Funding
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002	13,000	4,300	$4.5 million – Prop. 13 funds
Foothill Area Groundwater Storage Program (Monk hill/Raymond Basin)	Foothill MWD	February 2003	9,000	3,000	$1.7 million – Prop. 13 funds
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003	60,000+	20,000	$29.8 million: $15.0 million – Prop 13 $14.8 million – Met CIP*
Chino Basin Programs	IEUA TVMWD Watermaster	June 2003	100,000	33,000	$27.5 million: $9.0 million – Prop 13 $18.5 million – Met CIP*
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of LaVerne	October 2002	3,000	1,000	$3.3 million – Prop 13
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005	2,289	763	$2.43 million – Prop 13
Metropolitan—Calleguas MWD Groundwater Storage Project (North Las Posas Basin)	Calleguas MWD	1995, amended 1999	210,000	47,000 (70,000)	$31 million – Met CIP* $28.2 million expended.
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach Metropolitan	July 2005	3,600	1,200	$3.1 million – Prop 13
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD Metropolitan	Sept. 2005 Board	3,000	1,000	$1.23 million – Prop 13
TOTAL			**403,889**	**111,263**	**$40.26 million – Prop 13#** **$61.5 million – Met CIP***

* Metropolitan's Capital Investment Plan
# $4.7 million of Prop 13 funds requires reallocation. Per letter to Metropolitan's Executive Committee in Aug 2004, staff indicated that funds would be substituted for Metropolitan CIP funds on the Proposition 13 projects. Discussions are underway with IEUA to explore options for using those funds for increased storage.

Federal, State, and Local Permits/Approvals

- Final EIR for North Las Posas Groundwater Storage Program. Environmental Impact Report for the North Las Posas Groundwater Storage Program was certified by Calleguas Municipal Water District, lead agency, and by Metropolitan, responsible agency, in April 1995 and June 1995, respectively.
- Long Beach Conjunctive-use Storage Project. Environmental documentation for the Long Beach Conjunctive-use Storage Project was certified by the City of Long Beach in August 2001.
- Live Oak Basin Conjunctive-use Storage Project. Environmental documentation for the Live Oak Basin Conjunctive-use Storage Project was certified by Three Valleys MWD in January 2002.
- Foothill Area Groundwater Storage Project. Environmental documentation for the Foothill Area Groundwater Storage Project was certified by Foothill Municipal Water District in January 2003.
- Chino Basin Programs Groundwater Storage Project. Environmental documentation for the Chino Basin Programs Groundwater Storage Project was certified by Inland Empire Utility Agency in December 2002.
- Long Beach Conjunctive Use Storage Project -- Expansion in Lakewood. Environmental documentation for the project was certified by the City of Lakewood in May 2005.
- City of Compton Conjunctive Use Program. Environmental documentation for the project was certified by the City of Compton in December 2004.
- Orange County Groundwater Conjunctive Use Program. Environmental documentation for the project was certified by Orange County Water District in March 1999 and in July 2002.
- Environmental Review for 2010 Programs. Environmental review of the 2010 Groundwater Conjunctive Use Programs will be completed prior to signing agreements.

The following Table A.3-7 shows the detailed water supply forecasts by water source, in five-year increments and for single dry-year, multiple dry years and average years. Table A.3-8 shows the minimum supplies expected over the next three years.

Table A.3-7
Details of Projected Supplies

Colorado River Aqueduct Program Capabilities Year 2010 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Base Apportionment – Priority 4	526,000	526,000	526,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment	0	0	30,000
PVID Land Management Program	111,000	111,000	70,000
Subtotal of Current Programs	***722,000***	***722,000***	***711,000***
Programs Under Development			
Hayfield Storage Program	0	0	0
Lower Coachella Storage Program	0	0	0
Chuckwalla Storage Program	0	0	0
Salton Sea Restoration Transfer	95,000	95,000	0
Subtotal of Proposed Programs	***95,000***	***95,000***	***0***
Less: Coachella SWP/QSA Transfer	0	0	0
Maximum Metropolitan Supply Capability	**817,000**	**817,000**	**711,000**
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	70,000	70,000	70,000
Coachella & All-American Canals Lining	94,000	94,000	94,000
Maximum CRA Supply Capability [1]	**981,000**	**981,000**	**875,000**
Maximum Expected CRA Deliveries	**981,000**	**981,000**	**875,000**

[1] Colorado River Aqueduct deliveries limited to 1.250 MAF annually

Table A.3-7
Details of Projected Supplies

Colorado River Aqueduct Program Capabilities Year 2015 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Base Apportionment – Priority 4	503,000	503,000	503,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment	0	0	20,000
PVID Land Management Program	111,000	111,000	70,000
Subtotal of Current Programs	***699,000***	***699,000***	***678,000***
Programs Under Development			
Hayfield Storage Program	100,000	100,000	0
Lower Coachella Storage Program	150,000	150,000	0
Chuckwalla Storage Program	0	0	0
Salton Sea Restoration Transfer	210,000	210,000	0
Subtotal of Proposed Programs	***460,000***	***460,000***	***0***
Less: Coachella SWP/QSA Transfer	(35,000)	(35,000)	(35,000)
Maximum Metropolitan Supply Capability	**1,124,000**	**1,124,000**	**643,000**
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	100,000	100,000	100,000
Coachella & All-American Canals Lining	94,000	94,000	94,000
Maximum CRA Supply Capability [1]	**1,318,000**	**1,318,000**	**837,000**
Maximum Expected CRA Deliveries	**1,250,000**	**1,250,000**	**837,000**

[1] Colorado River Aqueduct deliveries limited to 1.250 MAF annually

Table A.3-7
Details of Projected Supplies

Colorado River Aqueduct Program Capabilities Year 2020 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Base Apportionment – Priority 4	503,000	503,000	503,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment	0	0	19,000
PVID Land Management Program	111,000	111,000	70,000
Subtotal of Current Programs	***699,000***	***699,000***	***677,000***
Programs Under Development			
Hayfield Storage Program	100,000	100,000	0
Lower Coachella Storage Program	150,000	150,000	0
Chuckwalla Storage Program	150,000	150,000	0
Salton Sea Restoration Transfer	0	0	0
Subtotal of Proposed Programs	***400,000***	***400,000***	***0***
Less: Coachella SWP/QSA Transfer	(35,000)	(35,000)	(35,000)
Maximum Metropolitan Supply Capability	**1,064,000**	**1,064,000**	**642,000**
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	190,000	190,000	190,000
Coachella & All-American Canals Lining	94,000	94,000	94,000
Maximum CRA Supply Capability 1	**1,348,000**	**1,348,000**	**926,000**
Maximum Expected CRA Deliveries	**1,250,000**	**1,250,000**	**926,000**

[1] Colorado River Aqueduct deliveries limited to 1.250 MAF annually

Table A.3-7
Details of Projected Supplies

Colorado River Aqueduct Program Capabilities Year 2025 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Base Apportionment – Priority 4	503,000	503,000	503,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment	0	0	19,000
PVID Land Management Program	111,000	111,000	70,000
Subtotal of Current Programs	***699,000***	***699,000***	***677,000***
Programs Under Development			
Hayfield Storage Program	100,000	100,000	0
Lower Coachella Storage Program	150,000	150,000	0
Chuckwalla Storage Program	150,000	150,000	0
Salton Sea Restoration Transfer	0	0	0
Subtotal of Proposed Programs	***400,000***	***400,000***	***0***
Less: Coachella SWP/QSA Transfer	(35,000)	(35,000)	(35,000)
Maximum Metropolitan Supply Capability	**1,064,000**	**1,064,000**	**642,000**
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canals Lining	94,000	94,000	94,000
Maximum CRA Supply Capability 1	**1,358,000**	**1,358,000**	**936,000**
Maximum Expected CRA Deliveries	**1,250,000**	**1,250,000**	**936,000**

[1] Colorado River Aqueduct deliveries limited to 1.250 MAF annually

Table A.3-7
Details of Projected Supplies

Colorado River Aqueduct Program Capabilities Year 2030 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Base Apportionment – Priority 4	503,000	503,000	503,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment	0	0	19,000
PVID Land Management Program	111,000	111,000	70,000
Subtotal of Current Programs	***699,000***	***699,000***	***677,000***
Programs Under Development			
Hayfield Storage Program	100,000	100,000	0
Lower Coachella Storage Program	150,000	150,000	0
Chuckwalla Storage Program	150,000	150,000	0
Salton Sea Restoration Transfer	0	0	0
Subtotal of Proposed Programs	***400,000***	***400,000***	***0***
Less: Coachella SWP/QSA Transfer	(35,000)	(35,000)	(35,000)
Maximum Metropolitan Supply Capability	**1,064,000**	**1,064,000**	**642,000**
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canals Lining	94,000	94,000	94,000
Maximum CRA Supply Capability 1	**1,358,000**	**1,358,000**	**936,000**
Maximum Expected CRA Deliveries	**1,250,000**	**1,250,000**	**936,000**

[1] Colorado River Aqueduct deliveries limited to 1.250 MAF annually

Table A.3-7
Details of Projected Supplies

California Aqueduct Program Capabilities Year 2010 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
SWP Deliveries[1,2]	509,000	175,000	1,472,000
San Luis Carryover[3]	93,000	280,000	280,000
SWP Call-back of DWCV Table A Transfer	26,000	5,000	0
Central Valley Storage and Transfers			
Semitropic Program	107,000	107,000	0
Arvin Edison Program	90,000	90,000	0
San Bernardino Valley MWD Program	37,000	70,000	20,000
Kern Delta Program	50,000	50,000	0
Subtotal of Current Programs	***912,000***	***777,000***	***1,772,000***
Programs Under Development			
Delta Improvements[4]	55,000	55,000	185,000
Market Transfer Options	150,000	150,000	0
Central Valley Transfers/Purchases	125,000	125,000	0
Mojave Program	0	0	0
IRP SWP Target	0	0	0
Subtotal of Proposed Programs	***330,000***	***330,000***	***185,000***
Maximum Supply Capability	**1,242,000**	**1,107,000**	**1,957,000**

[1] Single Dry-year figure includes 76 TAF of additional SWP supplies in 1977 per DWR

[2] Multiple and Single Dry year figures include DWCV Table A supplies

[3] Includes DWCV carryover supplies

[4] Includes Phase 8 and increased pumping capacity

Table A.3-7
Details of Projected Supplies

California Aqueduct Program Capabilities Year 2015 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
SWP Deliveries[1,2]	509,000	175,000	1,472,000
San Luis Carryover[3]	93,000	280,000	280,000
SWP Call-back of DWCV Table A Transfer	26,000	5,000	0
Central Valley Storage and Transfers			
Semitropic Program	107,000	107,000	0
Arvin Edison Program	90,000	90,000	0
San Bernardino Valley MWD Program	37,000	70,000	20,000
Kern Delta Program	50,000	50,000	0
Subtotal of Current Programs	***912,000***	***777,000***	***1,772,000***
Programs Under Development			
Delta Improvements[4]	55,000	55,000	185,000
Market Transfer Options	0	0	0
Central Valley Transfers/Purchases	125,000	125,000	0
Mojave Program	35,000	35,000	0
IRP SWP Target	0	44,000	0
Subtotal of Proposed Programs	***215,000***	***259,000***	***185,000***
Maximum Supply Capability	**1,127,000**	**1,036,000**	**1,957,000**

[1] Single Dry-year figure includes 76 TAF of additional SWP supplies in 1977 per DWR

[2] Multiple and Single Dry year figures include DWCV Table A supplies

[3] Includes DWCV carryover

[4] Includes Phase 8 and increased pumping capacity

Table A.3-7
Details of Projected Supplies

California Aqueduct Program Capabilities Year 2020 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
SWP Deliveries[1,2]	509,000	175,000	1,472,000
San Luis Carryover[3]	93,000	280,000	280,000
SWP Call-back of DWCV Table A Transfer	26,000	5,000	
Central Valley Storage and Transfers			
Semitropic Program	107,000	107,000	0
Arvin Edison Program	90,000	90,000	0
San Bernardino Valley MWD Program	37,000	70,000	20,000
Kern Delta Program	50,000	50,000	0
Subtotal of Current Programs	***912,000***	***777,000***	***1,772,000***
Programs Under Development			
Delta Improvements[4]	110,000	110,000	240,000
Market Transfer Options	0	0	0
Central Valley Transfers/Purchases	125,000	125,000	0
Mojave Program	35,000	35,000	0
IRP SWP Target	29,000	80,000	0
Subtotal of Proposed Programs	***299,000***	***350,000***	***240,000***
Maximum Supply Capability	**1,211,000**	**1,127,000**	**2,012,000**

[1] Single Dry-year figure includes 76 TAF of additional SWP supplies in 1977 per DWR

[2] Multiple and Single Dry year figures include DWCV Table A supplies

[3] Includes DWCV carryover

[4] Includes Phase 8 and increased pumping capacity

Table A.3-7
Details of Projected Supplies

California Aqueduct Program Capabilities Year 2025 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
SWP Deliveries[1,2]	509,000	175,000	1,472,000
San Luis Carryover[3]	93,000	280,000	280,000
SWP Call-back of DWCV Table A Transfer	26,000	5,000	0
Central Valley Storage and Transfers			
Semitropic Program	107,000	107,000	0
Arvin Edison Program	90,000	90,000	0
San Bernardino Valley MWD Program	37,000	70,000	20,000
Kern Delta Program	50,000	50,000	0
Subtotal of Current Programs	***912,000***	***777,000***	***1,772,000***
Programs Under Development			
Delta Improvements[4]	110,000	110,000	240,000
Market Transfer Options	0	0	0
Central Valley Transfers/Purchases	125,000	125,000	0
Mojave Program	35,000	35,000	0
IRP SWP Target	29,000	80,000	0
Subtotal of Proposed Programs	***299,000***	***350,000***	***240,000***
Maximum Supply Capability	**1,211,000**	**1,127,000**	**2,012,000**

[1] Single Dry-year figure includes 76 TAF of additional SWP supplies in 1977 per DWR

[2] Multiple and Single Dry year figures include DWCV Table A supplies

[3] Includes DWCV carryover

[4] Includes Phase 8 and increased pumping capacity

Table A.3-7
Details of Projected Supplies

California Aqueduct
Program Capabilities
Year 2030
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
SWP Deliveries[1,2]	509,000	175,000	1,472,000
San Luis Carryover[3]	93,000	280,000	280,000
SWP Call-back of DWCV Table A Transfer	26,000	5,000	0
Central Valley Storage and Transfers			
Semitropic Program	107,000	107,000	0
Arvin Edison Program	90,000	90,000	0
San Bernardino Valley MWD Program	37,000	70,000	20,000
Kern Delta Program	50,000	50,000	0
Subtotal of Current Programs	***912,000***	***777,000***	***1,772,000***
Programs Under Development			
Delta Improvements[4]	110,000	110,000	240,000
Market Transfer Options	0	0	0
Central Valley Transfers/Purchases	125,000	125,000	0
Mojave Program	35,000	35,000	0
IRP SWP Target	29,000	80,000	0
Subtotal of Proposed Programs	***299,000***	***350,000***	***240,000***
Maximum Supply Capability	**1,211,000**	**1,127,000**	**2,012,000**

[1] Single Dry-year figure includes 76 TAF of additional SWP supplies in 1977 per DWR

[2] Multiple and Single Dry year figures include DWCV Table A supplies

[3] Includes DWCV carryover

[4] Includes Phase 8 and increased pumping capacity

Table A.3-7
Details of Projected Supplies

In Basin Storage Activities Program Capabilities Year 2010 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Metropolitan Surface Storage (DVL, Mathews, Skinner)	244,000	733,000	0
Flexible Storage in Castaic & Perris	73,000	219,000	0
Groundwater Conjunctive-use			
Long Term Replenishment and Cyclic Storage	86,000	86,000	0
North Las Posas Storage	47,000	47,000	0
Proposition 13 Storage	64,000	64,000	0
Subtotal of Current Programs	***514,000***	***1,149,000***	***0***
Programs Under Development			
Groundwater Conjunctive-use			
Raymond Basin	22,000	22,000	0
Prop 13 Storage Programs	1,000	1,000	0
Additional Programs[1]	55,000	55,000	0
Subtotal of Proposed Programs	***78,000***	***78,000***	***0***
Maximum Supply Capability	**592,000**	**1,227,000**	**0**

[1] Includes expansions of existing programs

Table A.3-7
Details of Projected Supplies

In Basin Storage Activities Program Capabilities Year 2015 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Metropolitan Surface Storage (DVL, Mathews, Skinner)	248,000	745,000	0
Flexible Storage in Castaic & Perris	73,000	219,000	0
Groundwater Conjunctive-use			
Long Term Replenishment and Cyclic Storage	86,000	86,000	0
North Las Posas Storage	47,000	47,000	0
Proposition 13 Storage	64,000	64,000	0
Subtotal of Current Programs	***518,000***	***1,161,000***	***0***
Programs Under Development			
Groundwater Conjunctive-use			
Raymond Basin	22,000	22,000	0
Prop 13 Storage Programs	1,000	1,000	0
Additional Programs[1]	80,000	80,000	0
Subtotal of Proposed Programs	***103,000***	***103,000***	***0***
Maximum Supply Capability	**621,000**	**1,264,000**	**0**

[1] Includes expansions of existing programs

Table A.3-7
Details of Projected Supplies

In Basin Storage Activities Program Capabilities Year 2020 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Metropolitan Surface Storage (DVL, Mathews, Skinner)	232,000	697,000	0
Flexible Storage in Castaic & Perris	73,000	219,000	0
Groundwater Conjunctive-use			
Long Term Replenishment and Cyclic Storage	86,000	86,000	0
North Las Posas Storage	47,000	47,000	0
Proposition 13 Storage	64,000	64,000	0
Subtotal of Current Programs	***502,000***	***1,113,000***	***0***
Programs Under Development			
Groundwater Conjunctive-use			
Raymond Basin	22,000	22,000	0
Prop 13 Storage Programs	1,000	1,000	0
Additional Programs[1]	80,000	80,000	0
Subtotal of Proposed Programs	***103,000***	***103,000***	***0***
Maximum Supply Capability	**605,000**	**1,216,000**	**0**

[1] Includes expansions of existing programs

Table A.3-7
Details of Projected Supplies

In Basin Storage Activities
Program Capabilities
Year 2025
(acre-feet per year)

Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Metropolitan Surface Storage (DVL, Mathews, Skinner)	217,000	650,000	0
Flexible Storage in Castaic & Perris	73,000	219,000	0
Groundwater Conjunctive-use			
Long Term Replenishment and Cyclic Storage	86,000	86,000	0
North Las Posas Storage	47,000	47,000	0
Proposition 13 Storage	64,000	64,000	0
Subtotal of Current Programs	***487,000***	***1,066,000***	***0***
Programs Under Development			
Groundwater Conjunctive-use			
Raymond Basin	22,000	22,000	0
Prop 13 Storage Programs	1,000	1,000	0
Additional Programs[1]	80,000	80,000	0
Subtotal of Proposed Programs	***103,000***	***103,000***	***0***
Maximum Supply Capability	**590,000**	**1,169,000**	**0**

[1] Includes expansions of existing programs

Table A.3-7
Details of Projected Supplies

In Basin Storage Activities Program Capabilities Year 2030 (acre-feet per year)			
Hydrology	**Multiple Dry Years (1990-92)**	**Single Dry Year (1977)**	**Average Year (1922-2004)**
Current Programs			
Metropolitan Surface Storage (DVL, Mathews, Skinner)	200,000	601,000	0
Flexible Storage in Castaic & Perris	73,000	219,000	0
Groundwater Conjunctive-use			
Long Term Replenishment and Cyclic Storage	86,000	86,000	0
North Las Posas Storage	47,000	47,000	0
Proposition 13 Storage	64,000	64,000	0
Subtotal of Current Programs	***470,000***	***1,017,000***	***0***
Programs Under Development			
Groundwater Conjunctive-use			
Raymond Basin	22,000	22,000	0
Prop 13 Storage Programs	1,000	1,000	0
Additional Programs[1]	80,000	80,000	0
Subtotal of Proposed Programs	***103,000***	***103,000***	***0***
Maximum Supply Capability	**573,000**	**1,120,000**	**0**

[1] Includes expansions of existing programs

Table A.3-8

Multiple Dry-year Supply Capability [1]

(Repeat of 1990-92 Hydrology)
(acre-feet per year)

	2006	2007	2008
Current Supplies			
In-Basin Storage	396,000	419,000	421,000
California Aqueduct	1,769,717	887,346	962,910
Colorado River Aqueduct	735,000	734,000	733,000
Supplies Under Development			
In-Basin Storage	0	0	0
California Aqueduct	200,000	200,000	200,000
Colorado River Aqueduct	0	25,000	25,000
Transfers to Other Agencies	0	0	0
Metropolitan Supply Capability	***3,100,717***	***2,265,346***	***2,341,910***

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

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

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

APPENDIX A.4
PUBLIC INVOLVEMENT

Appendix A.4
Public Involvement

In developing this report and the IRP Update process on which it relies, Metropolitan involved its member agencies in the planning process and in reviews of the various draft documents and assumptions. The details of these meetings are provided in the introductory chapter to this document.

In addition to those planning and member meetings, Metropolitan held public meetings with the Southern California Water Dialogue group. Through this group, outreach was attempted to over 400 individuals, affiliated with a very broad and diverse set of agencies, consultants, environmental groups and other non-profit organizations. Participants represent organizations ranging from the Sierra Club, the Mono Lake Committee and The Nature Conservancy, to the Building Industry Association and the Southern California Water Committee, to agencies such as the Los Angeles Department of Water and Power, the San Diego County Water Authority, and the Mojave Water Agency.

Finally, Metropolitan held the publicly-noticed meeting required by the Urban Water Management Planning Act. This Appendix includes a copy of the letter sent to cities and counties in Metropolitan's service area notifying them of the meeting. It also includes a copy of the Public Notice advertising the meeting that was included in Southern California newspapers on Monday, September 26 and Monday, October 3, 2005.

Finally, the last page of this Appendix contains a copy of the resolution of the Metropolitan Board of Directors adopting the 2005 Regional Urban Water Management Plan.

Letter Notifying Cities and Counties

September 14, 2005

To Whom It May Concern:

This letter serves as notification that The Metropolitan Water District of Southern California (Metropolitan) will be holding a public hearing at the Water Planning, Quality and Resources Committee Board meeting to receive input on the draft 2005 Regional Urban Water Management Plan (RUWMP). The RUWMP presents Metropolitan's long-term plans for ensuring the reliability and quality of water resources for the region. The RUWMP complies with California state law requiring urban water suppliers to prepare and update Urban Water Management Plans every five years. Public Input is encouraged, appreciated, and will be considered during finalization of the 2005 RUWMP.

Public Hearing will be held on:

Monday, October 10, 2005 (exact time to be determined)
Metropolitan Water District Headquarters
700 N. Alameda Ave.
Los Angeles, Ca 90012

The draft Plan is posted on Metropolitan's web site at www.mwdh2o.com. Please check on the website for updated room and time information. Written comments are due by **October 10, 2005** to:

Metropolitan Water District
700 N. Alameda Ave.
Los Angeles, Ca 90012
Attn: Michael Hurley

If you would like more information or have any questions, please contact Michael Hurley at (213) 217-6221 or via email at mhurley@mwdh2o.com.

Very Truly Yours,

Stephen N. Arakawa
Water Resource Management

PUBLIC HEARING SCHEDULED ON

DRAFT REGIONAL URBAN WATER MANAGEMENT PLAN

The Metropolitan Water District of Southern California (Metropolitan) will hold a public hearing on **Monday, October 10, 2005** to receive comments on the draft 2005 Regional Urban Water Management Plan (RUWMP).

The hearing will be held at 2:00 p.m. in the Board Room of Metropolitan's headquarters building at 700 North Alameda Street, Los Angeles, California before the Water Planning, Quality and Resources Committee of Metropolitan's Board of Directors.

The RUWMP presents Metropolitan's long-term plans for ensuring the reliability and quality of water resources for the region. The RUWMP complies with California state law requiring urban water suppliers to prepare and update urban water management plans every five years. The draft plan is posted on Metropolitan's Web site at www.mwdh2o.com.

Public input is encouraged, appreciated, and will be considered during finalization of the 2005 RUWMP. In addition to the public hearing, Metropolitan will accept written comments on the draft plan. All written comments must be received by **October 10, 2005** to:

The Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153
Attn: Michael Hurley

For more information on the draft RUWMP, please call Michael Hurley of Metropolitan's Water Resources Management Group at (213) 217-6221

Board Resolution

DRAFT
RESOLUTION
OF THE BOARD OF DIRECTORS
OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
APPROVING THE 2005 REGIONAL URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Urban Water Management Planning Act requires urban water suppliers to prepare and adopt an Urban Water Management Plan every five years on or before December 31, in years ending in five and zero; and

WHEREAS, the California Urban Water Management Planning Act specifies the requirements and procedures for adopting such Urban Water Management Plans; and

WHEREAS, the Board of Directors of the Metropolitan Water District of Southern California has duly reviewed, discussed, and considered such Urban Water Management Plan and has determined the 2005 Regional Urban Water Management Plan to be consistent with the California Urban Water Management Planning Act and to be an accurate representation of the water resources plan for the Metropolitan Water District of Southern California

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of The Metropolitan Water District of Southern California that, on Nov. 8, 2005 this District hereby adopts this 2005 Regional Urban Water Management Plan for submittal to the State of California.

I HEREBY CERTIFY that the foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of The Metropolitan Water District of Southern California, at its meeting held on Nov. 8, 2005

Executive Secretary
The Metropolitan Water District
of Southern California

APPENDIX A.5
EXISTING AND COMMITTED LOCAL PROJECTS

A.5 Existing and Committed Local Projects

The following tables contain local projects that have been identified by Metropolitan's member agencies.

Table A.5-1
Groundwater Recovery and Treatment Projects

Agency	Project Name	Ultimate Yield	2005 Est. Yield
City of Beverly Hills	Beverly Hills Desalter	2,600	1,362
City of Burbank	Burbank Lake Street GAC Plant	2,744	0
City of Burbank	Burbank/Lockheed Valley Plant	10,000	10,000
Calleguas Municipal Water District	Tapo Canyon Water Treatment Plant	1,445	0
Central Basin Municipal Water District	Juan Well Filter Facility	900	330
Eastern Municipal Water District	Menifee Basin Desalter	3,360	664
Eastern Municipal Water District	Perris Desalter	4,500	0
Foothill Municipal Water District	Glenwood Nitrate	1,600	0
City of Glendale	San Fernando Wells	7,200	7,200
Inland Empire Utilities Agency	Chino Basin Desalter No. 1 - IEUA	4,780	3,916
Inland Empire Utilities Agency	Chino Basin Desalter No. 1 Expansion - IEUA	3,000	0
Inland Empire Utilities Agency	Chino Basin Desalter No. 2 - IEUA	3,350	0
Las Virgenes Municipal Water District	Westlake Wells - Tapia WRF Intertie	150	150
Las Virgenes Municipal Water District	Two Wells in Westlake	600	600
Municipal Water District of Orange County	Irvine Desalter	6,700	0
Municipal Water District of Orange County	Tustin Desalter	3,271	881
Municipal Water District of Orange County	Capistrano Beach Desalter	1,300	0
Municipal Water District of Orange County	San Juan Desalter	4,800	1,619
Municipal Water District of Orange County	Mesa Consolidated Colored Water Treatment Facility	11,300	4,607
Municipal Water District of Orange County	Water Factory 21 Blend	3,500	0
Municipal Water District of Orange County	Garden Grove Nitrate Blending Project	2,166	2,166
Municipal Water District of Orange County	Tustin Nitrate	1,172	1,172
City of Santa Monica	Santa Monica GW Treatment Plant	1,800	1,800
San Diego County Water Authority	Oceanside Desalter Phase I	2,399	0
San Diego County Water Authority	Lower Sweetwater Desalter Phase 1	3,600	1,974
San Diego County Water Authority	Oceanside Desalter Phase I and II	6,500	2,227
Three Valleys Municipal Water District	Pomona Well # 37	1,100	0
Three Valleys Municipal Water District	Pomona, City of	3,600	3,600
City of Torrance	Madrona Desalter (Goldsworthy)	2,446	2,082
West Basin Municipal Water District	West Basin Desalter No. 1	1,576	0
Western Municipal Water District of Riverside County	Arlington Desalter	6,176	4,926
Western Municipal Water District of Riverside County	Chino Basin Desalter No. 1 - Western	4,240	4,168
Western Municipal Water District of Riverside County	Chino Basin Desalter No. 1 Expansion - Western	3,000	0
Western Municipal Water District of Riverside County	Chino Basin Desalter No. 2 - Western	6,650	0
Western Municipal Water District of Riverside County	Temescal Basin Desalting Facility	10,000	10,000

Table A.5-2
Recycling Water Projects

Agency	Project Name	Ultimate Yield	2005 Est. Yield
City of Burbank	Caltrans	100	65
City of Burbank	Media City Center	50	38
City of Burbank	PSD Power Plant	900	900
City of Burbank	Burbank Reclaimed Water System Expansion Proj.	850	509
Calleguas Municipal Water District	Conejo Creek Diversion Project	14,000	1,790
Calleguas Municipal Water District	Oak Park/North Ranch Water Reclamation Proj.	1,300	1,032
Central Basin Municipal Water District	Bellflower Reclamation Project	50	50
Central Basin Municipal Water District	Cerritos Reclamation Project	3,600	1,700
Central Basin Municipal Water District	Cerritos Reclaimed Water Expansion Project	260	206
Central Basin Municipal Water District	Lakewood Water Reclamation Project	447	353
Central Basin Municipal Water District	Century Reclamation Program	10,500	3,165
Central Basin Municipal Water District	Rio Hondo Water Reclamation Program	2,80.9	0
Eastern Municipal Water District	Eastern Recycled Water Pipeline Reach 16	820	0
Eastern Municipal Water District	Hemet/SJ Regional Reclamation - Direct	8,300	8,300
Eastern Municipal Water District	Moreno Valley Regional Reclamation	9,514	6,352
Eastern Municipal Water District	Perris Valley Regional Reclamation	5,917	5,672
Eastern Municipal Water District	Rancho California Reclamation (Existing non-LPP)	450	450
Eastern Municipal Water District	Temecula Valley Regional Reclamation	7,073	6,447
Eastern Municipal Water District	Eastern Regional Reclaimed Water System	4,830	0
Eastern Municipal Water District	EMWD Reach I Phase II	1,700	227
Eastern Municipal Water District	Rancho California Reclamation Expansion	6,250	3,273
Eastern Municipal Water District	Lake Elsinor Make Up Water	3,000	0
Foothill Municipal Water District	La Canada-Flintridge Country Club	135	135
City of Glendale	Power Plant Project	450	450
City of Glendale	Glendale Water Reclamation Expansion Project	500	264
City of Glendale	Glendale Brand Park Reclaimed Water Project	73.3	0
City of Glendale	Glendale Verdugo-Scholl Canyon Recl. Water Proj.	2,225	655
Inland Empire Utilities Agency	Upland Hills Country Club	224	224
Inland Empire Utilities Agency	Existing IEUA Regional Recycled Water Dist. System - Non LRP	3,500	3,500
Inland Empire Utilities Agency	IEUA Regional Recycled Water Dist. System	45,500	1,738
Las Virgenes Municipal Water District	Decker Canyon WRP	300	0
Las Virgenes Municipal Water District	Calabasas System	1,000	1,000

Table A.5-2 (continued, page 2)
Recycling Water Projects

Agency	Project Name	Ultimate Yield	2005 Est. Yield
Las Virgenes Municipal Water District	Las Virgenes Valley System	300	300
Las Virgenes Municipal Water District	Calabasas Reclaimed Water System Expansion	700	700
Las Virgenes Municipal Water District	Las Virgenes Reclamation Project	2,772	2,023
City of Long Beach	Long Beach Reclamation Project	2,500	2,500
City of Long Beach	THUMS	2,145	1,390
City of Long Beach	Long Beach Reclamation Expansion Phase I	3,600	0
City of Long Beach	Long Beach Reclamation Project	1,700	1,178
City of Los Angeles	Hansen Area Water Recycling Project Phase 1	2,500	0
City of Los Angeles	Hansen Area Water Recycling Project Phase 2	1,165	0
City of Los Angeles	Sepulveda Basin Water Recycling Project Phase IV	546	0
City of Los Angeles	Cal Trans (5 & 134 Fwys)	100	100
City of Los Angeles	Griffith Park	2,000	1,500
City of Los Angeles	Los Angeles Greenbelt Project - MCA	325	325
City of Los Angeles	MGM/SONY Building	10	10
City of Los Angeles	Los Angeles Greenbelt Project	1,610	662
City of Los Angeles	Sepulveda Basin Water Reclamation Project	1,500	0
City of Los Angeles	Import from West Basin for Irrigation	2,500	283
Municipal Water District of Orange County	Capistrano Valley Non-Domestic Water System Expansion	2,895	0
Municipal Water District of Orange County	Development of Non-Domestic Water Sys. Exp. Ladera	2,772	0
Municipal Water District of Orange County	Moulton Niguel Phase 4 Reclamation System Expansion	1,276	0
Municipal Water District of Orange County	IRWD Recycled Water System Upgrade	8,500	0
Municipal Water District of Orange County	El Toro Existing	500	500
Municipal Water District of Orange County	Irvine Ranch Part 1 Expansion	3,700	3,700
Municipal Water District of Orange County	Los Alisos WD	2,100	2,100
Municipal Water District of Orange County	Moulton Niguel WD Existing	470	470
Municipal Water District of Orange County	Santa Margarita WD - Oso	1,284	1,216
Municipal Water District of Orange County	Trabuco Canyon Reclamation Project (Existing)	280	280
Municipal Water District of Orange County	Capistrano Non-Domestic Water System	750	750
Municipal Water District of Orange County	Irvine Ranch Reclamation Project	10,000	10,000
Municipal Water District of Orange County	Moulton Niguel Reclamation Project	8,000	6,794
Municipal Water District of Orange County	San Clemente Water Reclamation Project	1,500	207
Municipal Water District of Orange County	Santa Margarita Reclamation Expansion Project	3,600	1,951

Table A.5-2 (continued, page 3)
Recycling Water Projects

Agency	Project Name	Ultimate Yield	2005 Est. Yield
Municipal Water District of Orange County	South Laguna Reclamation Expansion Project	700	0
Municipal Water District of Orange County	South Laguna Reclamation Project	866	860
Municipal Water District of Orange County	Trabuco Canyon Reclamation Expansion Project	800	349
Municipal Water District of Orange County	Green Acres Reclamation Project - Coastal	800	143
Municipal Water District of Orange County	Green Acres Reclamation Project - MWDOC	5,400	1,285
City of Santa Ana	Green Acres Reclamation Project - Santa Ana	800	118
City of Santa Monica	Dry Weather Runoff Reclamation Facility	280	21
City of Santa Monica	Santa Monica Water Gardens	33	33
San Diego County Water Authority	Encina Basin Water Rec. Prog - Phases I and II (5)	5,000	1,342
San Diego County Water Authority	Olivenhain Recycled Project - SE Quadrant	1,788	443
San Diego County Water Authority	Otay Recycled Water System	7,500	0
San Diego County Water Authority	RDDMWD Recycled Water Program	648	52
San Diego County Water Authority	RDDMWD Recycled Water Program Sempra - Non LRP	3,400	2,000
San Diego County Water Authority	Camp Pendleton	3,900	2,400
San Diego County Water Authority	Rancho Santa Fe (Existing)	350	250
San Diego County Water Authority	San Vincente	600	600
San Diego County Water Authority	Santa Maria - Phase A	700	700
San Diego County Water Authority	Valley Center - Phase A	300	300
San Diego County Water Authority	Encina Water Pollution Control Facility Recl. Proj. (2)	165	165
San Diego County Water Authority	Oceanside Water Reclamation Project	200	110
San Diego County Water Authority	Ramona/Santa Maria Water Reclamation Project	400	176
San Diego County Water Authority	Shadowridge Reclaimed Water System	375	0
San Diego County Water Authority	Encina Basin Water Reclamation Project Phase I (5)	1,396	0
San Diego County Water Authority	Escondido Regional Reclaimed Water Project	2,800	89
San Diego County Water Authority	Fallbrook Reclamation Project	1,200	315
San Diego County Water Authority	North City Water Reclamation Project	17,500	3,323
San Diego County Water Authority	Otay Water Reclamation Project	1,277	1,038
San Diego County Water Authority	Padre Dam Reclaimed Water System Phase I	850	652
San Diego County Water Authority	San Elijo Water Reclamation System	1,600	1,054
San Diego County Water Authority	San Pasqual Reclamation Project	1,100	0
San Diego County Water Authority	South Bay Water Reclamation Project (excluding Otay)	200	200
Three Valleys Municipal Water District	City of Industry Regional Water System - Rowland	1,884	0

Table A.5-2 (continued, page 4)
Recycling Water Projects

Agency	Project Name	Ultimate Yield	2005 Est. Yield
Three Valleys Municipal Water District	City of Industry Regional Water System - Suburban	2,584	0
Three Valleys Municipal Water District	City of Industry Regional Water System - Walnut	4,400	0
Three Valleys Municipal Water District	City of Industry Reclaimed System - Phase A	3,360	3,360
Three Valleys Municipal Water District	Pomona Reclamation Project	9,320	5,527
Three Valleys Municipal Water District	Walnut Valley Reclamation Project	1,900	1,700
Three Valleys Municipal Water District	Walnut Valley Reclamation Expansion Project	500	500
City of Torrance	Import from West Basin for Mobil Refinery	7,500	6,917
Upper San Gabriel Valley Municipal Water District	California Country Club	375	375
Upper San Gabriel Valley Municipal Water District	Puente Hills/Rose Hills	4,000	1,763
Upper San Gabriel Valley Municipal Water District	Direct Reuse Project Phase IIA	2,258	0
West Basin Municipal Water District	West Basin Water Reclamation Program	70,000	13,070
Western Municipal Water District of Riverside County	Ellsinore Valley/Horse Thief Reclamation	560	392
Western Municipal Water District of Riverside County	Ellsinore Valley/Railroad Canyon Reclamation	730	730
Western Municipal Water District of Riverside County	Indian Hills Reclamation Project	1,310	1,310
Western Municipal Water District of Riverside County	March AFB Reclamation Project	261	261
Western Municipal Water District of Riverside County	Santa Rosa Water Reclamation Facility	5	3

Table A.5-3
Recycling Water for Seawater Barriers

Agency	Project Name	Ultimate Yield	Est. 2005
Central Basin Municipal Water District	Alamitos Barrier Reclaimed Water Project	3,024	0
City of Los Angeles	Harbor Water Recycling Project	5,000	0
Municipal Water District of Orange County	Water Factory 21 Blend	3,500	0
Municipal Water District of Orange County	OCWD WF21 Above 12-yr. Avg.	5,000	5,000
Municipal Water District of Orange County	Groundwater Replenishment System Talbert Seawater Intrusion Barrier Component	31,000	0

Table A.5-4
Recycling Water for Groundwater Replenishment

Agency	Project Name	Ultimate Yield	Est. 2005
Central Basin Municipal Water District	Montebello Forebay	50,000	50,000

Table A.5-5
Recycling Water for Groundwater Recharge*

Agency	Project Name	Yield
Inland Empire Utilities Agency	Chino Basin Recharge Improvement Project	8,000
Inland Empire Utilities Agency	Chino Basin Recharge Improvement Project (New Yield Capture)	10,000

* All member agencies were surveyed, however only the member agency listed responded with groundwater recharge.

APPENDIX A.6
IDENTIFIED POTENTIAL LOCAL PROJECTS TO MEET REMAINING IRP TARGET

The projects in the following table have been identified by Metropolitan's member agencies as being under investigation for the potential to meet local resource targets in future.

Table A.6-1
Identified Potential Projects*

Agency	Project Name	**Yield**
Inland Empire Utilities Agency	Chino Basin Desalter No. II Expansion	10,000
Inland Empire Utilities Agency	Chino Basin Desalter No. III	16,000
Inland Empire Utilities Agency	IEUA Recycled Water Expansion	46,000
Inland Empire Utilities Agency	Dry Year Yield Expansion (GW Conjunctive Use)	132,000
Eastern Municipal Water District	Perris Desalter II	4,500
Eastern Municipal Water District	San Jacinto Valley RWRF Expansion to 14 MGD	3,400
Eastern Municipal Water District	San Jacinto Valley RWRF Expansion to 18 MGD	4,500
Eastern Municipal Water District	Moreno Valley RWRF Expansion to 21 MGD	9,000
Eastern Municipal Water District	Temecula Valley RWRF Expansion to 18 MGD	6,700
Eastern Municipal Water District	Perris Valley RWRF Expansion to 22 MGD	12,300
Municipal Water District of Orange County	ETWD Portion of El Toro AWT Joint project with MNWD and IRWD	200
Municipal Water District of Orange County	IRWD Wells 51, 52, 53, 21 & 22	5,327
Municipal Water District of Orange County	IRWD Other Groundwater	1,500
Municipal Water District of Orange County	IRWD Irvine Desalter Wells 106,115	2,900
Municipal Water District of Orange County	IRWD Michelson Reclamation Expansion Phase II	4,300
Municipal Water District of Orange County	Laguna Beach Well in the OCWD Basin	2,025
Municipal Water District of Orange County	MNWD portion of SOCWA AWT	204
Municipal Water District of Orange County	MNWD portion of El Toro AWT Joint project	50
Municipal Water District of Orange County	SMWD Chiquita Reclamation Expansion I	739
Municipal Water District of Orange County	SMWD Chiquita Reclamation Expansion II	3,400
Municipal Water District of Orange County	SMWD Canada Gobernadora	725
Municipal Water District of Orange County	SMWD Arroyo Trabuco	473
Municipal Water District of Orange County	SMWD Horno Basin Surface Water	215
Municipal Water District of Orange County	Groundwater Replenishment System (for Direct Replenishment)	38,000
City of Pasadena	Ion-Exchange System - Perchlorate Removal at Sunset Reservoir	TBD
City of Pasadena	Ion-Exchange System - Perchlorate Removal at Windsor Reservoir	TBD
San Diego County Water Authority	City of SD North City Reclamation Facility	100
San Diego County Water Authority	Santa Fe Valley WRF/Olivenhain MWD	200
San Diego County Water Authority	Meadowlark WRF/Vallecitos WD	1,200
San Diego County Water Authority	NC WRP & San Pasqual WRP/City of SD	425
San Diego County Water Authority	South Bay WRP/City of San Diego	3,500

* All member agencies were surveyed for potential projects, however only the member agencies listed responded.

ENCLOSED DOCUMENTS

RECENT CUWCC FILINGS

2004 CUWCC Filing

Reported as of 8/

Water Supply & Reuse

Reporting Unit:
Metropolitan Water Dist of SC

Year:
2004

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
CRA	750115	Imported
SWP	1734020	Imported

Total AF: 2484135

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	25078	retail
Beverly Hills	12188	retail
Burbank	14547	retail
Calleguas MWD	121461	wholesale
Central Basin MWD	87691	wholesale
Compton	3205	retail
Eastern MWD	3822	wholesale
Eastern MWD	91719	retail
Foothill MWD	14831	wholesale
Fullerton	13975	retail
Glendale	23796	retail
Inland Empire UA	72728	wholesale
Las Virgenes MWD	24882	retail
Long Beach	43081	retail
Los Angeles	367693	retail
MWD Orange Co	360586	wholesale
Pasadena	24719	retail
San Diego CWA	637552	wholesale
San Fernando	508	retail
San Marino	1602	retail
Santa Ana	19978	retail
Santa Monica	14444	retail
Three Valleys MWD	89653	wholesale
Torrance	20517	retail
Upper San Gabriel VMWD	61841	wholesale
West Basin MWD	150447	wholesale
Western MWD	115112	wholesale

Total AF: 2417656

2004 CUWCC Filing

Reported as of 8/

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	2417656
b. Determine other system verifiable uses (AF)	141260
c. Determine total supply into the system (AF)	2484135
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	1.03
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	yes
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	yes

a. If yes, describe the leak detection program:

System is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.

B. Survey Data

1. Total number of miles of distribution system line.	1017
2. Number of miles of distribution system line surveyed.	1017

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	350000	350000
2. Actual Expenditures	350000	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

2004 CUWCC Filing

Reported as of 8/

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

Major media campaign for CA Friendly landscaping and outdoor water efficiency. Full complement of brouchures for retailers' use. Educational facility tours for the public.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	68
b. Public Service Announcement	yes	24
c. Bill Inserts / Newsletters / Brochures	yes	15
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	26
f. Special Events, Media Events	yes	5
g. Speaker's Bureau	yes	8
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1600000	2700000
2. Actual Expenditures	2460000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Expenditures include $300K for staff expense (2.5 FTEs x $120K/FTE)

2004 CUWCC Filing

Reported as of 8/

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	7	11525	293
Grades 4th-6th	yes	26	82020	405
Grades 7th-8th	yes	15	9160	81
High School	yes	13	22465	83

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 11/1/1983

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1571000	1152350
2. Actual Expenditures	1365000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Expenditures include $600K for staff (6 FTEs x $100K/FTE)

2004 CUWCC Filing

Reported as of 8/

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	106000	106558	**8**	No		
2	yes	79000	78952	**9**	yes	4500000	4427785
3	No			**10**	No		
4	No			**11**	No		
5	yes	1410000	1441819	**12**	No		
6	yes	3500000	3530665	**13**	No		
7	No			**14**	yes	9200000	9215540

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

2004 CUWCC Filing

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.45	8	No	
2	yes	.45	9	yes	2
3	No		10	yes	2.2
4	No		11	No	
5	yes	2.7	12	No	
6	yes	1.4	13	No	
7	No		14	yes	1.2

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	8	yes
2	No	9	yes
3	No	10	No
4	No	11	No
5	yes	12	No
6	yes	13	No
7	yes	14	No

2004 CUWCC Filing

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	22000000	22000000
2. Actual Expenditures	23425319	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Section A values include CCP$, consulting, CUWCC dues, and assigned FTEs @ $120K Section B includes Section A + BMPs 3,7,8. BMP 12 expenses are imbedded in Sec A expenses by BMP

2004 CUWCC Filing

Reported as of 8/

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Increasing Block Seasonal
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$839000000
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$214000000

2. Commercial

a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$

3. Industrial

a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$

4. Institutional / Government

a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$

5. Irrigation

a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$

6. Other

a. Water Rate Structure

2004 CUWCC Filing

b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? — No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2004 CUWCC Filing

Reported as of 8/

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2004**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	80%
b. Coordinator's Name	Andy Hui
c. Coordinator's Title	Unit Manager V
d. Coordinator's Experience and Number of Years	2 years managing unit
e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
6. Number of conservation staff, including Conservation Coordinator.	10

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1695000	1811000
2. Actual Expenditures	1733600	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

RSU Labor (including travel, training, materials, etc)(minus 45400-45550)+ $500,000 (to cover AH and TB whose salary expenses are under AS's budget) x 0.65 = BMP staff expenses

2003 CUWCC Filing

Reported as of 8/

Water Supply & Reuse

Reporting Unit: **Metropolitan Water Dist of SC**

Year: **2003**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
CRA	917771	Imported
SWP	1476822	Imported

Total AF: 2394593

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
Anaheim	23951	retail
Beverly Hills	13178	retail
Burbank	12098	retail
Calleguas MWD	116756	wholesale
Central Basin MWD	82009	wholesale
Compton	2892	retail
Eastern	108293	retail
Eastern	4512	wholesale
Foothill MWD	12514	wholesale
Fullerton	12545	retail
Glendale	21948	retail
Inland Empire UA	71033	wholesale
Las Virgenes MWD	21155	retail
Long Beach	40789	retail
Los Angeles	370914	retail
MWD Orange Co.	314242	wholesale
Pasadena	24581	retail
San Diego CWA	613560	wholesale
San Fernando	383	retail
San Marino	442	retail
Santa Ana	12141	retail
Santa Monica	13027	retail
Three Valleys MWD	83399	wholesale
Torrance	20980	retail
Upper San Gabriel VMWD	62326	wholesale
West Basin MWD	143762	wholesale
Western MWD	68154	wholesale

Total AF: 2271584

2003 CUWCC Filing

Reported as of 8/

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year? — yes

2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:

a. Determine metered sales (AF)	2271584
b. Determine other system verifiable uses (AF)	61995
c. Determine total supply into the system (AF)	2394593
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.97

3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? — yes

4. Did your agency complete a full-scale audit during this report year? — yes

5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? — yes

6. Does your agency operate a system leak detection program? — yes

a. If yes, describe the leak detection program:

System is monitored by 10+ patrols who also collect WQ samples, pilots flying the CRA and pipeline staff in the normal course of their duties. If water is detected near any of our facilities, we analyze a water sample to determine if it's our water leaking. Normally it is not. If it is, we may hire a leak detection firm to locate the leak.

B. Survey Data

1. Total number of miles of distribution system line.	1017
2. Number of miles of distribution system line surveyed.	1017

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	350000	350000
2. Actual Expenditures	350000	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? — No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

2003 CUWCC Filing

Reported as of 8/

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

   a. If YES, describe the program and how it's organized.

   Major media campaign for CA Friendly landscaping and outdoor water efficiency. Full complement of brouchures for retailers' use. Educational facility tours for the public.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	56
b. Public Service Announcement	no	
c. Bill Inserts / Newsletters / Brochures	yes	18
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	no	
f. Special Events, Media Events	yes	4
g. Speaker's Bureau	yes	11
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	450000	1600000
2. Actual Expenditures	438000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Expenditures include $300K for staff expense (2.5 FTEs x $120K/FTE)

2003 CUWCC Filing

Reported as of 8/

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	8	13700	390
Grades 4th-6th	yes	29	109000	540
Grades 7th-8th	yes	17	9680	88
High School	yes	12	34305	122

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 11/1/1983

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1526000	1571000
2. Actual Expenditures	1475000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Expenditures include $600K for 6 FTEs

2003 CUWCC Filing

Reported as of 8/

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	94000	93970	**8**	No		
2	yes	70000	69132	**9**	yes	2950000	3232497
3	No			**10**	No		
4	No			**11**	No		
5	yes	1300000	1291701	**12**	No		
6	yes	1750000	1741556	**13**	No		
7	No			**14**	yes	10600000	10671440

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	No
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	yes

3. Staff Resources by BMP

2003 CUWCC Filing

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.45	**8**	No	
2	yes	.45	**9**	yes	2
3	No		**10**	yes	2.2
4	No		**11**	No	
5	yes	2.7	**12**	No	
6	yes	1.4	**13**	No	
7	No		**14**	yes	1.2

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	No
4	No	**11**	No
5	yes	**12**	No
6	yes	**13**	No
7	yes	**14**	No

2003 CUWCC Filing

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	20000000	22000000
2. Actual Expenditures	19849000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Budget discontinuity from FY 2002 due to including staff, consulting, etc this FY, unlike previous years.

2003 CUWCC Filing

Reported as of 8/

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential	
a. Water Rate Structure	Increasing Block Seasonal
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$870000000
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$254000000
2. Commercial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
3. Industrial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
4. Institutional / Government	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
5. Irrigation	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
6. Other	
a. Water Rate Structure	

2003 CUWCC Filing

b. Sewer Rate Structure

c. Total Revenue from Volumetric Rates $

d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources $

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1125000	0
2. Actual Expenditures	1125000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Conservation pricing expenses were for consulting, 3 FTEs, and $650,000 for billing system programming prior to the Jan 2003 implementation of unbundled, tiered rates.

2003 CUWCC Filing

Reported as of 8/

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2003**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	80%
b. Coordinator's Name	Andy Hui
c. Coordinator's Title	Unit Manager V
d. Coordinator's Experience and Number of Years	1 year managing unit
e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
6. Number of conservation staff, including Conservation Coordinator.	10

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1750000	1695000
2. Actual Expenditures	1274000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

RSU Labor (including travel, training, materials, etc)(minus 45400-45550)+ $500,000 (to cover AH and TB whose salary expenses are under AS's budget)x 0.65 = staff expenditures for BMPs

2002 CUWCC Filing

Reported as of 8/

Water Supply & Reuse

Reporting Unit:

Year:
2002

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type

Total AF:

2002 CUWCC Filing

Reported as of 8/

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	2307710
b. Determine other system verifiable uses (AF)	153224
c. Determine total supply into the system (AF)	2517881
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.98
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	yes
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	yes
a. If yes, describe the leak detection program:	

System audits are a continuous process. This presumably satisfies the pre-screening system audit requirement (A.1). Water balances are done daily. Distribution system is visually inspected on an ongoing basis.

B. Survey Data

1. Total number of miles of distribution system line.	1015
2. Number of miles of distribution system line surveyed.	1015

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	84633	88864
2. Actual Expenditures	84633	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

2002 CUWCC Filing

Reported as of 8/

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

    a. If YES, describe the program and how it's organized.

    Conservation messages are a standard part of Metropolitan's outreach message efforts. Metropolitan has also developed and financed educational materials and programs for use by schools and community groups.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	8
b. Public Service Announcement	yes	2
c. Bill Inserts / Newsletters / Brochures	yes	2
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	no	
f. Special Events, Media Events	yes	16
g. Speaker's Bureau	yes	18
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	390000	3800000
2. Actual Expenditures	745000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

    a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2002 CUWCC Filing

Reported as of 8/

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	27	7873	15
Grades 4th-6th	yes	43	54650	86
Grades 7th-8th	yes	15	10043	6
High School	yes	28	27120	17

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 11/1/1983

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	925000	925000
2. Actual Expenditures	820000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2002 CUWCC Filing

Reported as of 8/

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	270000	94292	**8**	No		
2	yes	0	13149	**9**	yes	1630000	710350
3	No			**10**	yes	370000	334575
4	No			**11**	No		
5	yes	310000	280821	**12**	No		
6	yes	1460000	863470	**13**	No		
7	No			**14**	yes	9810000	11413320

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	yes
2) Residential retrofits	yes
3) Commercial, industrial, and institutional surveys	No
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

2002 CUWCC Filing

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.4	8	No	
2	yes	.1	9	yes	2
3	No		10	yes	1.5
4	No		11	No	
5	yes	2	12	No	
6	yes	1	13	No	
7	No		14	yes	2.5

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	8	yes
2	No	9	yes
3	No	10	yes
4	No	11	No
5	yes	12	No
6	No	13	No
7	yes	14	No

2002 CUWCC Filing

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	13670000	12687092
2. Actual Expenditures	13709977	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2002 CUWCC Filing

Reported as of 8/

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

2. Commercial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

3. Industrial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

4. Institutional / Government

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

5. Irrigation

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

6. Other

a. Water Rate Structure	Uniform

2002 CUWCC Filing

b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$844000000
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$139000000

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2002 CUWCC Filing

Reported as of 8/

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2002**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	100%
b. Coordinator's Name	Ed Thornhill
c. Coordinator's Title	Ed Thornhill
d. Coordinator's Experience and Number of Years	13 Years
e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
6. Number of conservation staff, including Conservation Coordinator.	9

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	850000	820000
2. Actual Expenditures	830000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Estimated staff expenses are based on 9.5 of the 17 staff members of the Regional Supply Unit doing work full-time.

2001 CUWCC Filing

Reported as of 8/

Water Supply & Reuse

Reporting Unit:

Year:
2001

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type

Total AF:

2001 CUWCC Filing

Reported as of 8/

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2001**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	2075204
b. Determine other system verifiable uses (AF)	242424
c. Determine total supply into the system (AF)	2369913
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.98
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	yes
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	yes

a. If yes, describe the leak detection program:

System audits are a continous process. This presumably satisfies the pre-screening system audit requirement (A.1). Water balances are done daily. Distribution system is visually inspected on an ongoing basis.

B. Survey Data

1. Total number of miles of distribution system line.	1015
2. Number of miles of distribution system line surveyed.	1015

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	80603	84633
2. Actual Expenditures	80603	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

2001 CUWCC Filing

Reported as of 8/

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2001**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

Conservation messages are a standard part of Metroploitan's outreach message efforts. Metroploitan has also developed and financed educational materials and programs for use by schools and community groups

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	2
b. Public Service Announcement	yes	1
c. Bill Inserts / Newsletters / Brochures	yes	2
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	no	
f. Special Events, Media Events	yes	2
g. Speaker's Bureau	yes	11
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	160600	390000
2. Actual Expenditures	235476	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2001 CUWCC Filing

Reported as of 8/

BMP 08: School Education Programs

Reporting Unit: **Metropolitan Water Dist of SC**
BMP Form Status: **100% Complete**
Year: **2001**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	31	9221	20
Grades 4th-6th	yes	44	58505	92
Grades 7th-8th	yes	17	10200	6
High School	yes	25	25200	15

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 11/1/1983

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	975000	925000
2. Actual Expenditures	815000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2001 CUWCC Filing

Reported as of 8/

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2001**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	70000	92427	**8**	No		
2	yes	0	17378	**9**	yes	330000	252280
3	No			**10**	No		
4	No			**11**	No		
5	yes	321800	327668	**12**	No		
6	yes	260000	239800	**13**	No		
7	No			**14**	yes	8820000	7882860

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	yes
2) Residential retrofits	yes
3) Commercial, industrial, and institutional surveys	No
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

2001 CUWCC Filing

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	yes	.4	**8**	No	
2	yes	.1	**9**	yes	1.5
3	No		**10**	yes	.5
4	No		**11**	No	
5	yes	1	**12**	No	
6	yes	1	**13**	No	
7	No		**14**	yes	2.5

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	yes
4	No	**11**	No
5	yes	**12**	No
6	No	**13**	No
7	yes	**14**	No

2001 CUWCC Filing

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	9550000	13670000
2. Actual Expenditures	9216525	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2001 CUWCC Filing

Reported as of 8/

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2001**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

2. Commercial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

3. Industrial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

4. Institutional / Government

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

5. Irrigation

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

6. Other

a. Water Rate Structure	Uniform

2001 CUWCC Filing

b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$809000000
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$145000000

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2001 CUWCC Filing

Reported as of 8/

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Metropolitan Water Dist of SC	**100% Complete**	**2001**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	100%
b. Coordinator's Name	Ed Thornhill
c. Coordinator's Title	Ed Thornhill
d. Coordinator's Experience and Number of Years	12 years
e. Date Coordinator's position was created (mm/dd/yyyy)	8/8/1988
6. Number of conservation staff, including Conservation Coordinator.	7

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	808600	850000
2. Actual Expenditures	610000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Last year conservation labor was budgeted separately.