



Southern California's Integrated Water Resources Plan

Executive Summary

Report Number 1107

March 1996



MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

SOUTHERN CALIFORNIA'S INTEGRATED WATER RESOURCES PLAN

Executive Summary

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FOREWORD

There is no resource more important to the economic and social well-being of Southern California than water. In 1996, the Metropolitan Water District of Southern California (Metropolitan) celebrates 55 years of service providing imported water to a region comprising half of the population, jobs, and business of the State of California. Looking back, we can take great pride in accomplishments that are unparalleled in the water industry. And yet, there is little time to look backward. Particularly, when the future looks so different from the past.

During the last three years, Metropolitan, its member agencies, groundwater basin management agencies, and other water providers have participated in the development of an Integrated Resources Plan (IRP). This plan represents a dramatic shift in the way we look at water management now and into the future. It replaces exclusive dependence on Metropolitan for supplemental water with coordinated approaches developed in conjunction with local resources. It implements water conservation measures together with new supplies. And it searches for solutions that offer long-term reliability at the lowest possible cost to the region as a whole.

This change did not occur overnight. Since the 1980s, Metropolitan has gradually shifted from an exclusive supplier of imported water to becoming a regional water manager — providing not only imported water, but also supporting local resource development, conservation, and seasonal storage. The IRP represents the fulfillment of this new role for Metropolitan and the recognition that meeting Southern California's future water needs is a shared responsibility among many water providers.

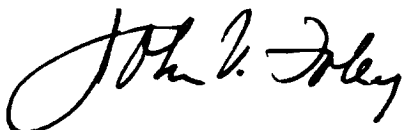
The IRP represents both a process and a plan. As a process, it broke new ground in communication among the many water agencies and providers in the region. Most importantly, the process achieved the coordination of hundreds of important initiatives and projects that were being undertaken throughout Southern California. As a plan, it explicitly linked future supply reliability with the necessary resource and capital investments.

This report documents the product of this process and sets targets for improvements in every area of demand management and water supplies available to the region. It presents Metropolitan's commitments, as well as the contributions expected from local water providers. It is a picture of where we are today and a vision for where we want to be in the future. Through the coming years, it will be an important yardstick against which we can measure our progress and adjust our plans.

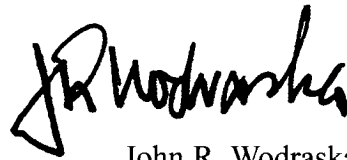
In January of 1996, Metropolitan's Board of Directors approved the IRP as a planning guideline to be used for resources and capital facility investments. We expect that adjustments to this plan will be necessary. In fact, the only certainty with long-range planning is that the future is often unpredictable and never exactly what was projected.

For this reason, the most important message of the IRP is that the water providers of Southern California must continue to work together in a collaborative open process of management and wise stewardship of our water and financial resources. Frequently, the competition for water leads to conflict and disagreement. That fact will likely never change. On the other hand, the IRP process has demonstrated that it is economically prudent to look for ways to replace conflict with cooperation, good intentions with commitments, and fragmented efforts with coordinated plans.

We congratulate the many hundreds of participants and contributors to this Integrated Resources Plan for their sustained level of effort. For Metropolitan's part, we pledge to fulfill our commitments to the IRP and will continue to participate in a new era of collaborative water management for Southern California.



John V. Foley
Chairman of the Board



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ACKNOWLEDGMENTS

The consensus reached during the Integrated Resources Planning (IRP) process could not have been possible without the dedication of the participants of the IRP Workgroup, comprising of staff from Metropolitan, general managers and staff from Metropolitan's member agencies and sub-agencies, general managers and staff from the major groundwater basin management agencies, and technical consultants.

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SOUTHERN CALIFORNIA'S INTEGRATED WATER RESOURCES PLAN EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

INTRODUCTION

Southern California's challenge in managing its water resources is driven by one of the most fundamental realities of the West — it is an arid region subject to drought. In this setting, the responsibility for providing a growing population with a safe and reliable water supply is no easy task, especially given the many diverse and competing interests for the region's water resources. Across the country, it is clear that traditional approaches to water supply planning are not well suited to the complex issues that face the water industry today. New approaches that take a broader perspective and involve the public in the decision-making process are being used by water agencies to solve the problems of supply shortages and water quality. This report summarizes one such approach, referred to as Integrated Resources Planning (IRP), that Southern California undertook in order to arrive at a comprehensive long-term water resources strategy to meet the region's needs.

Service Area Description

Water in Southern California is provided through a complex system of infrastructure controlled by many different institutional entities. More than 350 public agencies and private companies provide water to approximately 16 million people living in a 5,200 square mile area. The Metropolitan Water District of Southern California (Metropolitan) is the primary wholesale provider of imported water for the region. Metropolitan serves 27 member agencies comprising 14 cities, 12 municipal water districts, and 1 county water authority (see Figure E-1). Metropolitan's member agencies, in turn, serve customers in more than 145 cities and 95 unincorporated communities.

Metropolitan's service area (sometimes referred to in this report as "region") includes the Southern California coastal plain. It extends about 200 miles along the Pacific Ocean from the City of Oxnard on the north to the Mexican border on the south, and it reaches 70 miles inland from the coast. The service area includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Although it comprises only 13 percent of the land area of these counties, over 90 percent of their population resides within Metropolitan's boundaries.

In addition to the region's water providers, groundwater basin agencies play a critical role in providing a reliable water supply to the region. These groundwater agencies are responsible for the water supply and quality management of the basins, some of which are court adjudicated and others which are managed. Figure E-2 presents the major groundwater basins in Southern California.

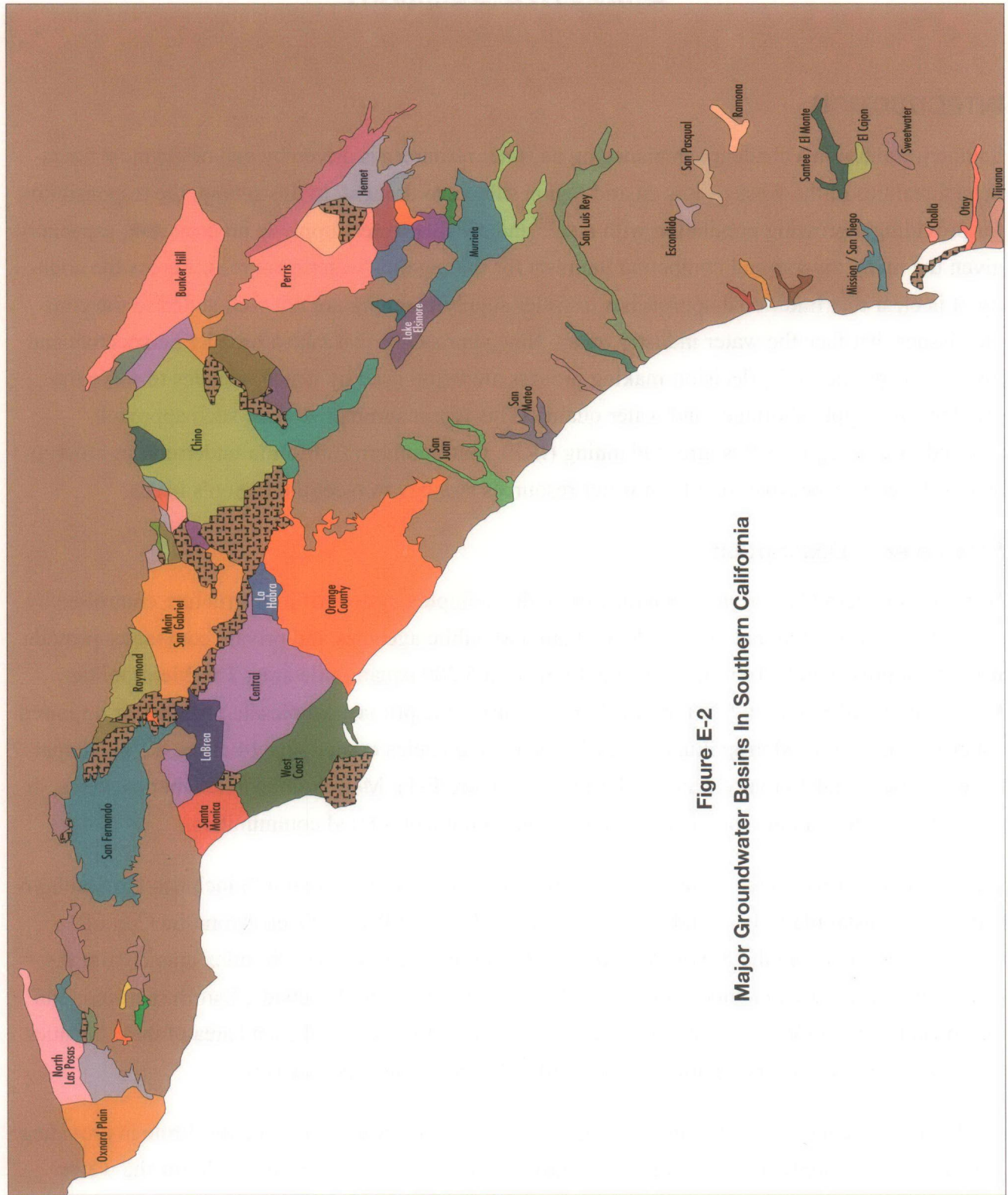


Figure E-2
Major Groundwater Basins In Southern California

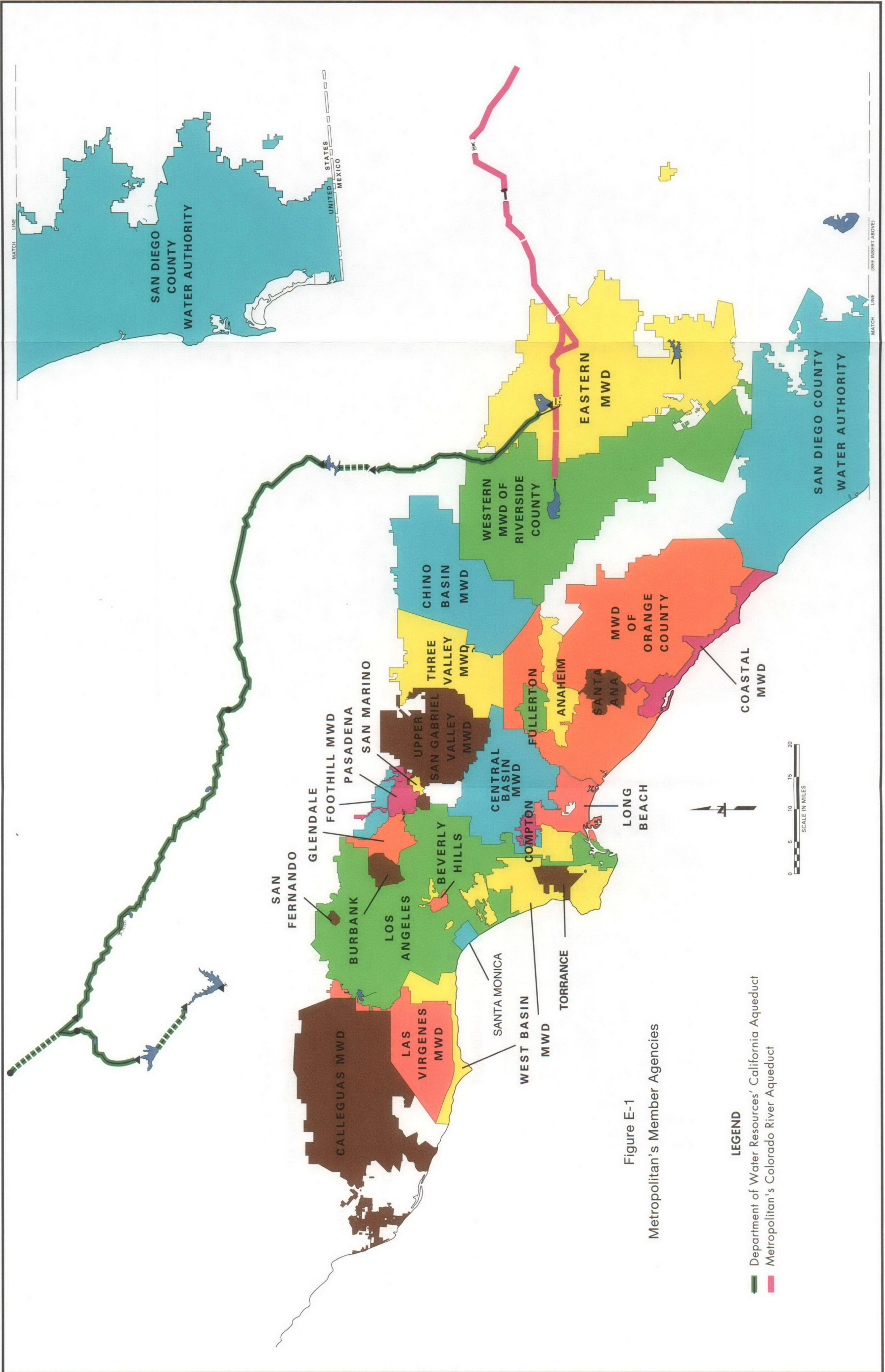


Figure E-1
Metropolitan's Member Agencies

LEGEND
— Department of Water Resources' California Aqueduct
— Metropolitan's Colorado River Aqueduct

Sources of Water Supply

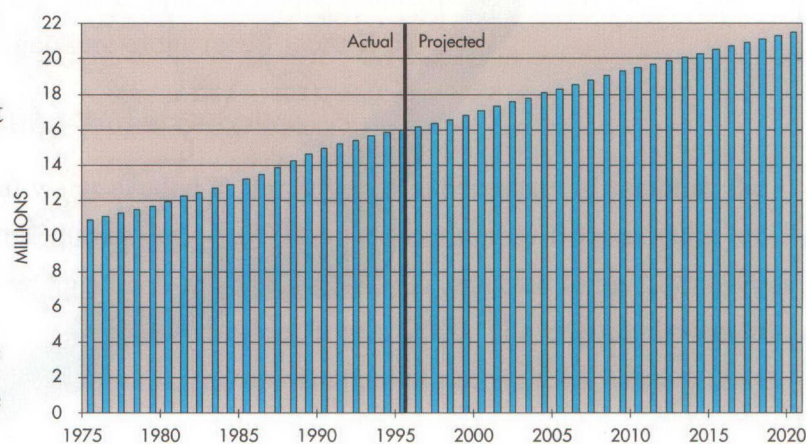
The water that is used by the residents of Southern California originates from many sources. About 1.36 million acre-feet per year (34 percent) of the region's average supply is developed locally using groundwater basins, surface reservoirs and surface diversions to capture natural runoff. Another 0.15 million acre-feet per year (4 percent) of supply is attributed to local water recycling projects that reclaim wastewater for groundwater recharge, irrigation, and direct industrial uses. Finally, about 2.39 million acre-feet per year (62 percent) is imported from three major supply systems (see Figure E-3). The first of these imported systems, the Los Angeles Aqueducts, is operated by the city of Los Angeles and transports water from the Mono Basin and Owens Valley down to Southern California. The second system, the Colorado River Aqueduct (CRA), was constructed by Metropolitan and transports water from the Colorado River. The third major system, the State Water Project (SWP), moves water from the Sacramento-San Joaquin Delta via the California Aqueduct to the region.

THE NEED FOR AN INTEGRATED RESOURCES PLAN

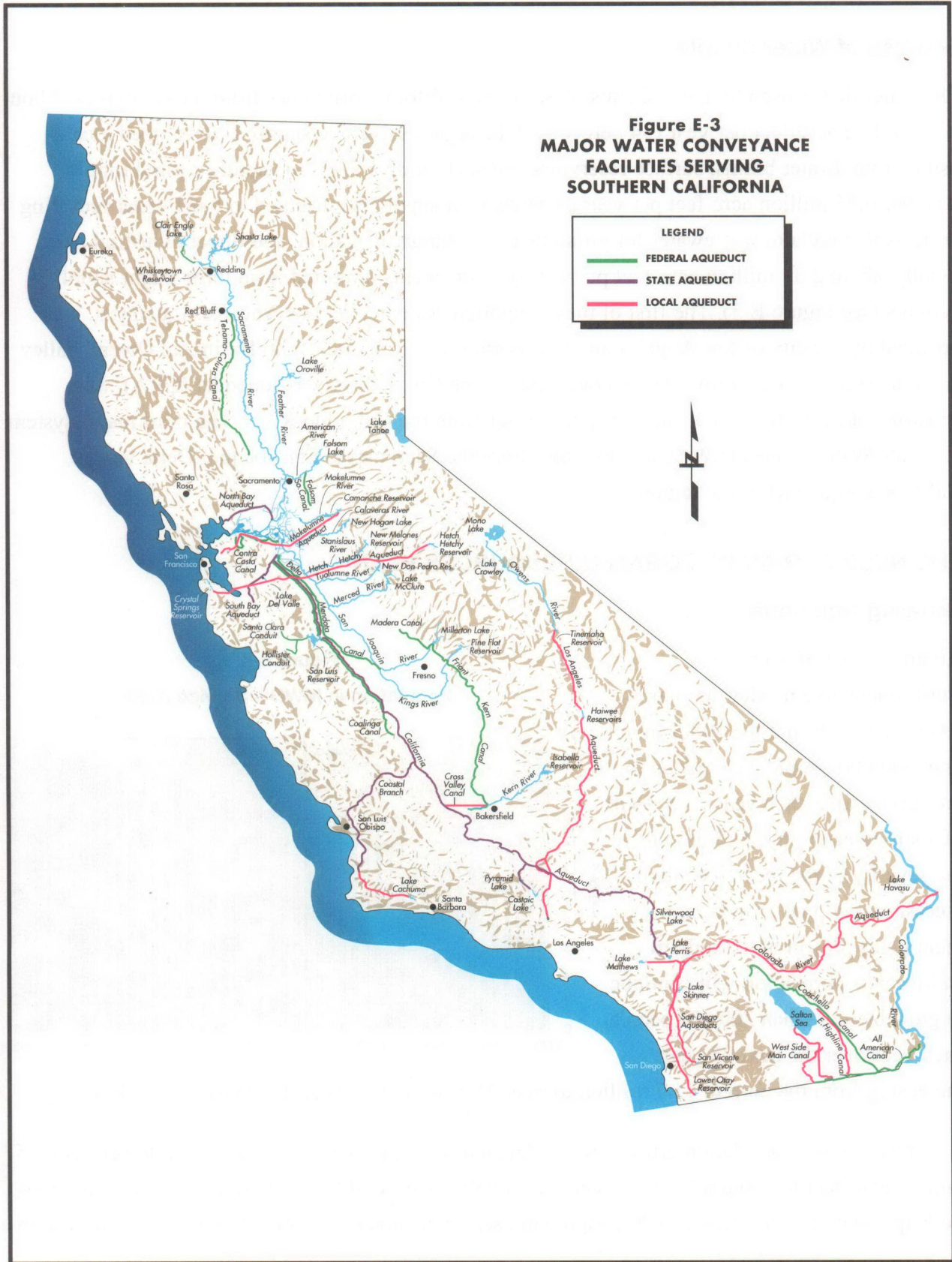
Growing Demands

About one out of every two Californians live in Metropolitan's service area. During the 1980s more than 300,000 people were added to the service area each year, as a result of a strong economy. And despite the severity of the recent economic recession, regional growth management plans project that Southern California's population will continue to grow by more than 200,000 people each year over the next 25 years — increasing from the current 15.7 million to over 21.5 million by year 2020 (see Figure E-4).

Figure E-4
Population in MWD's Service Area

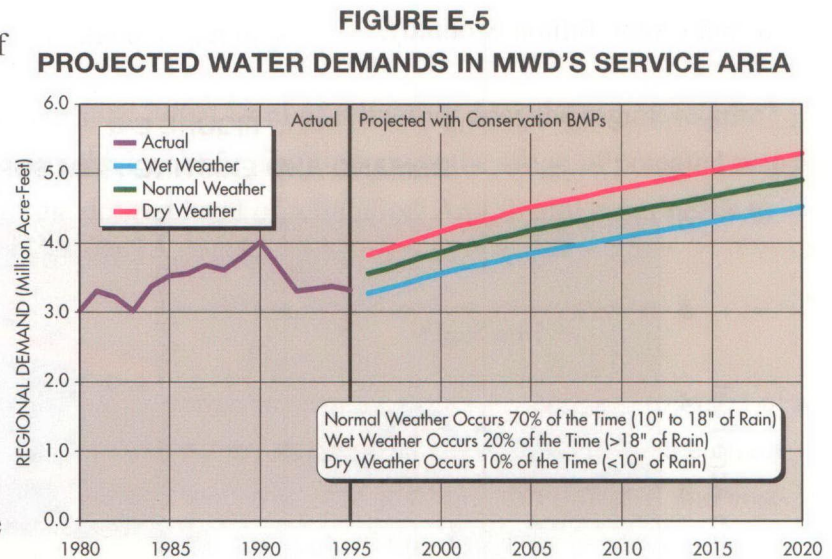


As a result of this population growth, water demands are expected to increase from the current 3.5 million acre-feet to about 4.9 million acre-feet by the year 2020 (under normal weather conditions). To help forecast water demands, Metropolitan uses an econometric model that relates water use to



independent variables such as population, housing, employment, income, price, weather, and conservation. Demographic projections are based on the Growth Management Element of the 1993 Regional Comprehensive Plan (RCP) adopted by the Southern California Association of Governments (SCAG) and the Preliminary Series 8 forecasts issued by the San Diego Association of Governments (SANDAG).

In addition, the forecast of water demands incorporates projections of water savings resulting from long-term conservation measures called for in the state-wide “best management practices” (BMPs). The full implementation of these BMPs are expected to save about 730,000 acre-feet per year by 2010 and 880,000 acre-feet per year by 2020 under normal weather conditions. An important factor affecting future water demand is the year to year variability that is caused by weather. In any given year, the region’s water demands can vary ± 7 percent due to fluctuations in rainfall and temperature alone (see Figure E-5).



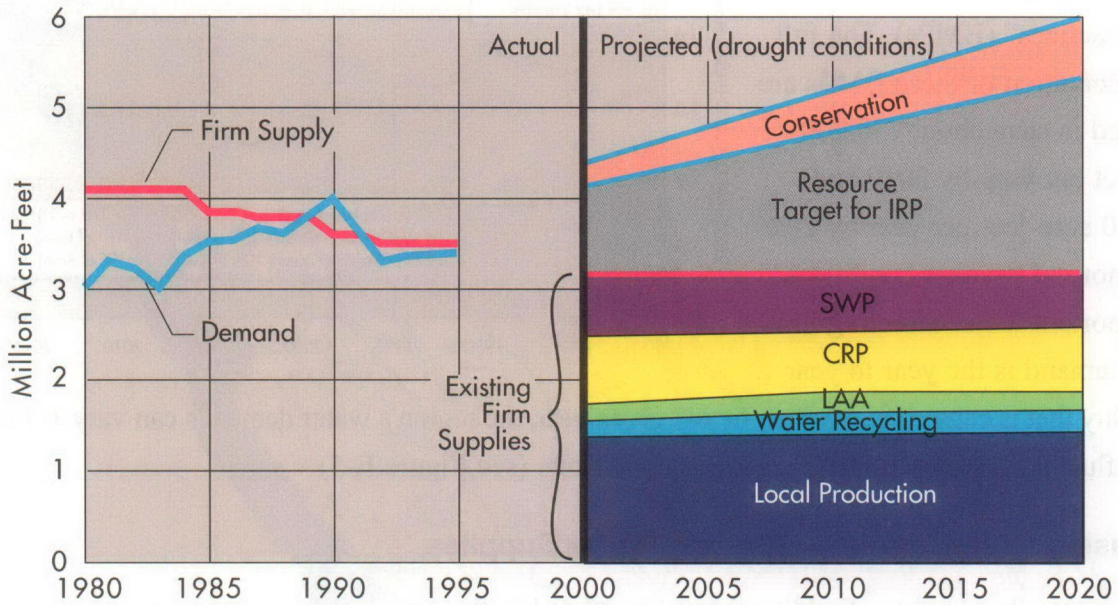
Increasing Competition for Existing Water Supplies

To determine the amount of additional water needed in the future, it is necessary to establish the region’s existing firm supplies available during dry years. The dry-year supply from existing locally developed resources (including the Los Angeles Aqueduct supplies) is expected to be 1.88 million acre-feet in year 2010 and increase to 1.91 million acre-feet in year 2020. The ongoing competition for imported water to serve the urban, agricultural, and environmental needs of the western states has resulted in significant uncertainties in the future deliveries of firm water supply available from the Colorado River and the State Water Project. Without additional commitments and investments, firm imported supplies available during a dry year are expected to range from 1.3 to 1.8 million acre-feet per year.

Consequences of No Action

Comparing the firm existing supplies for the region with projected demands under hot and dry weather conditions results in potential water supply shortages of 1.1 million acre-feet by the year 2000 and 2.2 million acre-feet by 2020 (see Figure E-6). In fact, the comparison of existing supplies and projected demands during wet and normal years indicates that supply shortages could occur every other year by the year 2010, a level of service that would be devastating to Southern California's \$450 billion economy.

**FIGURE E-6
DEMAND AND EXISTING FIRM SUPPLIES**



Cost of Redundant Investments

Given the circumstances, many Southern California water providers, including Metropolitan, have been planning investments in projects and programs within the service area to address future water reliability needs. Without a coordinated and balanced regional response to growing demands, the region could run the risk of overspending on its water infrastructure — potentially leading to higher water rates.

THE INTEGRATED RESOURCES PLANNING PROCESS

With this realization, Metropolitan and its member agencies embarked on a 2½ year IRP process. The focus of this process was to collectively examine the available resource options, both local and imported, together with conservation — developing a least-cost plan that meets the reliability needs of the region and, just as importantly, avoids redundant investments. The product of this intensive effort is a 25-year resources plan that offers a realistic means of achieving a reliable and affordable water supply for Southern California into the next century.

The IRP process asked several basic questions. What level of reliability does the region require? What is the preferred means of achieving the level of reliability, given the range of potential water supply options? Can the region afford the desired level of reliability? And finally, what needs to happen in order to implement the preferred resource strategy?

The IRP Process Participants

The IRP process was designed to include a wide range of resource options in the development of a strategy for meeting regional supply goals. Many of the options considered are outside the direct control of Metropolitan and its member agencies. Nevertheless, they represent practical and cost-effective means of achieving regional goals. To realize these benefits, a high level of consensus and cooperation must be achieved among all participants — Metropolitan, its member agencies, groundwater basin agencies, other resource agencies, and the public. The IRP process reached out to water managers, decision makers, interest groups, and individuals to obtain valuable input and guidance regarding the preferred water resource strategy, to review the technical analyses supporting the decision-making process, and to secure a commitment to action from all those responsible for implementing the “Preferred Resource Mix.”

IRP Workgroup

Much of the technical guidance and direction for the IRP was provided by the IRP Workgroup, which included representatives from Metropolitan’s staff, member agency and sub-agency managers, and groundwater basin managers. This group served as the de facto technical steering committee for the IRP, providing crucial direction, establishing needed criteria, and reviewing evaluations. During the entire process, this group met over 35 times and spent hundreds of hours evaluating detailed analyses.

Regional Assemblies

The major milestones in the process were established by a series of three regional assemblies held in October 1993, June 1994, and March 1995. Modeled after the American Assembly Process developed by Dwight Eisenhower at Columbia University in the 1950s and used to gain consensus on difficult policy issues, these regional assemblies represented the first time ever that Metropolitan's senior management, Board of Directors, member agency managers, and other water providers convened to discuss regional water management. Participants also included general managers from groundwater basin agencies, local retail water providers (sub-agencies), and invited public representatives. In total, over 150 assembly participants provided input to the IRP. Each assembly produced a written Assembly Statement documenting areas of consensus, as well as identifying those areas where divergent views remained unresolved and further analysis and evaluation were required.

Public Forums and Member Agency-Sponsored Workshops

In addition to the IRP Workgroup and the three regional assemblies, broader public input to the planning process was obtained at six public forums and several member agency workshops addressing water resource issues and concerns. Public forum attendees were invited from business, environmental, community, agricultural and water interests, both inside and outside the region. In total, about 450 individuals participated in these forums and workshops.

Evaluating Alternative Resource Strategies

The IRP process relied upon detailed analyses of water supply options, alternative resource development strategies, and the operational performance of the preferred resource mix in achieving regional reliability goals. The methodology employed least-cost planning principles, operating within constraints. Potential resource options identified to meet the overall IRP resource target included:

- ⇨ Water Conservation
- ⇨ Water Recycling
- ⇨ Groundwater Recovery
- ⇨ Colorado River Aqueduct Supply Improvements
- ⇨ State Water Project Supply Improvements
- ⇨ Regional Storage (both groundwater storage and surface reservoirs)
- ⇨ Voluntary Water Transfers
- ⇨ Ocean Desalination

The evaluation proceeded in two distinct phases. Phase 1 examined the broadest possible range of alternative resource strategies capable of meeting the region's reliability goal. Phase 2 narrowed in on the resource strategy selected during Phase 1 and identified a least-cost resource mix that achieved regional reliability goals within prescribed constraints.

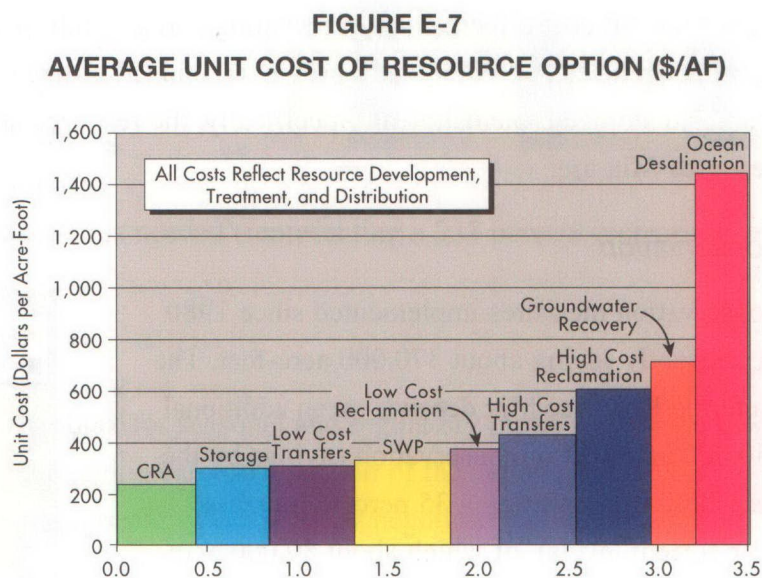
Phase 1

The first phase of the IRP consisted of broad analyses of alternative combinations of resource options for meeting the region's goals and objectives. The October 1993 Assembly produced evaluation criteria used as the basis for comparing several alternative resource strategies available to the region. These criteria included: (1) reliability, (2) cost, (3) risk, (4) flexibility, (5) environmental impact, and (6) impacts to the local economy. Phase 1 offered a coarse screening of possible strategies that ranged from a heavy emphasis on local resource development on one hand, to a heavy emphasis on additional imported supplies on the other. The detailed refinement of a preferred strategic direction was left until Phase 2.

Phase 2

Following the decision at the June 1994 Assembly to pursue a balanced approach to the development of imported and local resources, Metropolitan staff, working with the IRP Workgroup, undertook a more detailed least-cost plan for achieving the region's reliability goal. The primary objective of Phase 2 was to find the right combination of additional local water resources, imported supplies, and demand-side manage-

ment investments to meet the region's reliability goal in a cost-effective and environmentally sound manner. The analysis proceeded from three important premises: (1) maximize the operational utility of all of the surface and groundwater storage available within the region; (2) add additional supplies in order of ascending costs; and (3) constrain dependence on specific options to reflect water quality requirements, flexibility, and institutional and environmental issues. Figure E-7 illustrates the resource options that were identified to meet the gap between existing firm water supplies and



future demand. The resource options were ranked in terms of their total unit costs and how much water they could provide.

THE PREFERRED RESOURCE MIX

The participants in the IRP process concluded that, in the aggregate, Southern California is better off pursuing the Preferred Resource Mix than any other combination of water resource development strategies. The consensus arrived at regarding the establishment of the Preferred Resource Mix reflects the most comprehensive strategy on how the region should achieve an affordable level of water supply reliability to date.

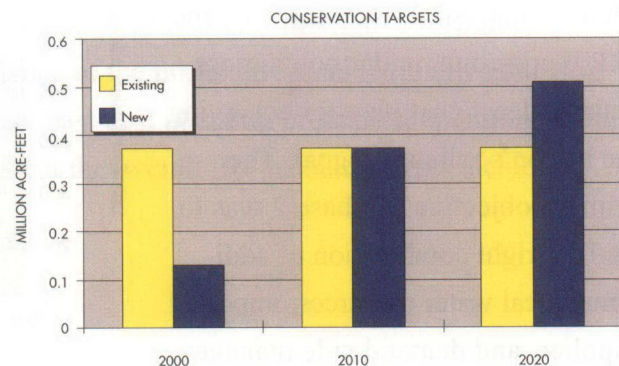
Resource Targets

The strategy reflected in the Preferred Resource Mix is based on five fundamental objectives:

- (1) maximize the availability of low cost water delivered by the Colorado River Aqueduct,
- (2) provide adequate State Water Project supplies to meet reliability and water quality requirements,
- (3) fully utilize the existing potential for local groundwater conjunctive use and surface storage,
- (4) implement cost-effective water recycling and groundwater recovery projects identified by member agencies and other water providers, and
- (5) utilize voluntary water transfers needed for dry years and storage replenishment. Specifically, the resource targets included in the Preferred Resource Mix are:

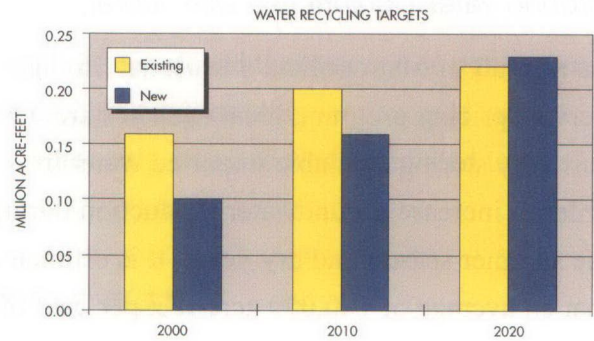
Conservation

Conservation measures implemented since 1980 are currently saving about 370,000 acre-feet. The Preferred Resource Mix depends on an additional 130,000 acre-feet of conservation savings by the year 2000 (representing a 35 percent increase over current levels), of which about 89,000 acre-feet results from the implementation of new plumbing codes and ordinances. By 2020, about 512,000 acre-feet of additional conservation savings is needed (representing a 138 percent increase over current levels), of which about 235,000 acre-feet results from the implementation of plumbing codes and ordinances.



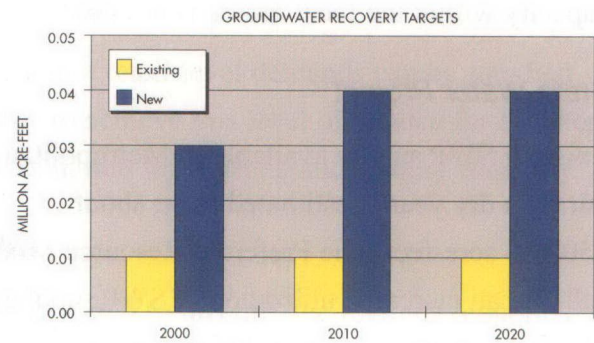
Water Recycling

Existing water recycling is providing the region with about 160,000 acre-feet per year of supply. These existing local projects are expected to increase their supply yield to about 220,000 acre-feet by 2020. The Preferred Resource Mix depends on an additional 100,000 acre-feet of new supply from water recycling by the year 2000 (representing an 63 percent increase from current levels). By the year 2020, about 230,000 acre-feet of additional supply is needed (representing a 180 percent increase over current levels).



Groundwater Recovery

Currently, about 10,000 acre-feet of net groundwater supply is produced from groundwater recovery projects. The Preferred Resource Mix depends on an additional 30,000 acre-feet of net groundwater production as a result of groundwater recovery projects by year 2000 (representing a 150 percent increase over current levels). By 2020, about 40,000 acre-feet of net production is needed (representing a 233 percent increase over current levels).

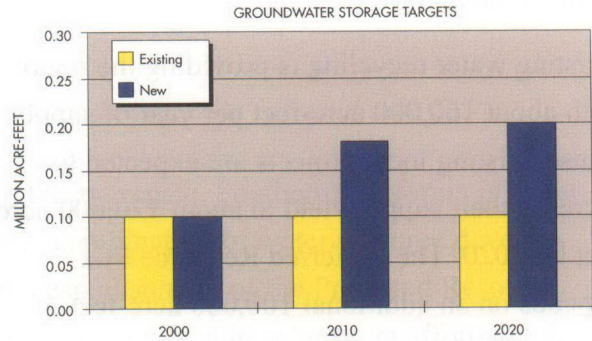


Regional Surface Reservoir Storage

Existing surface reservoirs used by Metropolitan for seasonal and regulatory purposes include Lake Mathews and Lake Skinner. In addition, the region can use a portion of the storage in DWR's terminal reservoirs during an emergency. As a result of the recently negotiated Monterey Agreement, about 220,000 acre-feet of storage in these DWR terminal reservoirs can now be used by Metropolitan during dry years (carryover supply). While this agreement provides the region with more dry-year supplies during droughts and added flexibility, it does not change the total storage requirements for the region. Metropolitan's 800,000 acre-foot Eastside Reservoir Project will be used to meet Southern California's remaining storage requirements, with 400,000 acre-feet dedicated to emergency purposes and 400,000 acre-feet dedicated to drought carryover.

Groundwater Conjunctive Use Storage

As a result of Metropolitan's Seasonal Storage Service pricing program, local agencies are currently storing available imported water in order to increase groundwater production during the summer season and dry years. It is estimated that an average of 100,000 acre-feet per year of groundwater supply is produced as a result of Metropolitan's existing discount pricing for winter season deliveries. The Preferred Resource Mix identifies the potential for 200,000 acre-feet of additional groundwater production during dry years. To accomplish this additional dry year production, about one million acre-feet of dedicated storage capacity within the local basins is required.



State Water Project

Existing SWP supply available to Metropolitan during a dry year is estimated to be about 650,000 acre-feet. The Preferred Resource Mix calls for an increased utilization of SWP supplies of about 700,000 acre-feet during dry years by year 2020. Progress towards achieving this SWP resource target has already been made. The recently negotiated Bay-Delta Accord provides additional flexibility in the system and calls for identification of a permanent solution within three years. Reliance on SWP supplies is critical to achieving the region's reliability goals and to provide water quality adequate to carry out local resource programs.



Colorado River Aqueduct

The CRA represents the region's least-cost imported supply and should be maximized in order to ensure reliability for all of Metropolitan's member agencies. To ensure that deliveries from the CRA are fully maximized at about 1.3 million acre-feet per year, Metropolitan has a strategy that includes reliability improvements such as river re-operations, banking conserved and surplus water, land fallowing agreements, and potential conservation efforts.

Central Valley Water Transfers

About 300,000 acre-feet of voluntary water transfers will be developed through option agreements, storage programs, and purchases of water through the drought bank or other similar spot markets. These agreements will allow Metropolitan to use this water only when needed, estimated to be about 25 percent of the time.

THE STRENGTH OF A BALANCED AND FLEXIBLE PLAN

For many participants, the decision to support the water resources plan developed through the IRP process was based on the strengths and benefits it offered over other alternative strategies. The benefits that the Preferred Resource Mix provides are:

Achievement of 100% Reliability at the Retail Level

The most important feature of the plan is the assurance that retail-level demands can be satisfied under all foreseeable hydrologic conditions. The ability to achieve this level of service for Southern California's retail water customers provides a solid foundation for a strong and healthy economy.

Least-Cost Approach to Sustainable Reliability

The Preferred Resource Mix represents the least-cost approach to meeting the region's reliability goal, given the external forces and constraints affecting imported supplies. From a narrow financial perspective, the development of local resources, in some cases, may appear more costly than securing incremental supplies from imported sources or from agricultural water transfers. During the past decade, however, a new water management ethic has emerged in Southern California that has provided the foundation for consensus solutions among urban, environmental, and agricultural interests throughout the state. This demonstrated commitment to stewardship will be an essential element in securing the statewide agreements necessary for long-term reliable imported supplies. In this context, this plan is the least-cost, sustainable approach to long-term regional reliability.

Achievement of Regional Water Quality Objectives

A significant consideration that emerged during the planning process was the importance of SWP deliveries in managing the region's imported water quality. While Metropolitan and its member agencies are committed to meet or exceed all state and federal water quality requirements, the two major sources of imported water have different water quality characteristics. Compared with SWP water, Colorado River water has much higher concentrations of total dissolved solids (TDS) or

salinity. The Preferred Resource Mix includes sufficient SWP supplies to allow for blending with Colorado River water throughout the service area.

Reduced Risks Through Diversification

The IRP process identified many risks associated with additional local and imported supply development. The diversification of investments offered in the plan reduces the region's exposure to the risk of a given investment not performing up to expectations, in terms of cost, quality, or supply availability. It also reduces the potential impact of an emergency such as a major earthquake. The Preferred Resources Mix avoids the pitfalls of "putting all your eggs in one basket."

Flexibility to Adjust to Future Changes

Besides reducing the exposure to risk through a diversification strategy, the plan offers flexibility in response to uncertain future demands. Specifically, the plan's reliance on voluntary water transfer option agreements and many local resource projects allows the region to adapt more easily than is possible with a program of fewer, large capital and core resource investments. With the balanced approach called for in the Preferred Resource Mix, as circumstances change, the pace of additional investments can change as well. This flexibility will help provide financial security for Metropolitan and its member agencies. And while Metropolitan is committed to following through with its financial commitments to any given local project, the plan provides the ability to adjust overall program commitments based on revised projections of need.

METROPOLITAN'S COMMITMENT TO THE IRP

The water resource strategy that has emerged from the IRP process has strengthened Metropolitan's unique role in regional water management. The successful implementation of the Preferred Resource Mix places a significant responsibility on Metropolitan to provide leadership in several important areas. These areas include: (1) securing additional imported supplies through comprehensive programs that increase the availability of water delivered through the Colorado River Aqueduct and the State Water Project, including water transfers; (2) implementing water management programs that support the development of cost-effective local resources, conjunctive use storage, and conservation; (3) providing the regional infrastructure needed to integrate imported and local sources of supply; and (4) establishing a comprehensive management plan for dealing with periodic supply surplus and shortage conditions.

Colorado River Aqueduct Costs

Power is the primary component of variable supply costs for the CRA. CRA power costs are expected to increase from approximately \$26 million in 1995 to \$50 million in 2005. As cost impacts associated with the potential sale of all or part of the Hoover and Parker generating facilities become more certain, they will be incorporated into the long-term financial forecast. To maintain a full CRA delivery, several programs have been included in cost projections, including: river re-operations, banking conserved and surplus water, Interstate Underground Storage, and Test Land Fallowing in the Palo Verde Irrigation District. In aggregate, it is expected that these programs will cost about \$75 per acre-foot.

State Water Project Costs

To ensure that the SWP is a reliable supply in the future, the IRP includes investments in interim Delta improvements (including South Delta channel enlargements and barriers, and acoustic fish barriers on the Sacramento River) and a long-term Delta solution. The annualized capital cost to Metropolitan of the interim improvements is projected at \$5 million. The annualized capital cost to fund a permanent Delta transfer facility is estimated at \$60 million in 2000, increasing to \$78 million by 2010. These costs are additional to Metropolitan's current obligations for fixed costs on the SWP.

Central Valley Water Transfers

Water transfers are a critical element of the least-cost resource strategy developed in the IRP. By 2005, Metropolitan may need to spend as much as \$105 million to purchase up to 300,000 acre-feet of water transfers in order to avoid a shortage during a drought situation. To avoid the large rate increases that purchases of water transfers in a single year could cause, a Water Transfer Fund was established. Together with the use of Metropolitan's existing Rate Stabilization Fund, the rate impacts of single year purchases of water transfers will be minimized.

Water Management Programs

Metropolitan's water management programs include financial incentives and assistance for developing water recycling and groundwater recovery projects, groundwater conjunctive use storage programs, and conservation. Total annual operating costs for water management programs are expected to increase from \$22 million in 1995 to \$86 million in 2005 and to over \$112 million by 2020, as yields from currently approved projects increase, additional local projects are added to achieve IRP targets,

and the implementation of BMPs continues. In addition, over \$210 million is included in Metropolitan's capital improvement program for construction of facilities related to groundwater storage.

Regional Infrastructure Needs

In order to provide for the treatment, distribution, and storage of imported supplies, Metropolitan is implementing a \$4.1 billion Capital Improvement Program (CIP) over the next 10 years. The remaining 10 year investments for major storage, distribution, and treatment facilities include: (1) \$1.2 billion for the Eastside Reservoir Project; (2) \$0.9 billion for the Inland Feeder project; (3) \$1.3 billion for investments in regional water treatment, conveyance facilities, and groundwater storage; and (4) \$0.7 billion for additional reliability, rehabilitation, and administrative facilities.

Summary of Metropolitan's Commitments

Table E-1 summarizes Metropolitan's projected annual expenditures needed for the implementation of the IRP. The implementation of the Preferred Resource Mix provides significant regional benefits. The commitment to higher levels of conservation and local resources development allows Metropolitan to defer capital improvements it would otherwise require to meet the demands of its member agencies. This reduced capital program will in turn, lower Metropolitan's water rates and result in lower overall water costs for the region.

Table E-1
Metropolitan's Projected Expenditures
(\$ millions)

Fiscal Year Ending	1995	2000	2005	2010	2020
State Water Project	216.6	328.7	364.5	425.7	510.6
Colorado River Supplies	46.2	42.8	54.0	68.2	109.3
Water Management Programs	22.1	68.6	86.2	108.4	112.9
Capital Costs ¹	228.5	438.5	490.7	492.8	472.0
Existing Operating Costs	207.5	223.5	247.2	286.4	386.2
Future Operating Costs ²	0.0	9.0	38.3	46.4	71.3
Required Reserves	28.9	32.3	11.4	10.9	23.0
Total	749.8	1,143.4	1,292.3	1,438.8	1,685.3

¹ Includes debt service and PAYGO.

² O&M costs related to new facilities only.

On the other hand, these potential savings come at a price. They can only be realized if the conservation and local resources development components of the IRP are accomplished, and the overall targets established in the plan are achieved. While Metropolitan can influence the implementation of conservation and local resources development, it cannot achieve these targets alone. It must rely upon the general commitment of its member agencies and other water providers to do their part toward the accomplishment of the IRP.

FINANCIAL IMPACTS

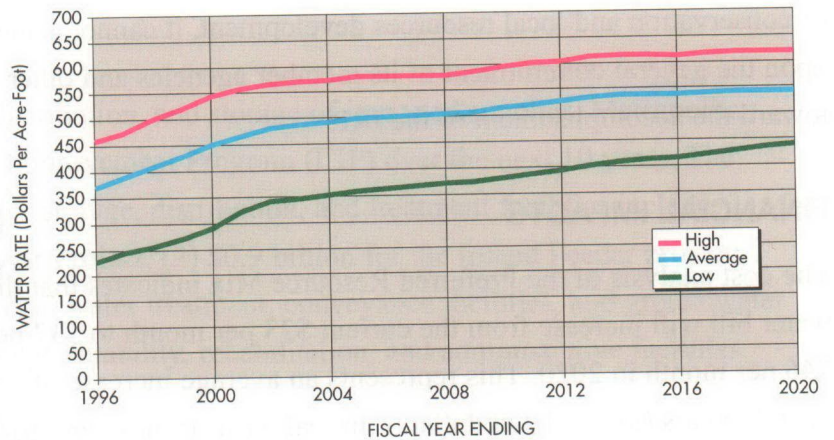
The cost analysis of the Preferred Resource Mix indicates that the region's average household's water bill will increase from the current \$23 per month to \$37 per month in 2010 and \$46 per month in 2020. This represents an average increase of about 4 percent per year over the next 25 years (in escalated dollars). In real terms (removing inflation), the average retail cost of water is expected to increase by less than 2 percent per year over the 25 year planning period.

Most of the increase in costs will occur over the next ten years, as a result of regional infrastructure needed to improve reliability and water quality. About 60 percent of the costs associated with providing Southern California's water supply is expected to occur at the local level by the 350 retail water providers, while the remaining 40 percent will be attributed to imported water supply development and regional infrastructure.

Implementation of the IRP is expected to increase Metropolitan's total revenue requirement by an average annual rate of about 5 percent over the next 25 years, increasing from \$0.7 billion in 1995 to over \$1.3 billion by 2005 and \$1.7 billion by 2020. Projections of Metropolitan's rates and charges are estimated based upon expected demand levels, costs, and revenues from various sources, including property taxes, interest income hydroelectric power sales, a Readiness-to-Serve charge, a connection maintenance charge, a New Demand Charge, a treatment surcharge, and commodity rates.

Metropolitan's projected treated and untreated commodity rates for basic service in 2005 are expected to be \$492 per acre-foot and \$395 per acre-foot, respectively. When all water related rates and charges are included, the average unit cost (or effective rate) of Metropolitan's water under the Preferred Resource Mix is expected to remain below \$500 per acre-foot through 2005 and will not exceed \$550 per acre-foot through 2020 (see Figure E-8).

FIGURE E-8
Metropolitan's Effective Water Rate (\$/AF)



OUTLOOK FOR THE FUTURE

One of the important outputs of the March 1995 Assembly was the need to make the IRP a continuous process. The Preferred Resource Mix, along with the policies and procedures required to implement it, should be periodically evaluated and, if appropriate, adjusted. The need for consistency must be balanced by a willingness to remain open and adaptive.

The IRP process offers a framework for continuing dialogue and decision-making, particularly as the results of implementation measures are better quantified and compared to desired targets. The only certainty is that the future will be different from what is projected, and additional evaluation and adjustment will be needed to provide the level of reliability desired by the water users of Southern California in an affordable manner.

Finally, the IRP has been the catalyst for far-reaching proposals that could significantly alter the future of Metropolitan and its member agencies. Fortunately, the tools and processes exist to thoroughly evaluate these proposals and measure them against the principles and plan presented in this document. It is certain that the water managers of Southern California will continue their search for the most affordable means of providing reliable supplies of safe water to their customers now and into the future. The challenge remains in striking the correct balance between ongoing, open consideration of the wide range of resource alternatives and the decisive action needed to be certain a preferred choice has been implemented when required.