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GREATER LOS ANGELES COUNTY INTEGRATED REGIONAL WATER MANAGEMENT PLAN

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Leadership Committee of Greater Los Angeles County
Integrated Regional Water Management Plan

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

Acre-feet/year	Acre-feet per year
ASBS	Area of Biologifcal Significance
BMP	Best Management Practice
BPTCP	Bay Protection and Toxic Cleanup program
CAMMPR	California Management Measures for Polluted Runoff
CCA	Critical Coastal Area
CCR	Covenants, Conditions, and Restrictions
CEQA	California Environmental Quality Act
cfs	cubic feet per second
COG	Council of Governments
DAC	Disadvantaged Community
DHS	Department of Health Services (State of California)
DONE	Department of Neighborhood Empowerment
DWR	Department of Water Resources
DWSAP	Drinking Water Source Assessment and Protection
EJCW	Environmental Justice Coalition for Water
USEPA	United States Environmental Protection Agency
GAMA	Groundwater Ambient Monitoring and Assessment
GOPR	Governor's Office of Planning and Research
IRP	Integrated Resources Plan
IRWM	Integrated Regional Water Management
IRWMP or Plan	Integrated Regional Water Management Plan
JPA	Joint Powers Authority
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation District
LADWP	Los Angeles Department of Water and Power
LANI	Los Angeles Neighborhood Initiative
LAWGE	Los Angeles Working Group on the Environment
mgd	million gallons per day
MHI	median household income
MOU	Memorandum of Understanding
MWD	Municipal Water District
NCCP	Natural Community Conservation Plans
NDMA	Nitrosodimethylamine
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source

PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyl
POTWs	Publicly Owned Treatment Works
PPIC	Public Policy of California
Region	Greater Los Angeles County Region
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SCCWRP	Southern California Coastal Water Research Project
SDWA	Safe Drinking Water Act
SMBRC	Santa Monica Bay Restoration Commission
SMBRP	Santa Monica Bay Restoration Project
SUSMP	Standard Urban Stormwater Mitigation Plan
SQMP	Stormwater Quality Management Plan
SWAMP	Surface Water Ambient Monitoring Program
SWAP	Source water Assessment Program
SWP	State Water Project
SWRCB	State Water Resources Control Board
TBT	Tributyltin
TDS	total dissolved solids
TM	Technical Memorandum
TMDL	total maximum daily loads
USDA	United States Department of Agriculture\
UV	Ultraviolet (Light)
WCA	Watershed Conservation Authority
WMA	Watershed Management Area
WPD	Watershed Protection Division
WQA	Water Quality Authority

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1. INTRODUCTION

1.1 Context

The Greater Los Angeles County Region (Region) has one of the broadest and most diverse water supply portfolios in the state of California. This Integrated Regional Water Management Plan (IRWMP or Plan) is the next step in the Region's collaborative efforts to assure a sustainable water supply through the more efficient use of water, the protection and improvement of water quality, and environmental stewardship. This IRWMP acknowledges that for the Region to meet its future needs, water supply planning must be integrated with other water resource management issues, such as urban stormwater runoff management, wastewater quality improvements, flood protection, and other environmental needs including habitat, parks and open space.

In a Region facing significant urban challenges such as population growth, densification, traffic congestion, poor air quality, and quality of life, water resource management must also be integrated with other urban planning issues. This IRWMP presents a proactive approach to addressing the Region's water resource needs, based on a vision established through extensive stakeholder input, consistent with planning principles identified in regional planning documents such as the Southern California Association of Governments (SCAG) Compass Growth Vision Report (SCAG, 2004).

To define benchmarks for a more sustainable water future, an 11-agency Leadership Committee (which is guiding development and implementation of the Plan) has established quantifiable planning targets for water supply, urban runoff, flood protection, habitat, and open space. These targets identify the magnitude of the Region's major water resource management issues and also provide a basis for estimating the cost of implementing projects and programs to meet these targets.

In the coming decades, water supply and conservation projects and programs will have to compete for limited fiscal resources with concurrent efforts to improve urban and stormwater runoff quality. With the cost of compliance with surface water quality regulations estimated to range from $43 to $284 billion (Brown and Caldwell, 1989 and Gordon, et al, 2002), jurisdictions and agencies in the Region will face difficult funding choices. The integration of multiple water management strategies via multipurpose projects will create opportunities to meet regional water resource needs, efficiently use fiscal resources, and provide the public with tangible community benefits. It is within this context that the following Plan is presented.

1.2 Background

Water demand in the Region long ago exceeded local supplies, resulting in the importation of water from great distances. Therefore, the Region is now reliant on supplies that vary with the climate fluctuations across numerous states. At the same time, local supplies are threatened with degradation over time. The need to protect lives and property from flooding resulted in extensive channelization and modification of the rivers

and streams on the coastal plain and inland valleys. The flood protection system quickly transports runoff to the ocean, however it provides little opportunity for natural riparian processes to benefit from that water or reduce or transform pollutants that may be present. As a result, trash, metals, bacterial and organic chemicals from developed areas are transported directly to inland water bodies and downstream coastal bays. This results in impairments that hinder the designated beneficial uses of those bodies.

The long-term sustainability of the Region's water supply faces increasing challenges. As noted in the California Water Plan Update 2005 (Bulletin No. 160):

> "Like many regions in the state, water quality and water supply challenges are intertwined. The… region must manage for uncertainties caused by population and economic growth. Growth will not only affect demand, but it will add contamination challenges from increases in wastewater discharges and urban runoff, as well as increased demand for water-based recreation… The region must also assess and plan for impacts of climate variations and global climate change, as well as the cost of replacing aging infrastructure.
>
> Given the size of the region and the diverse sources of water supply, the challenges to the region's water quality are varied. Surface water quality issues… are dominated by stormwater and urban runoff, which contribute contaminants (including trash) to local creeks and rivers…" (Department of Water Resources [DWR], 2005)

To respond to these issues, a more integrated approach is needed. With hundreds of cities, districts, and agencies in the Region, jurisdictional boundaries can potentially hinder coordinated efforts to develop and implement integrated programs and projects. Yet, cooperation at a regional scale is not new. Flood control districts, sanitation districts, and wholesale water agencies have a long tradition of working across jurisdictional boundaries to implement projects that have multiple benefits.

Most resource management agencies have single-purpose missions, which limit their ability to develop and implement multi-purpose programs and projects. Yet, in recent years, the potential for a transformation of the watersheds in this Region has emerged, beginning with visions of "restoring" the Los Angeles and San Gabriel Rivers, development of watershed management plans on most of the major tributaries and creeks, and the preparation of Integrated Resources Plans (IRPs) by large water and sanitation agencies. These Plans promote integrated efforts to manage resources and recognize that water and watershed resources are interconnected. Thus, the concept of integrated resource management in this Region is not new.

This IRWMP is an outgrowth of ongoing efforts to develop plans, projects, and programs at regional scales and utilize an integrated approach to water and other resource management issues.

1.3 Mission and Purpose

The Leadership Committee (established to guide preparation and implementation of this Plan) developed the following mission statement through a collaborative process within itself, five sub-regional Steering Committees, and stakeholder workshops at both regional and sub-regional levels.

The mission of this IRWMP is "to address the water resources needs of the Region in an integrated and collaborative manner."

The purpose of this IRWMP to improve water supplies, enhance water supply reliability, improve surface water quality, preserve flood protection, conserve habitat, and expand recreational access in the Region. Although this Plan is intended to meet Proposition 50 requirements in the short term, it is also intended to

define a comprehensive vision for the Region which will generate local funding, position the Region for future state bonds, and create opportunities for federal funding.

1.4 IRWMP Process

The intent of the Integrated Regional Water Management (IRWM) Grant Program is to encourage the development of integrated regional water resource management plans and to provide funding, through competitive grants, for integrated projects that protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water. The IRWM Grant Program is administered jointly by DWR and State Water Resources Control Board (SWRCB).

In response to the release of the IRWM Grant Program Guidelines (DWR, 2004), six regional groups within Los Angeles County submitted grant applications (in May 2005) to support development of an IRWMP, including the Santa Monica Bay Restoration Commission, the City of Los Angeles, the Watershed Conservation Authority, the Upper San Gabriel Municipal Water District (MWD), the West Basin MWD, and the City of Downey. Based on review of the applications, DWR recommended funding only one application–the Watershed Conservation Authority's. In response, representatives of the regional groups worked together and with DWR and the SWRCB to expand the funding pool and provide funds for additional applications. DWR expanded the funding pool and proposed a single grant of $1.5 million, on the condition that the six original applicants prepare a single consolidated plan for the Region. In November 2005, a consultant team was selected to consolidate the previous efforts and develop a single plan.

Although this process will result in a single consolidated plan, given the size and complexity of the Region and the number of stakeholders and agencies that may participate in the process, to manage the stakeholder input process and acknowledge geographic variation, the IRMWP includes five sub-regions:

- North Santa Monica Bay Watersheds;
- Upper Los Angeles River Watershed;
- Upper San Gabriel River and Rio Hondo Watersheds;
- Lower San Gabriel and Los Angeles Watersheds; and
- South Bay Watersheds.

The organizational structure for the IRWMP includes a Leadership Committee, chaired by the Los Angeles County Flood Control District (LACFCD), representatives of five sub-regional Steering Committees and five additional seats representing specific water management focus areas (including groundwater, sanitation, surface water supply, recreation and habitat, and stormwater). Each sub-regional Steering Committee includes agency, city, and stakeholder representatives, and additional representatives for the water management focus areas. This structure provides opportunities for coordination and integration of decision-making and stakeholder input. Committees are meeting monthly during development of the IRWMP.

To provide opportunities for direct input by the entire range of stakeholders in the Region, the IRWMP process also includes six workshops at the sub-regional level and four workshops at the regional level. Workshops focus on specific topics (e.g., objectives, project integration, and plan implementation). In addition, a public draft of the IRWMP will be made available for review and comment during Fall 2006.

To prepare this IRWMP, existing plans, studies, and documents were reviewed to determine the extent to which those documents reflected concepts of integrated resource management and to identify whether those documents could collectively be integrated into an IRWMP. As a result of this analysis, it was determined that the existing plans and studies cannot readily be assimilated into a functionally equivalent IRWMP and thus preparation of a coordinated IRWMP would be required.

This IRWMP utilizes and adapts as appropriate technical information from the original planning grant applications and various existing plans, studies, and documents. The discussion of water supply relies upon water supply and demand information from the Urban Water Management Plans from many water agencies in the Region and the Metropolitan Water District's Integrated Resources Plan. The regional description and discussion of water quality issues is derived from local watershed plans (including Arroyo Seco Watershed Restoration Feasibility Study, Ballona Creek Watershed Management Plan, Common Ground, from the Mountains to the Sea, Compton Creek Watershed Management Plan, Dominguez Channel Watershed Management Master Plan, Malibu Creek Watershed Management Area Plan, Rio Hondo Watershed Management Plan, Sun Valley Watershed Plan, and the draft Upper San Gabriel River Watershed Management Plan), and existing and proposed TMDLs. All of these documents, and input from the stakeholder workshops, provide a basis for the mission, objectives, and planning targets articulated in this IRWMP, the Region's short-term and long-term priorities, and the water management strategies that are relevant to this Region.

The development of the IRWMP will be supported by various Technical Memorandums (TMs) and related products, which deal with topics such as water management strategies, project integration, benefit/cost analysis, and framework for implementation, and provides the background and technical analysis that support the plan, including water supply and demand. Feedback from the Leadership Committee, Steering Committees, and stakeholder workshops will articulate how water management strategies can be integrated into regional project concepts and prioritization of which regional project concepts are most appropriate for the individual sub-regions, in response to characteristics of each sub-region.

A public review draft of the IRMWP is scheduled to be released in October, 2005, after which the document will be finalized and submitted for adoption by the members of the RWMG, during the months of November and December, prior to the deadline of January 1, 2007.

1.5 Consistency with IRWMP Standards

As identified in the IRWM Grant Program Guidelines (DWR, 2004), this IRWMP is consistent with the minimum IRWMP standards, which are summarized in Table 1-1

Table 1-1. IRWMP Minimum Standards

Standards	Location in IRWMP Document
Adopted by January 1, 2007	Section 1.4
Participation of at least three agencies, two of which have statutory authority over water management	Section 1.6.1
Provides a map of the region showing the local agencies	Figures 2-4(A)-(E) and Figure 2-5
Provides a map showing the location of the proposed implementation projects;	Figure 5-3
Contains one or more regional objectives	Section 3.1
Documents that the minimum list of water management strategies were considered	Section 4.1
Integrates two or more water management strategies	Section 4.2
Presents project prioritization and a schedule for project implementation to meet regional needs.	Tables 5-2 and 7-1

Source: California Department of Water Resources. 2004. Integrated Regional Water Management Grant Program Guidelines, November

1.6 Stakeholder Involvement

1.6.1 Regional Water Management Group

The Leadership Committee established to guide the development and implementation of the Plan serves as the Regional Water Management Group (RWMG) for the IRMWP, as makes formal decisions with respect to the scope and content of the Plan. Five sub-regional Steering Committees provide input to the Leadership Committee on the major issues contained in the Plan. Stakeholder workshops provide additional input to the process. As illustrated in Figure 1-1, stakeholder input to the RWMG is structured around the five sub-regional Steering Committees and stakeholder workshops.

The governance structure for the Leadership Committee and the Steering Committees is currently governed by interim operating guidelines. These guidelines were developed while the draft Memorandum of Understanding (MOU) is undergoing legal review by the agencies that initially developed planning grant applications. At such time as the MOU is finalized and adopted, then the terms of that document will supersede the interim guidelines.

The Leadership Committee has 11 voting members, as shown in Figure 1-2, including the LACFCD (committee chair), the chairs of the five sub-regional Steering Committees, and five stakeholder agencies representing the following water management strategy areas: groundwater; surface water; sanitation; habitat/open space; and stormwater. The committee also includes 14 ex-officio (non-voting members), including: Bureau of Reclamation; California Department of Fish and Game; California Coastal Commission; California Coastal Conservancy; California Department of Transportation; California DWR; California Environmental Protection Agency; California Regional Water Quality Control Board Los Angeles Region (RWQCB); Californian Department of Parks and Recreation; California Department of Health Services (DHS); Metropolitan Water District of Southern California; National Parks Service; U.S. Army Corps of Engineers; and U.S. Department of Agriculture (USDA) Forest Service.

The specific management responsibilities of the Leadership Committee voting members as relates to water management are summarized below.

- **Los Angeles County Flood Control District.** LACFCD provides for the control and conservation of the flood, storm, and other waste waters of the district. It also conserves such waters for beneficial and useful purposes by spreading, storing, retaining or causing them to percolate into the soil within the district. The district also protects the harbors, waterways, public highways and property in the district from damage from such waters and may provide for recreational use of district facilities. The district was created in 1915 and now operates and owns 14 major dams, 115 debris basins, 26 groundwater recharge facilities, 524 miles of major channels, 29 pump stations, 77,990 catch basins and 2,800 miles of storm drains. It also operates 14 rubber dams and three seawater intrusion barrier systems. In January 1985, the district consolidated with the County Engineer and the County Road Department for form the Department of Public Works. The Chief Engineer of the district, the County Engineer and Road Commissioner are the official positions of the Director of the Department of Public Works.

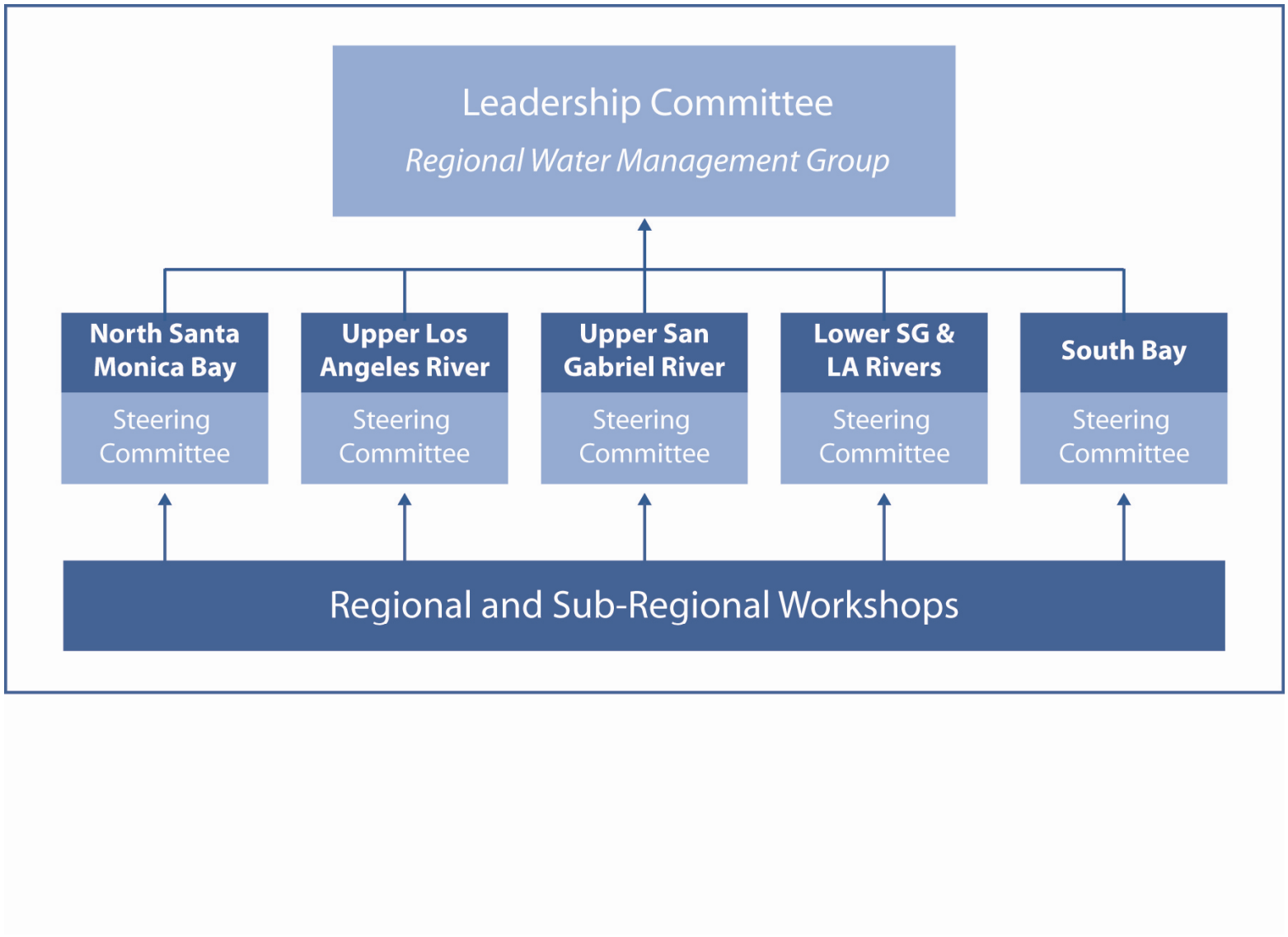

Figure 1-1. IRWMP Stakeholder Structure

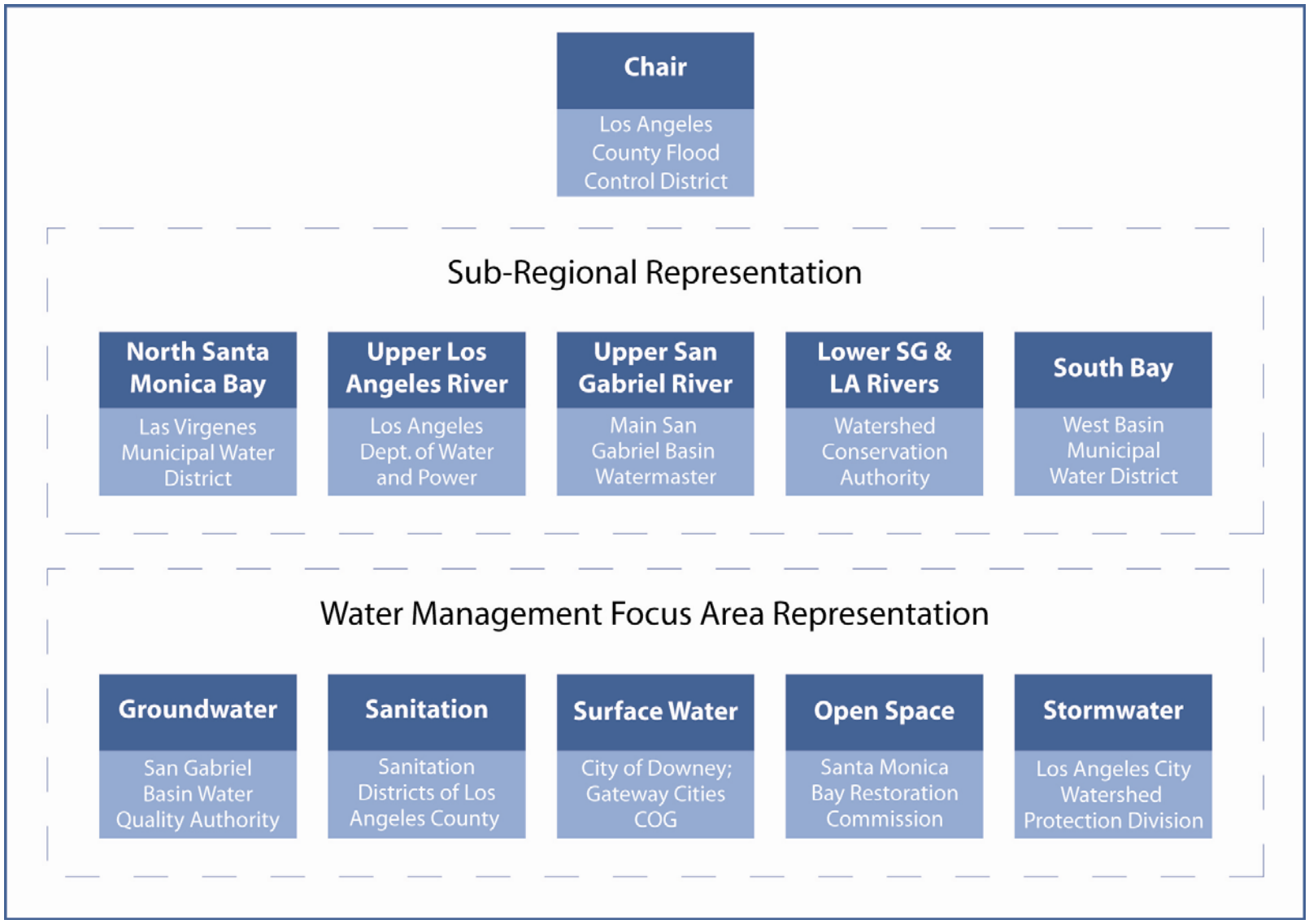

Figure 1-2. Leadership Committee Voting Members

- **West Basin MWD.** West Basin MWD is a public agency that wholesales imported water to cities, mutual water companies, investor-owned utilities and private companies in the South Bay and unincorporated areas of Los Angeles County, serving a population of more than 851,000. In addition, West Basin MWD provides the Region with recycled water for municipal, commercial and industrial uses. West Basin MWD owns the West Basin Water Recycling Facility in El Segundo, where approximately 28,000 acre-feet per year (acre-feet/year) of secondary treated wastewater from Hyperion Treatment Plant is additionally treated and distributed throughout the Region. Formed in 1947, West Basin MWD is committed to ensuring a safe and reliable water supply for the Region. West Basin MWD represents the South Bay Watershed sub-region on the Leadership Committee.
- **Las Virgenes MWD.** Las Virgenes MWD provides potable water, wastewater treatment, recycled water and biosolids composting to more than 65,000 residents in the cities of Agoura Hills, Calabasas, Hidden Hills, Westlake Village, and unincorporated areas of western Los Angeles County. Las Virgenes MWD works to maximize water resources by bringing water full circle. Wastewater is treated to be beneficially used as recycled water and biosolids compost. Las Virgenes MWD represents the North Santa Monica Bay Watersheds sub-region on the Leadership Committee.
- **City of Los Angeles Department of Water and Power.** Los Angeles Department of Water and Power (LADWP) is responsible for delivering reliable, safe water and electricity to 640,000 water customers (including households, multi-family dwellings, and businesses) and 1.4 million electric customers in the City of Los Angeles. LADWP represents the Upper Los Angeles River Watershed sub-region on the Leadership Committee.
- **Watershed Conservation Authority.** The Watershed Conservation Authority (WCA) is a joint powers entity between the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) and LACFCD whose focus is to provide multiple benefits such as open space, habitat restoration, and recreational opportunities in the Lower San Gabriel and Los Angeles Watersheds sub-region. WCA represents the Lower San Gabriel and Los Angeles Watersheds sub-region on the Leadership Committee.
- **Main San Gabriel Basin Watermaster.** The Main San Gabriel Basin Watermaster is the agency charged with administering adjudicated water rights within the watershed and managing groundwater resources in the Main San Gabriel Basin. The Main San Gabriel Watermaster represents the Upper San Gabriel River Watershed sub-region on the Leadership Committee.
- **San Gabriel Basin Water Quality Authority.** The San Gabriel Basin Water Quality Authority (WQA) was created by the State in 1993 to address the problem of groundwater contamination in the San Gabriel Valley, in part by coordinating the plans and activities of state and federal agencies and others involved in the cleanup. The WQA is empowered to address the problem of the migration of contaminated groundwater within the San Gabriel Basin and, in particular, the migration of contaminated water through the Whittier Narrows into the Central Basin. The WQA currently operates groundwater cleanup projects for beneficial uses in the San Gabriel Valley that are actively intercepting contaminated groundwater flowing toward the Whittier narrows. The WQA represents the Groundwater Water Management Area on the Leadership Committee.
- **County Sanitation Districts of Los Angeles County.** The County Sanitation Districts of Los Angeles County (LACSD) is a confederation of independent special districts serving about 5.1 million people in Los Angeles County. Its service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the County. LACSD constructs, operates, and maintains facilities to collect and treat approximately 530 million gallons per day (mgd) of municipal wastewater. Approximately 30% of the treated wastewater is reclaimed by LACSD, of which nearly one half is beneficially reused. LACSD also provides for the management of solid wastes including disposal, transfer operations, and materials recovery. LACSD represents the Sanitation Water Management Area on the Leadership Committee.

- **Gateway Cities Council of Governments.** The council serves as an advocate in representing the members of the Gateway Cities Council of Governments (COG) at the regional, state and federal levels on issues of importance to southeast Los Angeles County. The goal of the council is one of voluntary cooperation among the cities for the collective benefit of cities in southeast Los Angeles County. The Gateway Cities COG represents the Surface Water Management Area on the Leadership Committee, and the seat is currently held by the City of Downey.
- **Santa Monica Bay Restoration Commission (SMBRC).** The State of California and the U.S. Environmental Protection Agency (USEPA) established the Santa Monica Bay Restoration Project (SMBRP) as a National Estuary Program in December 1988. The Project was formed to develop a plan that would ensure the long-term health of the 266 square mile Santa Monica Bay and its 400 square mile watershed, located in the second most populous region in the United States. That plan, known as the Santa Monica Bay Restoration Plan, won State and Federal approval in 1995. On January 1, 2003, the Santa Monica Bay Restoration Project formally became an independent state organization and is now known as the Santa Monica Bay Restoration Commission. The SMBRC continues the mission of the Bay Restoration Project and the collaborative approach of the National Estuary Program but with a greater ability to accelerate the pace and effectiveness of Bay restoration efforts. The SMBRC represents the Habitat/Open Space Water Management Area on the Leadership Committee.
- **City of Los Angeles Bureau of Sanitation, Watershed Protection Division.** The Watershed Protection Division (WPD), founded in 1990, is responsible for the development and implementation of stormwater pollution abatement projects within the City, which covers approximately 23% of the Region. The WPD represents the Stormwater Water Management Area on the Leadership Committee.

The composition of the Leadership Committee achieves a cross sectional representation of all water management issues: Las Virgenes MWD, LADWP, and West Basin MWD are involved in water supply, conservation and water recycling issues; the Main San Gabriel Basin Watermaster and the San Gabriel Basin Water Quality Authority are focused on groundwater supply and groundwater quality issues, respectively; LACFCD deals extensively with stormwater quality, flood protection, and the conservation of stormwater runoff; the Gateway Cities Council of Governments provides the perspective of local cities on water issues; LACSD is the main agency for wastewater treatment, as well as a leader in water recycling; and the WCA and SMBRC are proponents for open space, habitat and water quality issues. Collectively, the members of the RWMG represent regional leadership in all water management areas.

To manage input from the stakeholders across the entire region and reflect local variations, five sub-regional Steering Committees were also established. Table 1-2 identifies the agencies and organizations represented on each of the sub-regional Steering Committees.

1.6.2 Agency and Stakeholder Participation

The IRWMP is the culmination of many years of prior planning efforts in the Region, as discussed above. These efforts include water supply and urban water management plans, resource management plans, river corridor master plans, and watershed plans. In the first stage of Plan development, some of these efforts coalesced to form larger sub-regional groups which submitted initial planning grant applications. The decision to consolidate these sub-regional efforts into a single plan thus benefits from many years of consensus building and has the potential to yield results that are more expansive than a stakeholder outreach process associated with development of a stand alone plan.

Table 1-2. Steering Committee Representation

South Bay Watersheds	North Santa Monica Bay Watersheds	Upper Los Angeles River Watershed	Lower San Gabriel and Los Angeles Rivers Watersheds	Upper San Gabriel River Watershed
• California Department of Water Resources • Central/West Basin MWD • City of Los Angeles Bureau of Sanitation • City of Torrance • County of Los Angeles Department of Public Works • County Sanitation Districts of Los Angeles County • Los Angeles Department of Water and Power • Mono Lake Committee • San Gabriel • Santa Monica Bay Restoration Commission • South Bay Cities COG • Water Replenishment District • West Basin Municipal Water District	• California Department of Parks and Recreation • California Coastal Conservancy • California Department of Transportation • City of Agoura Hills • City of Calabasas • City of Malibu • City of Westlake Village • County of Los Angeles Department of Public Works • Heal the Bay • Las Virgenes Municipal Water District • Los Angeles County Beaches & Harbors • Mountains Restoration Trust • National Park Service-Santa Monica Mountains NRA • Resource Conservatory of Santa Monica • Santa Monica Bay Restoration Commission • Santa Monica Baykeeper • Santa Monica Mountains Conservancy • Triunfo Sanitation District • Water District # 29 Los Angeles County Waterworks Div. • West Basin Municipal Water District	• Arroyo Seco Foundation • Burbank Water and Power • California Coastal Conservancy • City of Calabasas • City of Los Angeles • City of Los Angeles Department of Water and Power • City of Los Angeles Department of Recreation & Park • City of Los Angeles Dept. of Public Works Bureau of Sanitation • City of Pasadena • City of South Pasadena • Coastal Conservancy • Glendale Water and Power • Los Angeles & San Gabriel Rivers Watershed Council • Los Angeles County Department of Public Works • Mountains Recreation and Conservation Authority • Mountains Restoration Trust • Tujunga Watershed Council • Upper Los Angeles River Area Watermaster	• California Coastal Conservancy • City of Long Beach • Gateway COG—City Of Downey • Gateway COG—City of Lakewood • Gateway COG—City of Paramount • Los Angeles & San Gabriel Rivers Watershed Council • Los Angeles County Department of Public Works • Orange County, Resources and Development Management Department • County Sanitation Districts of Los Angeles County • Water Replenishment District • Watershed Conservation Authority • West Basin Municipal Water District	• California Department of Water Resources • Los Angeles & San Gabriel Rivers Watershed Council • Los Angeles County Department of Public Works • Main San Gabriel Basin Watermaster • Rivers and Mountains Conservancy • San Gabriel Basin Water Quality Authority • San Gabriel Valley Municipal Water District • San Gabriel Valley Water Association • Three Valleys Municipal Water District • Upper San Gabriel Valley Municipal Water District

Invitations to participate in stakeholder workshops, project identification, and plan development were transmitted to over 1,400 individuals representing hundreds of cities, agencies, districts, and organizations. A summary of the agencies and organizations included in this process follows.

- **Federal Agencies.** U.S. Army Corps of Engineers, Bureau of Reclamation, Forest Service, National Park Service, Natural Resources Conservation Service
- **State Departments and Agencies.** Caltrans, Fish and Game, Health Services, Parks and Recreation, Resources Agency, SWRCB, University of California Cooperative Extension, Water Resources
- **State Conservancies.** San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy, Coastal Conservancy, Baldwin Hills Conservancy;
- **Regional Agencies.** Southern California Association of Governments, Regional Water Quality Control Boards (Los Angeles and Santa Ana regions);
- **Special Districts.** County Sanitation Districts of Los Angeles County
- **Los Angeles County Departments.** Public Works, Regional Park and Open Space District, Parks and Recreation, Regional Planning, Beaches and Harbors;
- **Orange County Departments.** Resources and Development Management Department and Watershed and Coastal Resources;
- **Cities in Los Angeles County (including City Managers and Departments of Planning, Public Works, and Parks and Recreation).** Agoura Hills, Alhambra, Arcadia, Artesia, Azusa, Baldwin Park, Bell, Bellflower, Bell Gardens, Beverly Hills, Bradbury, Burbank, Calabasas, Carson, Cerritos, Claremont, Commerce, Compton, Covina, Cudahy, Culver City, Diamond Bar, Downey, Duarte, El Monte, El Segundo, Gardena, Glendale, Glendora, Hawaiian Gardens, Hawthorne, Hermosa Beach, Huntington Park, Industry, Inglewood, La Canada Flintridge, La Habra Heights, Lakewood, La Mirada, La Puente, La Verne, Lawndale, Long Beach, Los Angeles, Lomita, Lynwood, Malibu, Manhattan Beach, Maywood, Monrovia, Montebello, Monterey Park, Norwalk, Palos Verdes Estates, Paramount, Pasadena, Pico Rivera, Pomona, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Rosemead, San Dimas, San Fernando, San Gabriel, San Marino, Santa Fe Springs, Santa Monica, Sierra Madre, Signal Hill, South El Monte, South Gate, South Pasadena, Temple City, Torrance, Vernon, Walnut, West Covina, West Hollywood, Westlake Village, and Whittier;
- **Cities in Orange County (including City Managers and Departments of Planning, Public Works, and Parks and Recreation).** Anaheim, Brea, Buena Park, Cypress, Fullerton, La Habra, La Palma, Los Alamitos, Placentia, and Seal Beach;
- **Other Entities.** Non-profit organizations (trusts, foundations, conservancies, associations, societies, coalitions, alliances, councils); joint powers authorities, businesses, property owners; financial institutions; businesses and industry associations; Chambers of Commerce; educational institutions; civic organizations; and interested individuals; and
- **Water Agencies and Districts.** The major water wholesalers, regional water agencies, and individual cities with water departments were also invited to participate in the IRWMP process, as listed in Table 1-3. Each of the Region's districts and authorities are participants in the IRWMP process, and thus, all of the 92 cities in the Region are represented. With this participation, all entities that are party to groundwater basin adjudications in the Region are also represented. In addition, the Upper Los Angeles River Area Watermaster and the Main San Gabriel Basin Watermaster are participants in the process.

Table 1-3. Water Districts, Agencies, and Authorities in Greater Los Angeles IRWMP Region	
Regional District or Authority	Cities and Communities Served
Central Basin MWD*	Artesia, Bell, Bellflower, Bell Gardens, Cerritos, Commerce, Cudahy, Downey, East Los Angeles, Florence, Hawaiian Gardens, Huntington Park, La Habra Heights, Lakewood, La Mirada, Lynwood, Maywood, Montebello, Norwalk, Paramount, Pico Rivera, Santa Fe Springs, Signal Hill, South Gate, South Whittier, Vernon, Whittier
Foothill MWD*	Altadena, La Cañada Flintridge, La Crescenta, Montrose
Las Virgenes MWD*	Agoura, Agoura Hills, Calabasas, Chatsworth, Lake Manor, Hidden Hills, Malibu Lake, Monte Nido, Westlake Village, West Hills
Metropolitan Water District of Southern California	Anaheim, Beverly Hills, Burbank, Compton, Fullerton, Glendale, Long Beach, Los Angeles, Pasadena, San Fernando, San Marino, Santa Ana, Santa Monica, Torrance
Municipal Water District of Orange County*	Brea, Buena Park, Cypress, La Habra, La Palma, Los Alamitos, Placentia, Seal Beach
San Gabriel Basin Water Quality Authority	Municipal water districts, cities and water producers in the San Gabriel Valley
San Gabriel Valley MWD	Alhambra, Azusa, Monterey Park, Sierra Madre
Southeast Water Coalition Joint Powers Authority	Cerritos, Commerce, Downey, Huntington Park, Lakewood, Norwalk, Paramount, Pico Rivera, Santa Fe Springs, South Gate, Vernon and Whittier
Three Valleys MWD*	Azusa, Charter Oak, Claremont, Covina, Covina Knolls, Diamond Bar, Glendora, Industry, La Verne, Pomona, Rowland Heights, San Dimas, South San Jose Hills, Walnut, West Covina
Upper San Gabriel Valley MWD*	Avocado Heights, Arcadia, Baldwin Park, Bradbury, Citrus, Covina, Duarte, El Monte, Glendora, Hacienda Heights, Industry, Irwindale, La Puente, Mayflower Village, Monrovia, Rosemead, San Gabriel, South El Monte, South Pasadena, South San Gabriel, Temple City, Valinda, West Covina, West Puente Valley
Water Replenishment District of Southern California	Artesia, Bell, Bellflower, Bell Gardens, Carson, Cerritos, City of Commerce, Compton, Cudahy, Downey, El Segundo, Gardena, Hawaiian Gardens, Hawthorne, Hermosa Beach, Huntington Park, Inglewood, La Habra Heights, La Mirada, Lakewood, Lawndale, Lomita, Long Beach, Los Angeles, Lynwood, Manhattan Beach, Maywood, Montebello, Monterey Park, Norwalk, Palos Verdes Estates, Paramount, Pico Rivera, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Fe Springs, Signal Hill, South Gate, Torrance, Vernon, Whittier
West Basin MWD*	Alondra Park, Carson, Culver City, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Ladera Heights, Lawndale, Lennox, Lomita, Malibu, Manhattan Beach, Marina Del Rey, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Ross-Sexton, Topanga Canyon, Torrance, West Athens, West Hollywood

** Also served by the Metropolitan Water District of Southern California*

Sources: Metropolitan Water District of Southern California, San Gabriel Valley MWD, San Gabriel Basin Water Quality Authority, Southeast Water Coalition, Water Replenishment District of Southern California

With invitations to more than 1,400 individuals to participate in the process, the widespread participation of counties, cities, major water districts, agencies, authorities, flood control districts, Watermasters, the RWQCB, and numerous stakeholder organizations, and the representation of 70 jurisdictions and stakeholders on the Leadership and Steering Committees, all of the agencies and organizations that were necessary to address the objectives and water management strategies of the Plan are involved in the planning process.

1.6.3 Opportunities for Agency and Stakeholder Involvement

To develop the IRWMP that address regional issues, yet recognizes local conditions and preferences, a process has been established which relies on several mechanisms to involve stakeholders and incorporate their input: a series of Technical Memorandums (TMs), a series of stakeholder workshops (at the regional and sub-regional level), monthly sub-regional Steering Committees, monthly Leadership Committee meetings, project website, and e-mail notices. All of the project meetings are open to the public. The methods for stakeholder involvement and input are described below.

- **Technical Memorandums.** A significant body of work related to water supply, surface water quality, and open space is contained within numerous plans, reports, and studies. Rather than attempt to synthesize those documents directly in the IRWMP document, a series of TMs will be developed. These will incorporate and integrate stakeholder-generated information and cumulate that information across the entire region. In addition, a summary of existing plans, reports and studies, is being compiled to confirm the relevance of these various documents, along with interviews with selected stakeholders (e.g., water supply agencies) to obtain the individual perspective of those entities. As of the completion of this Draft Plan, the first four TMs have been completed on Water Supply, Water Quality/Flood Management, Open Space, and Integrated Water Strategies. Subsequent TMs will address topics of Project Integration, Benefit Assessment, Framework for Implementation, and Data Management.
- **Regional Workshops.** To encourage the formation of partnerships a series of regional stakeholder workshops will be held. The content of these meetings will include: background, context and schedule; objectives and strategies; implementation priorities and strategies; and review of the Plan. As of this Draft Plan, the first two regional workshops have been held.
- **Sub-Regional Stakeholder Workshops.** The major avenue for stakeholder input consists of sub-regional workshops. A total of 25 sub-regional workshops are proposed to be held, with five in each of the five sub-regions, to provide background on the IRWMP process; identify issues, opportunities and constraints; develop opportunities for project integration; prioritize methods to meet the objectives; and consider implementation options and strategies. As of this Draft Plan, fifteen total workshops (the first three rounds) have been held.
- **Steering Committees.** The sub-regional Steering Committees provide a forum for more detailed discussion of the issues related to development of the Plan and to provide input on issues being considered by the Leadership Committee, such as the selection of Step 2 projects. The Steering Committees also are used to prepare for the upcoming sub-regional stakeholder workshops. As of the Draft Plan, 30 Steering Committee meetings have been held (five in each sub-region).
- **Leadership Committee.** The Leadership Committee meets at least once per month and meets more frequently as needed, to provide direction for the plan development process, make decisions regarding administration of the Plan, and determine project priorities (e.g., the selection of Step 2 projects).
- **Project Website.** A project website has been developed (www.lawaterplan.org) to facilitate the distribution of project information to stakeholders. The website contains background information about the IRWMP plan development, a calendar of all meetings and workshops, and contact information for all Leadership Committee members. The website also contains a database tool through which

stakeholders can input information about projects or project concepts to be incorporated into the IRWMP.

- **E-Mail Communications.** Electronic mail is the main tool used to maintain a high level of stakeholder communication and engagement. All meetings and workshop announcements are sent as far in advance as possible to the latest list of stakeholders. In addition, various stakeholder groups (e.g., the Ballona Creek Watershed Task Force) are forwarding IRWMP messages to their constituencies, thereby extending the reach to additional stakeholders.

With this structure, and under the guidance of the Leadership Committee, stakeholders have the opportunity to influence water management related decisions in an efficient manner. To date, stakeholders have been instrumental in the following:

- Developing the IRWMP mission and objectives;
- Refining procedures for how projects are incorporated into the IRWMP; and
- Recommending improvements to stakeholder workshops.

As the IRWMP continues to be developed, stakeholders will help influence water management related decisions by:

- Helping to define integration strategies;
- Articulating short and long-term priorities; and
- Helping to craft implementation strategies.

Once the complete plan is developed, it will be made available for review by stakeholders and the general public. Comments received will be reviewed for consideration by the Leadership Committee for incorporation into the Final Plan as appropriate.

It is proposed that the overall regional stakeholder organization illustrated in Figure 1-1 will be maintained through the implementation phase. Recommendations relative to potential new stakeholders to be involved as well as stakeholder involvement process (e.g., website maintenance, frequency of workshops) will be included in the implementation strategy articulated in the Final IRWMP.

1.6.4 Disadvantaged Community Outreach

In addition to the general outreach strategies a special focus has been given to engage disadvantaged communities in the Region. An initial assessment was completed by conducting a census analysis of the five sub-regions, and identifying and mapping all communities with a median income below 80 percent of Statewide Median Household income – the state qualification for Disadvantaged Community (DAC) under Proposition 50, Chapter 8. Only the North Santa Monica Bay Watershed has no qualifying communities. Activities conducted to date to expand DAC participation include:

- A gap analysis was conducted of the stakeholder invitation lists to determine which disadvantaged communities in the plan area are not represented or underrepresented. A strategy was developed to increase participation from each of these communities by reaching out to selected agencies in those communities, including public works, community development, and parks and recreation. As the invitation list grows it will be cross-checked with sign-in sheets to assure that representatives from the identified disadvantaged communities are participating.
- Outreach to leaders of the statewide Environmental Justice Coalition for Water (EJCW) to introduce them to the planning effort. Based on feedback from the EJCW, additional communities and groups were added to the stakeholder lists.

- A meeting was conducted with the convener of the Los Angeles Working Group on the Environment (LAWGE) to discuss the DAC strategy. All members of the LAWGE have been invited to participate in the process. The LAWGE is a coalition of over 50 environmental and environmental justice groups that have been working together since 2005 to develop a cohesive environmental agenda for the City of Los Angeles. They have recently completed a list of top 18 recommendations for the City and presented them to top mayoral staff. Several of the recommendations are focused on safe and reliable water supply. Other areas of concern include adequate flood protection, air quality, equitable distribution of public open space, and a transparent public process in land use and resource allocation decision making.
- Other opinion leaders were contacted to discuss strategy, including representatives of the Desalination Response Group and the Mono Lake Committee.

Next steps for the DAC outreach strategy are:

- Outreach to Councils of Government (COGs). Meetings and presentations are currently proceeding with the South Bay Cities and Westside Cities COGs;
- Coordinate between sub-regional managers and Los Angeles County Department of Public Works (LACDPW) staff to assure coverage of unincorporated areas in each sub-region;
- Identify options to provide access for those without email or easy computer access to participate, such as assigning a phone contact point in each sub-region;
- Contact staff of Los Angeles Neighborhood Initiative (LANI) program regarding outreach to their stakeholders. LANI presently serves 17 diverse underserved neighborhoods in the City of Los Angeles that are economically-challenged residents and businesses, transit-dependant populations, and have a declining, blighted neighborhood main street (where LANI focuses initial improvements);
- Reach out to additional community groups who focus their efforts in economically disadvantaged communities including: Amigos De Los Rios, People for Parks, The Metropolitan Alliance, SCOPE, Pacoima Beautiful, and Communities for a Better Environment;
- Engage Los Angeles Unified and other local school districts in the planning effort;
- Continue outreach to watershed stakeholder groups including the Ballona Creek Task Force, Dominguez Watershed Advisory Council, Sun Valley Stakeholders Group, Tujunga Watershed Project Steering Committee, and Compton Creek Watershed Advisory Group;
- Work with the Los Angeles Department of Neighborhood Empowerment (DONE) to engage registered neighborhood councils located in disadvantaged communities. Include a review of projects posted on the "Neighborhood Café" page on the DONE website for project linkages; and
- Coordinate with other regional planning efforts with projects slated for disadvantage communities.

1.7 Stakeholder Outcomes

A number of outcomes will result from the stakeholder involvement and coordination process. These outcomes include opportunities to develop partnerships, ability to identify possible obstacles to Plan implementation, and opportunities to coordinate with State or federal agencies, and identify areas where a State agency or agencies may be able to assist in implementing the Plan. Outcomes to date are discussed below. These outcomes will be supplemented in the final document.

1.7.1 Vision Exercise

Stakeholders provided input about their vision for the Region in the first IRWMP sub-regional public workshops.

Comments from that exercise have been summarized as a series of underlying values that provide broad guidance for future actions:

- Respect, celebrate, and design with nature;
- Recognize the true value of local water resources;
- Pursue integrated solutions based on integrative watershed resource management;
- Work together for the greater economic benefit of the area; and
- Enable open public dialog around contentious issues.

1.7.2 Partnerships

One of the benefits of the IRWMP process is that it brings together disparate groups into a forum where common needs and opportunities for collaboration and integration can be identified. There have been many examples of partnerships that have formed to date in the IRWMP process, including the formation of the Leadership Committee and the Steering Committees, which have required multiple agencies to work together at new planning scales, both regional and sub-regional. As the process continues, it is anticipated that several types of partnerships will form, including geographic partnerships between jurisdictions in close proximity, public-private partnerships between public agencies and stakeholder organizations with common interests, and common-purpose partnerships, between entities with similar goals.

In addition, the identification of projects has lead to the formation of collaborative partnerships and will likely continue to do so during plan implementation. One example is demonstrated by a Large Landscape Conservation Project (described in Section 5) which is a partnership between the Surfrider Foundation and the West Basin MWD. Although the interests and roles of the two partners are very different, they have found that implementation of the project will meet some of their shared goals. Water conservation is important to the West Basin MWD as it will reduce imported water supplies and help to improve water supply reliability for the region. Water conservation is also important to the Surfrider Foundation because it will reduce dry weather urban runoff to the Santa Monica Bay. By working together these two partners are increasing chances for successful implementation and thus the ability to meet their own goals.

1.7.3 Coordination with Federal and State Agencies

The development of a plan focused on the integrated water resource management will benefit from the involvement of, and coordination with, a variety of state and federal agencies. A list of the agencies invited to participate in this effort was provided in Section 1.6.2 above. Federal, state and regional agencies included as Ex Officio members of the Leadership Committee are: U.S. Bureau of Reclamation; California Department of Fish and Game; California Coastal Commission; California Coastal Conservancy; California Department of Transportation; California DWR; California Environmental Protection Agency; California Regional Water Quality Control Board, Los Angeles Region (RWQCB); Californian Department of Parks and Recreation; California Department of Health Services (DHS); Metropolitan Water District of Southern California; National Parks Service; U.S. Army Corps of Engineers; and U.S. Department of Agriculture (USDA) Forest Service. Several of those agencies also participate at the sub-regional level, as noted in Table 1-2.

The involvement of state and federal agencies such as the National Park Service and the U.S. Army Corps of Engineers will be critical during the implementation phase. Examples are provided below:

- Federal agencies such as the National Park Service own a great deal of land which can impact the North Santa Monica Bay Watersheds. The National Forest Service manages large portions of the Upper Los Angeles Watershed and Upper San Gabriel and Rio Hondo Watersheds.

- The Angeles National Forest is the headwaters of the San Gabriel River watershed and has experienced problems with sedimentation following catastrophic wildfires. To address this problem the Upper San Gabriel Valley MWD is partnering with the USDA Forest Service to replant forests that have been denuded by wildfires.
- The U.S. Army Corps of Engineers is a desired partner in flood damage reduction projects and a necessary partner in any project that affects a Corps-constructed flood control channel. Additionally, it is a necessary partner in any dam-related activities, such as the removal of Rindge Dam in the North Santa Monica Bay Watershed. It also is important in conducting feasibility studies on restoration of local watersheds, including the Arroyo Seco and Ballona Creek, and could play a role in future funding opportunities related to ecosystem restoration along the rivers and major flood control channels.

Similar examples apply to state agencies involvement.

- California State Parks is already an active stakeholder. Its participation is critical as habitat projects may be implemented on state parks land. As an active project proponent, it can assist the IRWMP effort by communicating the importance of its projects to the public.
- RWQCB representatives are also engaged in the IRWMP process and are involved in parallel efforts to develop TMDLs and the associated TMDL Implementation Plans. By maintaining contact with both TMDL and IRWMP efforts, the RWQCB can identify projects that will meet TMDL requirements while simultaneously meeting other regional needs. By streamlining the process and avoiding duplication of efforts, the RWQCB can make maximize available funds.
- Southern California-based staff from California DWR attend most Leadership Committee and sub-regional Steering Committee meetings to observe the discussion and provide comments and suggestions about potential relationships between local and Statewide water resource planning.

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2. REGIONAL DESCRIPTION

2.1 Regional Overview

The Region, an area of approximately 2,058 square miles, is located in coastal southern California, as shown in Figure 2-1. The Region contains portions of four counties, Los Angeles, Orange, Ventura, and San Bernardino, and is bordered by two other IRMWP planning regions: the Watershed Coalitions of Ventura County (which consolidated the Ventura County and Calleguas Creek Watershed efforts) on the west and Orange County's IRWMP to the South. The Mojave Water Agency's Regional Water Management Plan is located to the northeast of the Region.

Although the development of an IRWMP at this scale was not originally suggested by local stakeholders, the preparation of an IRWMP for this Region is appropriate, given the consistency of the major water resource management issues, including substantial dependence on imported water, poor surface water quality due to urban and stormwater runoff, opportunities to expand production and utilization of recycled water, and significant groundwater resources in much of the area. Thus, water resource management planning at this scale is an opportunity to estimate the potential for optimized use of stormwater, recycled water, and groundwater resources to reduce dependence on imported water and enhance water supply reliability.

2.2 Physical Setting

2.2.1 Geology and Geomorphology

The geography of the Region can generally be divided into four distinct types: the coastal plain, inland valleys (e.g., San Fernando, San Gabriel, Pomona, and Walnut), foothills that generally surround the valleys, and two mountain ranges (the Santa Monica and San Gabriel Mountains). These mountains are part of the Transverse Ranges, which extend 350 miles east to west from the Eagle Mountains in San Bernardino County to the Pacific Ocean. To the north, the San Gabriel Mountains separate the Los Angeles basin from the Mojave Desert. To the west, the Santa Monica Mountains separate the Los Angeles basin from the Ventura basin. Topography in the Region ranges from sea level to over 10,000 feet in the San Gabriel Mountains. Most of the coastal plain is less than 1,000 feet in elevation. The foothills reach 3,000 to 4,000 feet before rising rapidly into the San Gabriels, to a height of 10,064 at Mt. San Antonio (Mt. Baldy). The grade of the mountain slopes in the San Gabriels average 65 to 70 percent, some of the steepest slopes in the world.

Geology varies from Precambrian metamorphic rocks (1.7 billion years old) to alluvial deposits washed down from mountain canyons. The San Gabriel Mountains are young mountains, geologically speaking, and continue to rise at a rate of nearly three-quarters of an inch per year. Because of this instability, they are also eroding at a rapid rate. Alluvial deposits of sand, gravel, clay and silt in the coastal plain are thousands of feet thick in some areas, due in part to the erosive nature of the San Gabriel and Santa Monica Mountains.

Figure 2-1. Greater Los Angeles County Region Context

The Region is extensively faulted, with the San Andreas Fault bordering the north side of the San Gabriels and the Sierra Madre–Cucamonga fault zone on the south side. Throughout the Region are hundreds of lesser fault systems, such as the Newport-Inglewood fault that runs from Newport Beach to Beverly Hills via Long Beach and Signal Hill. The most notorious are those that have been the cause of major earthquakes during the past few decades, known not by name but by the region in which they struck: Sylmar in 1971, Whittier Narrows in 1987, and Northridge in 1994.

2.2.2 Climate

The Region is within the Mediterranean climate zone, which extends from Central California to San Diego. Wet winters and long dry summers characterize this climate.

The geography of the Los Angeles Region results in a great deal of spatial variation in the local climate. The abrupt rise of the mountains from the coast creates a barrier that traps moist ocean air against the southerly slopes and partially blocks the desert summer heat and winter cold from the interior northeast. The common perception of the region as desert is misleading. The coastal plain may be more appropriately termed "semi-arid," although portions of the San Gabriel Mountains receive considerable snow and rainfall most years.

Summers are dry, with most precipitation falling in a few major storm events between November and March. Long-term annual rainfall averages vary from 12.2 inches along the coast, 15.5 inches in downtown Los Angeles to 27.5 inches in the mountains. The maximum-recorded 24-hour rainfall in the Region was 34 inches in the mountains and 9 inches on the coastal plain.

2.3 Internal Boundaries

2.3.1 Sub-Regional Boundaries

To manage stakeholder input and acknowledge local variation, the Region includes five sub-regions:

- North Santa Monica Bay Watersheds;
- Upper Los Angeles River Watershed;
- Upper San Gabriel River and Rio Hondo River Watersheds;
- South Bay Watersheds; and the
- Lower San Gabriel and Los Angeles Watersheds, as shown on Figure 2-2.

2.3.2 Watershed Boundaries

The Los Angeles and San Gabriel Rivers drain approximately 1,513 square miles of the Region and discharge to San Pedro Bay. These two watersheds are connected via the Rio Hondo, which transfers water during large storm events from the San Gabriel to the Los Angeles River. Other major watersheds in the region include Malibu Creek, Topanga Creek, Ballona Creek, and the Dominguez Channel. Various smaller watersheds drain directly to Santa Monica or San Pedro Bays. Based on the Watershed Management Initiative Chapter (of the Basin Plan prepared by the Los Angeles RWQCB) the IRWMP Region can be described as including the Los Angeles River Watershed, San Gabriel River Watershed, Santa Monica Bay Watershed Management Area (WMA) and the Dominguez Channel WMA. The RWQCB's WMAs are shown on Figure 2-3.

Figure 2-2. Greater Los Angeles County Sub-Regions

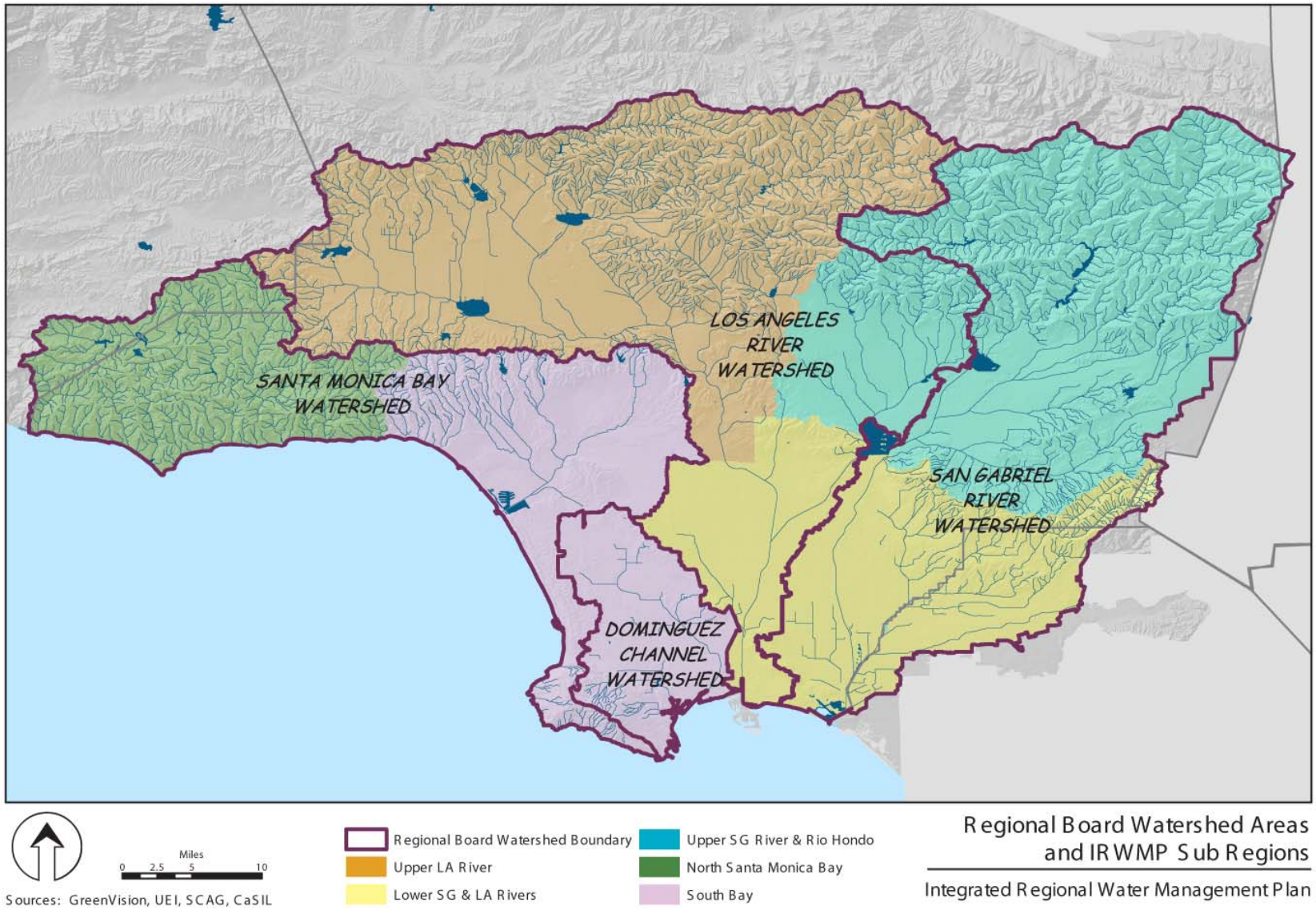

Figure 2-3. Greater Los Angeles County Region Watershed Management Areas

Given the extent of urbanization, within the developed coastal plain and interior valleys, both of the rivers, all major creeks, and most tributaries have been channelized, while the creeks and streams within the San Gabriel Mountains and Santa Monica Mountains generally are unchannelized, with minimal improvements at some locations.

2.3.3 Political Boundaries

The Region includes portions of 4 counties and 92 cities. Figures 2-4(A) through 2-4(E) depict the county and city boundaries within each of the five sub-regions.

2.3.4 Major Water Supply Boundaries

Within the Region, there are 35 institutions that provide water or wastewater services or manage groundwater resources. The boundaries of the major water wholesale districts and city-operated water agencies, with the five Greater Los Angeles IRWMP sub-regions overlain, are shown on Figure 2-5.

2.4 Sources of Water Supply

The Region has developed a diverse mix of local and imported water supply sources. Local water resources include groundwater, surface water, recycled water, water conservation, water transfers, and storage. Water is imported through the California State Water Project (SWP), the Colorado River Aqueduct, and the Los Angeles Aqueducts. Major water supply sources are described below and include:

- Groundwater;
- Local surface water;
- Imported water;
- Recycled water;
- Water transfers; and
- Storage.

2.4.1 Groundwater

Groundwater represents a significant portion of local supplies in the Region, approximately 23 percent of the Region's entire supply in an average year, and 29 percent in a dry year. Most groundwater basins in the Region are adjudicated (via a court decision) and producers within these basins must follow management guidelines established by their respective adjudications. Exceptions are the Orange County Basin, Santa Monica Basin and Hollywood Basin. The City of Santa Monica plans to implement a groundwater management plan for that basin. The Orange County Basin (which extends outside the southern boundary of the Region) is managed by Orange County Water District, which was established in 1933.

Groundwater basin recharge can occur via percolation of rainwater (natural recharge), however due to extent of impervious surfaces and the presence of clay soils in the Region, natural recharge is typically insufficient to maintain basin water levels and pumping levels. Many agencies therefore rely on artificial recharge, by diverting local supplies from rivers or creeks when flow conditions are optimal, to spreading grounds (or basins) which typically contain sandy soils that promote infiltration. In some locations, spreading is limited because of the capacity limitations of the spreading facilities rather than being limited by water supply. Concern about the presence of urban contaminants in stormwater may also limit the amount of local water that can be recharged. In addition, recycled water is infiltrated in spreading grounds and injected along the coast to form barriers to seawater intrusion at three locations (the Alamitos, Dominguez Gap, and West Coast Basin Barriers). This water source augments and blends with groundwater, which is eventually extracted for potable use.

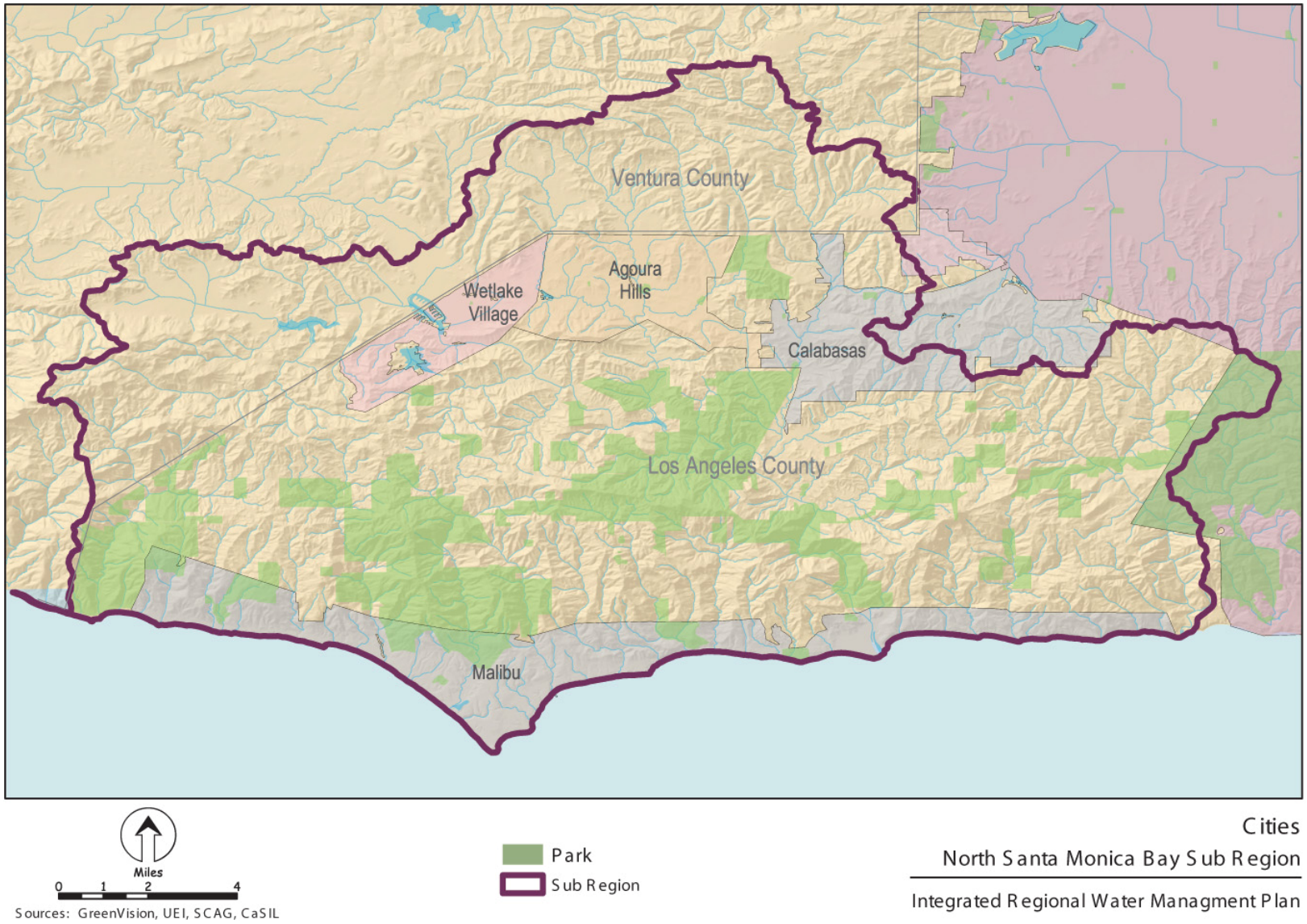

Figure 2-4(A). Cities in North Santa Monica Bay Watersheds Sub-Region

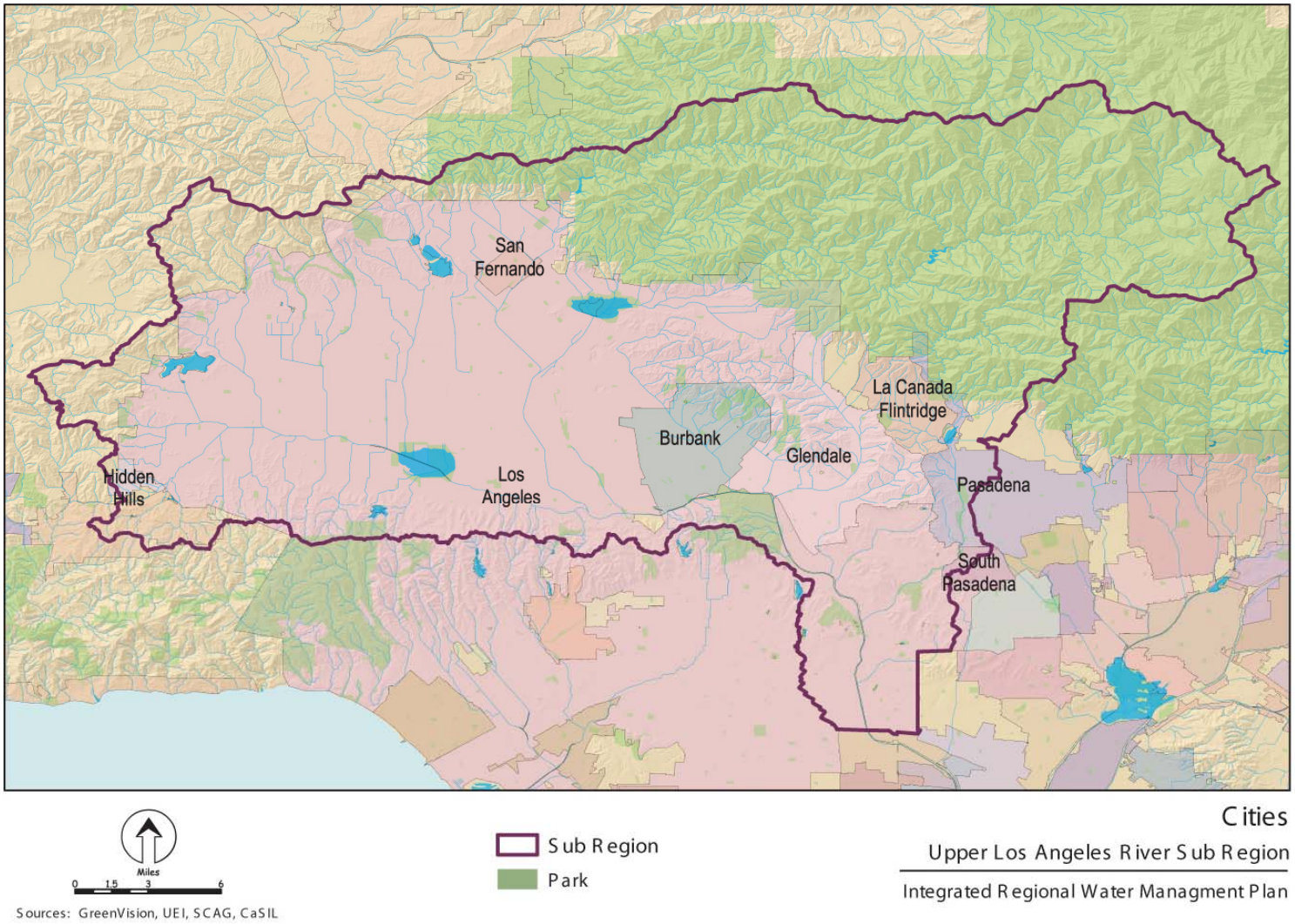

Figure 2-4(B). Cities in Upper Los Angeles River Watershed Sub-Region

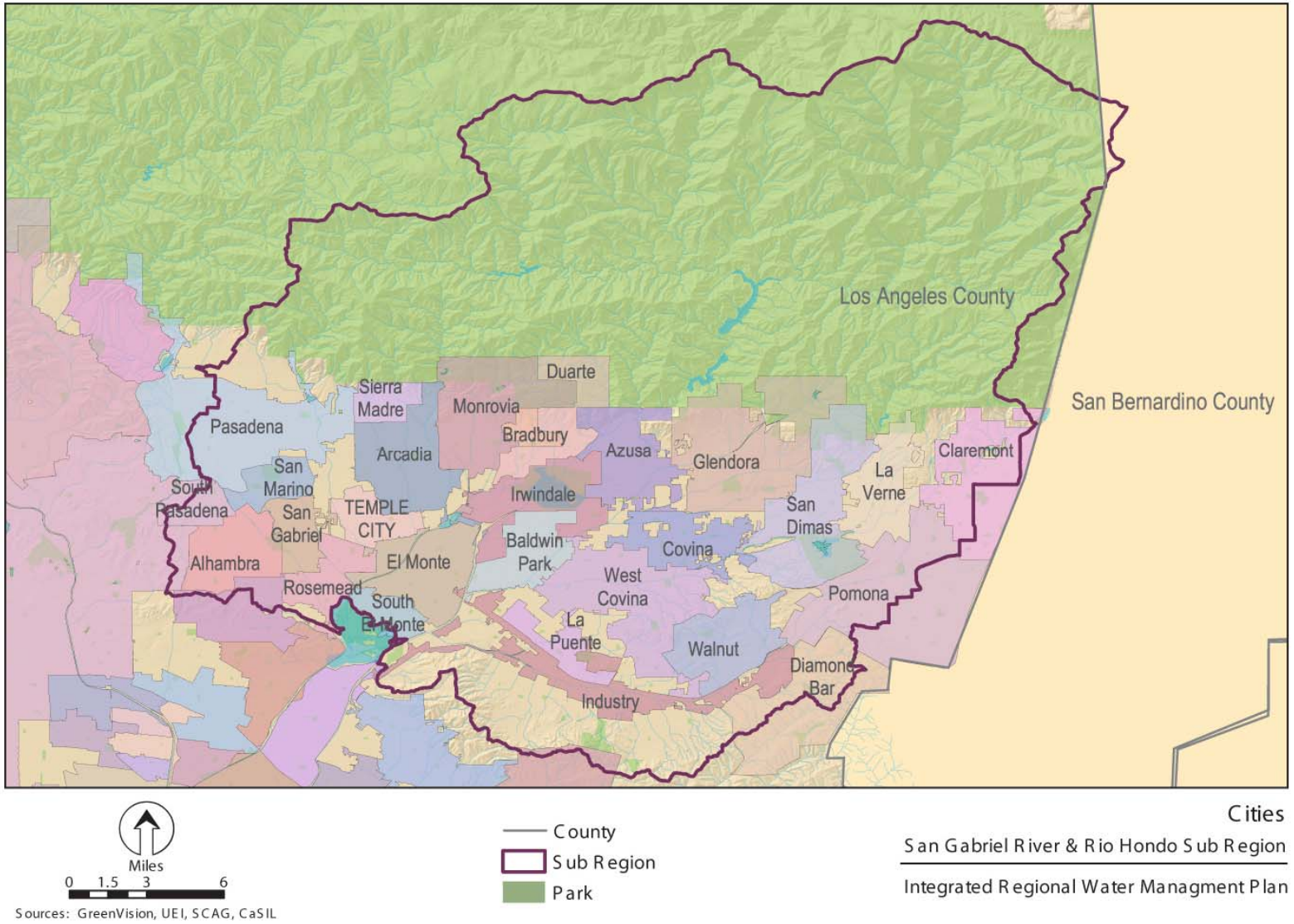

Figure 2-4(C). Cities in Upper San Gabriel River and Rio Hondo Watersheds Sub-Region

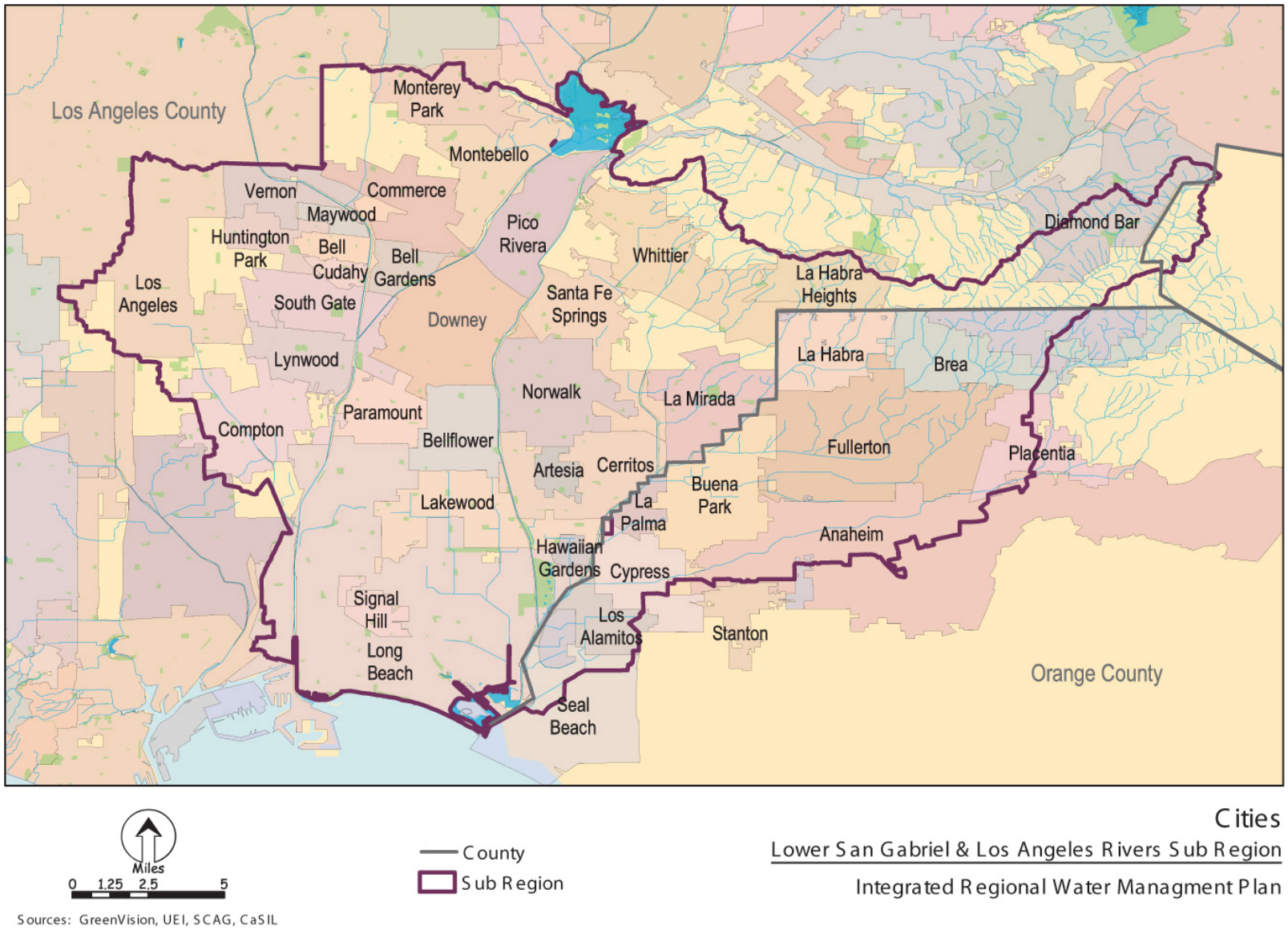

Figure 2-4(D). Cities in Lower San Gabriel and Los Angeles Watersheds Sub-Region

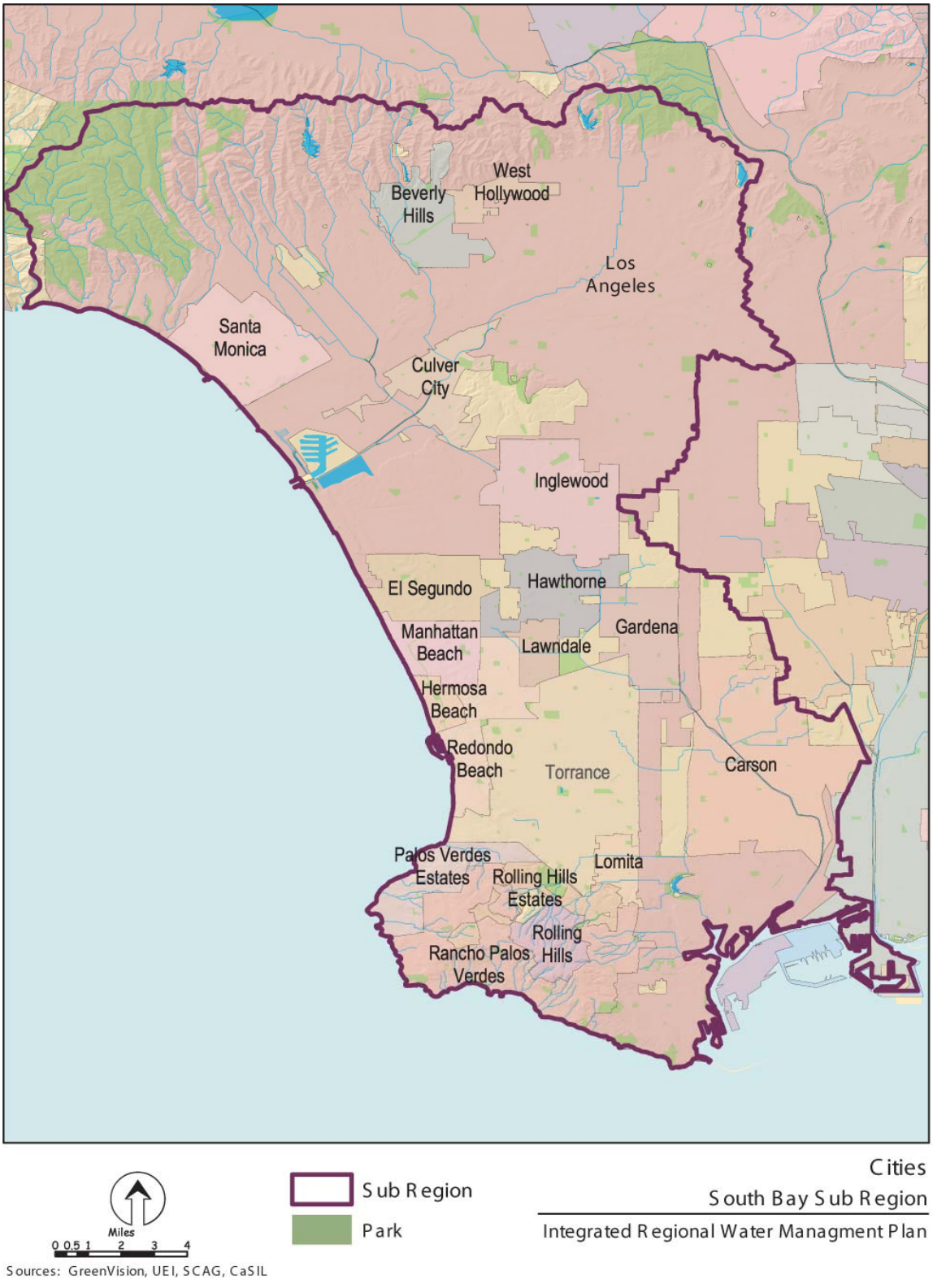

Figure 2-4(E). Cities in South Bay Watersheds Sub-Region

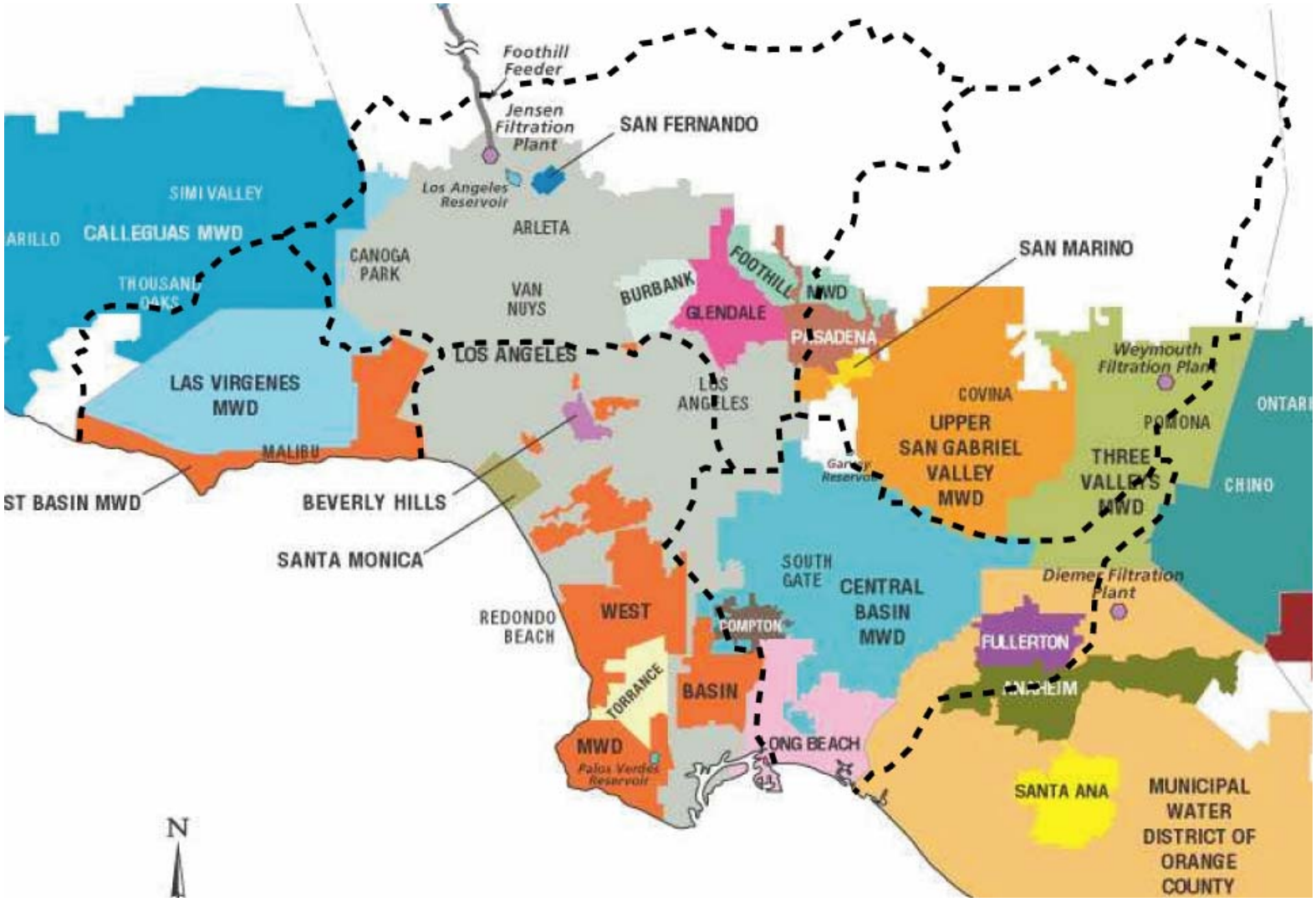

Figure 2-5. Major Water Suppliers

Conjunctive use programs may also be implemented to recharge basins, where imported water is recharged via spreading grounds or injection wells. Recharge can also occur "in-lieu," when an agency suspends production from its wells and uses imported supplies to supply customers. This reduction in pumping permits groundwater levels in the basin to build up. The amount of water that can be recharged in the basin may be limited by local runoff, recharge capacity, overlying groundwater demands, and water rights.

Most of the time, it is more cost effective for agencies to pump groundwater rather than purchase imported water. Thus, most groundwater agencies' strategy is to produce as much groundwater as they are able, up to annual yield limitations without significantly impacting groundwater levels, and meet the balance of the customer demand through imported water.

Groundwater basin water quality is a significant issue in the Region, as natural conditions result in high dissolved salt levels. In some aquifers, salt levels are so high the water is termed "brackish," which either requires advanced treatment to make the supply usable or blending the treated water with other supplies that have a lower salt content. In addition, land use practices and production practices have deteriorated water quality in portions of certain groundwater basins. Many factors have contributed to the deterioration of water quality including historic overdrafting of groundwater basins (sometimes resulting in seawater intrusion), industrial discharges, agricultural chemical usage, contaminants in urban runoff, and naturally occurring organics. The cost of treating these contaminants is often significant, and for some improperly disposed chemicals, effective treatment has not yet been identified. Various agencies, including the Metropolitan Water District and the San Gabriel Basin Water Quality Authority have implemented pilot programs to assess treatment options.

2.4.2 Local Surface Water

2.4.2.1 Los Angeles River

The Los Angeles River flows 51 miles from the union of Bell Creek and Arroyo Calabasas in the San Fernando Valley, then southeast through the City of Burbank and eventually southward to Long Beach. Originally, the Los Angeles River was the primary water source for the City of Los Angeles. To reduce the risk of catastrophic floods, the U.S. Army Corps of Engineers encased most of the river bed and banks in concrete, effectively eliminating interaction between groundwater and surface water, except for those portions where the natural bottom was retained. Today, the river is primarily fed from stormwater, effluent from wastewater treatment plants, urban runoff, base flow from the Santa Monica and San Gabriel Mountains, and groundwater inflow in the Glendale Narrows. Runoff from several tributaries is diverted to spreading grounds and facilities at various locations in the San Fernando Valley.

2.4.2.2 San Gabriel River

The San Gabriel River flows 75 miles southwest from San Gabriel Mountains, then southward from the Whittier Narrows to its discharge in the City of Seal Beach. Unlike the Los Angeles River, the San Gabriel River has a natural bed for most of its length, although the banks are armored with rip rap and cement for flood control purposes. Today, the river is fed by stormwater, base flow from the San Gabriel Mountains, urban run-off and effluent from wastewater treatment plants. Municipalities in the upper portion of the watershed receive portions of their water supply from surface water runoff from the San Gabriel Mountains. Significant quantities of surface water from the San Gabriel River are also used for groundwater recharge in several locations. During the dry season, the presence of dams and other diversions results in river flows that are sometimes discontinuous, as some river reaches are dry, while others have surface flows.

2.4.3 Imported Water

2.4.3.1 State Water Project

The California SWP is a system of reservoirs, pumps and aqueducts that carries water from Lake Oroville and other facilities north of Sacramento to the Sacramento-San Joaquin Delta and then transports that water to central and southern California. Although the system was never fully completed and typically delivers less than designed, when water is available the SWP is able to deliver its contractual amount of slightly more than four million acre feet of water a year. Environmental concerns have limited the volume of water that can be pumped to the SWP. The potential impact of further declines in ecological indicators in the Bay-Delta system on SWP water deliveries is unclear. Uncertainty about the long-term stability of the levee system surrounding the Delta system raises concerns about the ability to transfer water via the Bay-Delta to the SWP.

The Metropolitan Water District's contract with DWR, operator of the project, is for 2,011,000 acre-feet of water per year – about half the total project. However, Metropolitan projects a minimum dry year supply from the State Water Project of 650,000 acre-feet, and average annual deliveries of 1.5 million acre-feet. These amounts do not include water which may become available from transfer and storage programs.

Metropolitan began receiving water from the SWP in 1972. The infrastructure built for the project has become an important water management tool, especially for southern California and is used for moving not only annual entitlement from the State Water Project but also transfer water from other entities. Metropolitan, among others, has agreements in place to store water at a number of points along the aqueduct, primarily in Kern County. When needed, the project facilities can be used to move water hundreds of miles to southern California. However, there are certain obstacles that must be overcome, including substantive limitations on the movement of water across the Bay-Delta system, constraints related to the quality of water, and the cost of the water. Generally speaking, DWR will not allow water in their aqueduct that is of lower quality than its own water. DWR also requires a payment for use of the facilities and the power necessary to move the water.

2.4.3.2 Colorado River

The 242-mile Colorado River Aqueduct, completed in 1941 to deliver water to the southern California coastal plain, has a capacity of 1.2 million acre-feet/year. California is entitled to 4.4 million acre-feet/year. Of this amount, the first three priorities are for 3.85 million acre-feet are assigned in aggregate to the agricultural agencies along the river. Metropolitan's fourth priority entitlement is 550,000 acre-feet/year. Until only a few years ago Metropolitan routinely had access to 1.2 million acre-feet/year because Arizona and Nevada had not been using their full entitlement and the Colorado River flow was often above average, yielding surplus water that was made available to California and thus to Metropolitan.

While the Quantification Settlement Agreement (QSA) affirms the state's right to 4.4 million acre-feet/year, water allotments to California from the Colorado River could be reduced during future droughts along the Colorado River watershed as other states increase their diversions in accord with their authorized entitlements. California's Colorado River Water Use Plan and the QSA identify measures to conserve water (such as the lining of existing earthen canals) and to shift some water from agricultural use to urban use. Such transfers between willing sellers and willing buyers would offset potential reductions in future deliveries of urban water made available by the Colorado River. By 2020, the QSA programs will result in over 200,000 acre-feet of additional water for urban Southern California

2.4.3.3 Los Angeles Aqueducts

The Los Angeles Aqueducts deliver high-quality water from the Mono Basin and Owens Valley to the City of Los Angeles. Construction of the original 233-mile Los Angeles Aqueduct from the Owens Valley was

completed in 1913. In 1940 the aqueduct was extended 105 miles north to Mono Basin. A second aqueduct from Owens Valley was completed in 1970 to further increase capacity. Approximately 480,000 acre-feet of water can be delivered to the City of Los Angeles each year, however the amount the aqueducts delivers varies from year to year due to fluctuating precipitation in the Sierra Nevada Mountains. In addition, the diversion of water from Mono Lake has been reduced by a decision of the SWRCB and exportation of water from the Owens Valley is limited by the Inyo-Los Angeles Long Term Water Agreement (and related MOU) and an additional MOU between the Great Basin Air Pollution Control District and the City of Los Angeles (to reduce particulate matter air pollution from the Owens Lake bed). As a result of these restrictions on water transfers, future deliveries are expected to be reduced to an average of 321,000 acre-feet annually over the next 20 years.

2.4.4 Recycled Water

Current average annual recycled water production in the Region is approximately 225 million gallons per day (mgd), which represents approximately 25 percent of the current average annual effluent flows. Of the 225 mgd of recycled water produced annually, approximately 107 mgd is currently reused for municipal uses (e.g., irrigation), industrial applications, environmental uses, groundwater replenishment, or maintenance of seawater barriers in groundwater basins along the coast. The remainder is currently discharged to creeks, rivers, or directly to the ocean.

2.4.5 Water Transfers

Prior to 1991, water transfers within the Region had been limited to transfers of annual groundwater basin rights (which continue to occur). In addition, agencies sometimes transferred water to enhance operational flexibility. Metropolitan's transmission facilities generally have not been used to transfer local water from one agency to another mainly because of water quality issues and potential downstream impacts. Additionally, there is sometimes a restriction on exporting groundwater outside of the boundaries of a groundwater basin as a result of adjudication of the basin.

With the 1991 drought, the Governor's Water Bank was developed. Metropolitan Water District and other SWP contractor's took advantage of that resource to augment supplies and lessen the severity of the impacts of the drought. Since that time, Metropolitan has participated in water transfers as a water management strategy to augment supplies. The City of Los Angeles plans to develop water transfers as part of its supply strategy rather than purchasing water from Metropolitan during dry years. Should the costs of purchasing and wheeling (or moving) water from outside the region be lower than purchasing Metropolitan water, other agencies would likely be interested in implementing water transfers as a supply strategy.

2.4.6 Storage

As the water supply in the Region is heavily dependent on imported surface water, various surface reservoirs (managed by Metropolitan Water District and the SWP) located outside the Region (such as Diamond Valley Lake) are used to facilitate water delivery to local water agencies and districts. Several smaller reservoirs have also been developed within the Region to assist in the management of water supplies. However, most of these local reservoirs are limited in their ability to capture local runoff. Most of the remaining dams in the Region have been developed for flood management purposes and are typically not used for long term (e.g., multi-year) surface storage.

LACDPW oversees several surface water storage facilities, which were created to improve flood protection and store runoff for subsequent release and diversion to groundwater spreading grounds for recharge. Eleven dams were constructed as part of the San Gabriel River and Montebello Forebay water conservation system to impound runoff from the San Gabriel Mountains prior to release for downstream spreading and

groundwater recharge. Runoff in the San Gabriel River is captured in the upstream end by three dams in San Gabriel Canyon: Cogswell Dam on the West Fork, San Gabriel Dam below the confluence of the east and west forks of the San Gabriel River and, Morris Dam, a few miles downstream of San Gabriel Dam. Once released from the canyon facilities, stormwater flows to the Santa Fe Dam and may be diverted to the Santa Fe spreading grounds, located off-river along the northern boundary of dam or conveyed downstream to the Rio Hondo and San Gabriel coastal spreading grounds. On tributaries to the Los Angeles River, the Big Tujunga, Pacoima, and Devil's Gate dams provide similar functions. LACDPW also oversees 17 inflatable rubber dams throughout the Los Angeles Basin. Most are used to divert flows into the spreading grounds. Several rubber dams in the San Gabriel watershed also promote short-term instream water percolation.

Las Virgenes MWD purchases pretreated water from Metropolitan and stores it in Las Virgenes Reservoir, in the City of Westlake Village. The reservoir also provides seasonal water storage allowing Las Virgenes MWD to purchase supplies off-season and deliver at times of peak demand to meet high summer irrigation needs.

The in-city water distribution systems of the City of Los Angeles once included 15 open-air reservoirs. Due to concerns from DHS about open water storage, nine of these reservoirs have been bypassed, replaced, or covered. Los Angeles Reservoir is one of the last remaining open reservoirs. It replaced the Van Norman Reservoirs which were damaged in the 1971 earthquake. It has a capacity of 10,000 acre-feet and is a primary water source of the San Fernando Valley area. LADWP did not consider removal of the Los Angeles Reservoir a viable option. To protect its water quality, a floating cover was proposed.

The U.S. Army Corps of Engineers oversees Hansen and Sepulveda dams in the Los Angeles River Watershed and Santa Fe and Whittier Narrows dams in the San Gabriel River watershed. They are operated based on various constraints and operational priorities including flood protection, recreation and water conservation.

2.5 Water Supply vs. Demand

As the Greater Los Angeles Region is based on a collection of watersheds and few water agency boundaries are aligned with watershed boundaries, an estimate of the Region's water supply and demand was not readily available for this Plan. Water supply and demand for the Region was estimated based on review of key documents, the results of a survey distributed to water agencies in the Region, and meetings with staff of the Metropolitan Water District and other water agencies.

The Metropolitan Water District and its member agencies have adopted an Integrated Resources Plan (IRP) in 1996 (and updated it in 2004), which establishes targets for Metropolitan and its member agencies to meet demand for a single dry year1 (assuming a single dry-year supply on the State Water Project would equal 35% of entitlement based on current conditions). Based on the Metropolitan's IRP, Urban Water Management Plan, and 2005 IRP Report Card, Table 2-1 identifies the IRP supply target categories and targets for the entire Metropolitan Water District service area.

[1] Consistent with recent legislation, water supplies are typically estimated for three climatic conditions (based on historic records), including an average year, a single dry year (meaning a year of below-normal precipitation) and a multi-dry year period (e.g., a period of prolonged drought). For the purposes of this Plan, the demand and supplies are estimated for the single dry-year condition.

Table 2-1. Metropolitan Water District's IRP Categories and Targets	
IRP Supply Category	2005 Target
Conservation	1,107,000
Local Resources Program (Recycling, Groundwater Recovery, Ocean Desalination)	750,000
Colorado River Aqueduct[1]	1,250,000
State Water Project[2]	650,000
Groundwater Conjunctive Use	300,000
CVP/SWP Storage and Transfer	550,000
Metropolitan Surface Storage[3]	620,000
Total	5,227,000

1: The 1,250,000 acre-feet supply from the Colorado River Aqueduct is a target for specific year types when needed. Metropolitan is not expecting a full aqueduct in every year.

2: Updated Number from IRP Report card

3: Target for Surface Storage is for total storage capacity, not dry year withdrawal yield.

As the IRP covers most of the Region, proportioning total demand for Metropolitan's IRP to the Region could be used to estimate regional water demand, which could be supplemented with information on local water production (and demand as appropriate for portions of the Region not serviced by Metropolitan). By adding water demand for Los Angeles County to 20% of the water demand for Orange County (based on the estimated portion of the total Orange County population residing within the Greater Los Angeles IRWMP Region), an estimate of total water demand was derived. By comparing that estimate to the total raw water demand for the entire Metropolitan Service area, the proportion of total Metropolitan demand attributable to the Region (approximately 47%) was calculated, as shown in Table 2-2.

Table 2-2. Estimated Proportion of Region's Water Demand					
	2005	2010	2015	2020	2025
Total Raw Water Demand for Region	2,311,906 acre-feet/year	2,490,680 acre-feet/year	2,567,861 acre-feet/year	2,665,909 acre-feet/year	2,756,739 acre-feet/year
Total Raw Water Demand for Metropolitan Water District	4,851,600 acre-feet/year	5,237,500 acre-feet/year	5,437,200 acre-feet/year	5,670,400 acre-feet/year	5,891,400 acre-feet/year
Proportion of Region's Demand	48%	48%	47%	47%	47%

By combining information from Metropolitan's IRP, Urban Water Management Plan, and 2005 IRP Report Card, and results of the survey of local water agencies, the Region's current water supplies (for a single dry year) was estimated at 2,511,967 acre-feet (assuming SWP deliveries in a single dry year would be 35 percent of entitlement). By comparing the Region's supply to the estimated demand (proportioned from Metropolitan's IRP targets), the difference could be determined, as shown in Table 2-3. For the 20-year planning horizon of this Plan, the gap between estimated water demand and water supply is approximately 850,000 acre-feet.

Table 2-3. Estimated Regional Water Supply Gap			
Year	Estimated Regional Supply[1] (Acre Feet)	Estimated Regional Demand (Acre Feet)	Difference (Acre Feet)
2010	2,511,967	2,756,720	244,752
2015	2,511,967	3,043,190	531,223
2020	2,511,967	3,317,633	805,665
2025	2,511,967	3,360,269	848,301

1. Based on current supply, assuming SWP delivery in a single dry year would be 35 percent of entitlement.

Metropolitan's IRP proposes that member agencies develop projects to increase local water production and increase conservation, and suggests that financial incentives can facilitate some of those projects. The IRP also assumes that additional imported water will be available to augment current supplies, including additional deliveries from the SWP and Colorado River.

It should be noted this analysis includes a supply buffer to insure against risk of loss of supply and assumes additional imported water would be available to contribute to the estimated supply gap. This estimate may be subject to revision based on future delivery projections. For example, the Draft SWP Reliability Analysis suggests that dry-year deliveries from the SWP could decline from 35 to 5 percent of entitlement.

2.6 Water Quality

After more than two centuries of agricultural, industrial, and residential development and the widespread utilization of chemicals, fertilizers, industrial solvents, and household products, have resulted in varying degrees of water quality degradation in both surface and ground waters in the Region. These sources of degradation can be classified as either point or nonpoint sources. Point sources are the discharge of water and/or wastes to the soil, groundwater, or surface waters. Common examples include wastewater treatment and industrial discharges and leaking underground storage tanks. Nonpoint sources are area-wide discharges to soil, groundwater, and surface waters, such as the application of fertilizers, atmospheric deposition of contaminants, and litter such as trash and plant materials. Point sources can be traced back to a single source, such as the end of a pipe, while nonpoint sources have widespread origins. Although many stormwater contaminants come from nonpoint sources (as the discharge of stormwater typically occurs via an individual storm drain or channel), stormwater discharge is typically regulated as a point source.

Under the Porter Cologne Water Quality Control Act of 1969, responsibility for protecting water quality in Los Angeles County rests with the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) (including the Los Angeles and Santa Ana Boards in the Greater Los Angeles IRWMP Region). The SWRCB sets statewide policies and develops regulations for the implementation of water quality control programs mandated by state and federal statutes and regulations. The RWQCBs develops and implements a Basin Plan, which is designed to preserve and enhance water quality. The determination of whether water quality is impaired is based on the designated beneficial uses of individual water bodies, which are established in the Basin Plan. As mandated by Section 303(d) of the Federal Clean Water Act, the SWRCB maintains and updates a list of "impaired" water bodies that exceed State and federal water quality standards. To address these impairments, the RWQCBs are responsible to identify the maximum amount of pollutants, or Total Maximum Daily Loads (TMDLs), that may be present without impairing the designated beneficial uses.

Even though the Region has significantly reduced pollutants that are discharged to water bodies from individual point sources since the Clean Water Act was established over 30 years ago, many of the major rivers and water bodies are still considered impaired due to trash, bacteria, nutrients, metals, and/or toxic pollutants. The quality of many water bodies continues to be degraded from pollutants discharged from diffuse and diverse nonpoint sources, and from the cumulative impacts of multiple point sources. As a result, resulting many of the Region's creeks, rivers, and water bodies are included on the most recent update of the 303(d) list of impaired water bodies, as depicted on Figures 2-6(A) and (B). Consequently, during the next ten years, dozens of TMDLs are scheduled to be developed, in addition to the ten TMDLs developed to date, and which will require the implementation of projects and programs by hundreds of point source dischargers, the counties, and the 92 cities in the Region.

2.6.1 Surface Water

Within the Region, surface water quality is generally better in the headwaters and upper portions of watersheds, and is generally degraded by urban and stormwater runoff closer to the Pacific Ocean. Common contaminants in urban and stormwater runoff in the Region are described below.

Sediment is a common component of stormwater, and can be a pollutant at certain levels. Sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can also transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Erosion and subsequent sedimentation is a natural process of the highly-erodable San Gabriel Mountains. Other sources of sediment include stream banks, bridge pilings, vacant lots, and construction sites.

Nutrients are a class of substances, including nitrogen and phosphorous, which provide are critical to the growth of plants. In high amounts, nutrients can result in excessive or accelerated growth of vegetation, such as algae, which can result in another form of water quality impairment. Common sources of nutrients include fertilizers used in landscaping and agriculture, human and animal waste, and effluent from wastewater treatment facilities.

Bacteria and viruses are common contaminants of in both urban runoff and stormwater. High levels of indicator bacteria (such as *Escherichia coli*) in stormwater sometimes results in the closure of beaches to contact recreation. Sources include sanitary sewer leaks and spills, illicit connections of sewer lines to the storm drain system, malfunctioning septic tanks, and fecal matter from humans, pets, animals and birds.

Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage from tanks, pipelines and old extraction sites, accidental spills, cleaning of vehicles and equipment, leaks in hydraulic systems, and the improper disposal of restaurant wastes and used oil.

Metals found in urban and stormwater runoff include lead, zinc, cadmium, copper, chromium, and nickel. Metals can be toxic to aquatic organisms and can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish or birds). Many artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as those surfaces corrode, flake, dissolve, decay, or leach. During storms, much of the trace metal load in stormwater is associated with sediments.

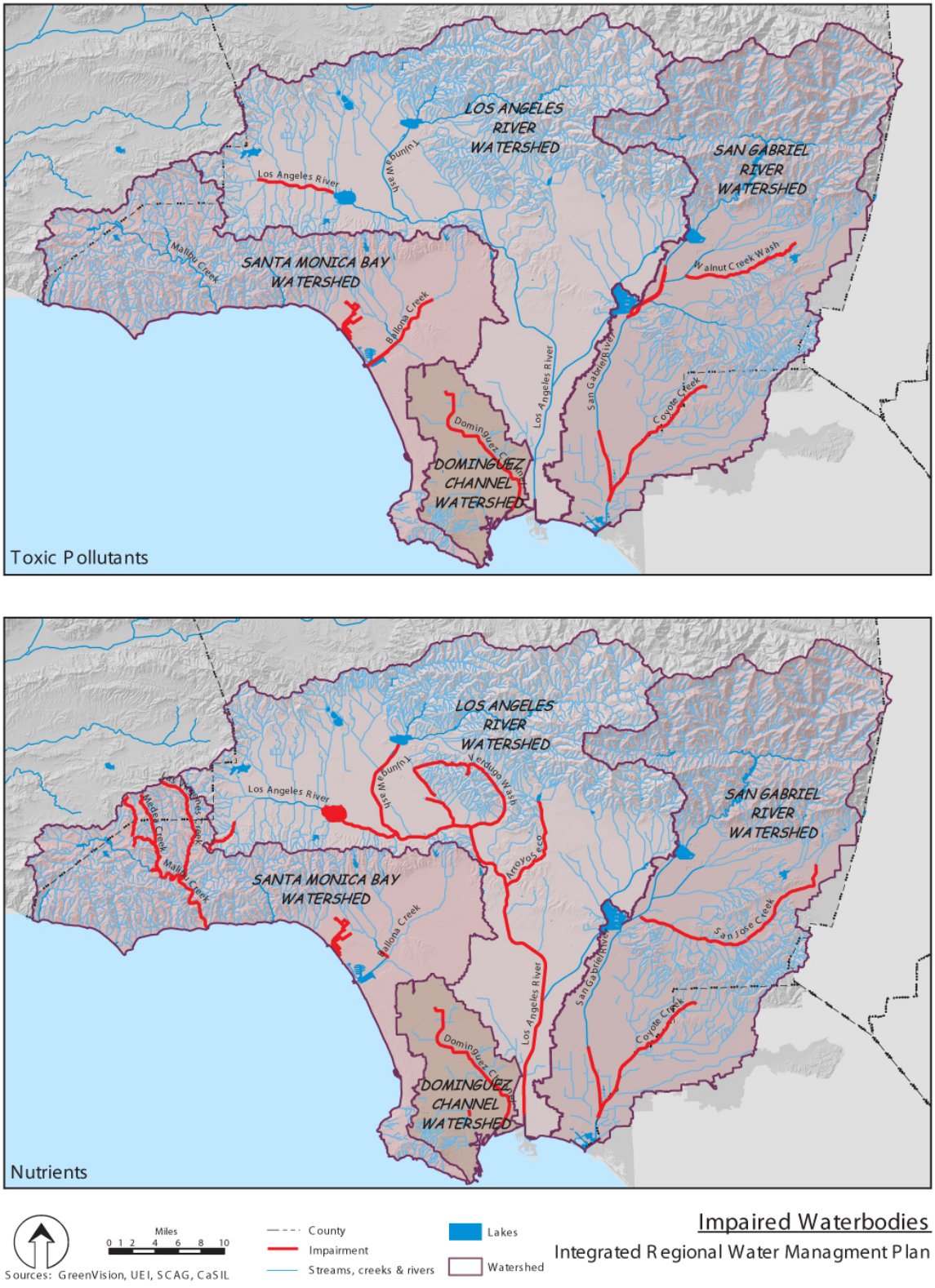

Figure 2-6(A). Impaired Stream Reaches for Toxicity and Nutrients

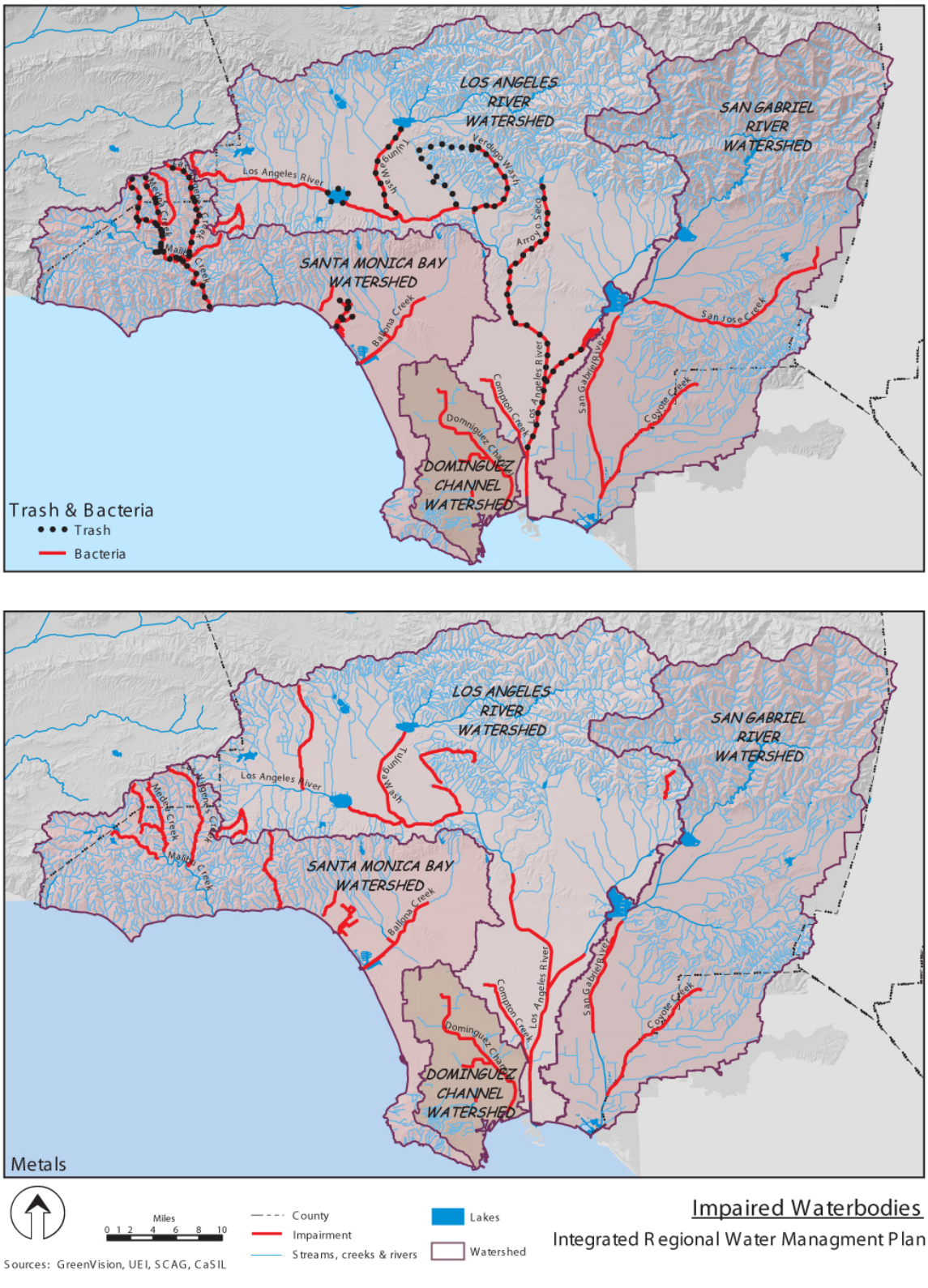

Figure 2-6(B). Impaired Stream Reaches for Trash, Bacteria, and Metals

Organic compounds (e.g., adhesives, cleaners, sealants, solvents, etc.) and pesticides (e.g., herbicides, fungicides, rodenticides, and insecticides) may be found in urban and stormwater runoff in low concentrations. The widespread use of these substances and their improper disposal are the common sources of these compounds. Bioaccumulation of pesticides can have adverse effects on aquatic life the animals that consume that life). Some of these substances that were prohibited long ago due to negative impacts are still detected in low concentrations (such as dichloro-diphenyl-trichloroethane [DDT]) and are now termed "legacy" pollutants.

Trash, debris, and other floatables are the result of the improper use, storage, and disposal of packaging and other products in urban environments, plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. In addition to negative aesthetic impacts, these substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in water bodies.

2.6.2 Groundwater

Groundwater quality varies throughout the Region, based on naturally occurring conditions, historical land use patterns, and groundwater extraction patterns.

Naturally occurring soil and geologic conditions in the region often result in elevated levels of dissolved solids in groundwater (measured in terms of Total Dissolved Solids [TDS]). Commonly referred to as "hard" water, these dissolved solids include inorganic salts (including calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and small amounts of organic matter. Increases in groundwater TDS concentrations are a function of the recharge of storm and urban runoff, imported water, and incidental recharge. They are also attributed in part to the legacy of salt contamination from past agricultural and land uses, including fertilizer use and waste disposal.

Groundwater quality in some portions of the Region has been degraded by elevated levels of nitrates primarily from past agricultural land use practices and plumes of volatile organic compounds (VOCs) from the past disposal of industrial solvents. These include trichloroethylene (TCE), a common degreaser and cleaning product, and perchloroethylene (PCE), commonly used in dry cleaning of clothing. In addition, perchlorate contamination, associated with the manufacturing and testing of solid rocket propellants, is another major concern. The solid salts of ammonium perchlorate, potassium perchlorate, or sodium perchlorate are soluble in water and can persist for decades. Groundwater contamination could also occur from the widespread use of methyl tertiary butyl ether (MTBE) a gasoline additive used to increase octane ratings and reduce emissions. Although the use of MTBE was discontinued in 2003 (following the discovery of MBTE in groundwater wells in the City of Santa Monica), many underground gasoline storage tanks leaked and created the potential for contamination. Groundwater clean up efforts are being coordinated various agencies and cities, including the San Gabriel Basin Water Quality Authority.

2.7 Environmental Resources

2.7.1 Wetlands

The Region is estimated to have lost over 90 percent of its coastal wetlands. According to the Coastal Conservancy, within the Los Angeles River watershed, 100 percent of the original lower riverine and tidal marsh and 98 percent of all inland freshwater marsh and ephemeral ponds have been drained or filled (California Resources Agency, 2001). Similar loss occurred with the channelization and improvement of the Region's creeks. Currently, only two significant coastal wetland areas remain: the Los Cerritos wetlands complex, and the Ballona wetlands and lagoons near the mouth of Ballona Creek. Other remaining historic wetland areas include the El Dorado wetlands near the confluence of Coyote Creek and the San Gabriel

River; the lower reach of Compton Creek where the channel bottom is unlined; some limited saltwater marsh along the banks at the lowest reach of the Los Angeles River (SCWRP, 2001 and Resources Agency, 2001), and the coastal lagoons in the North Santa Monica Bay Watersheds, including Malibu Lagoon and Topanga Creek Lagoon.

After a long history of widespread destruction and degradation, wetlands have belatedly been recognized as performing many valuable, even critical roles in the environment. Wetlands can function as sources, sinks and transformers of chemical, genetic and biological materials. They have been likened to "the kidneys of the landscape" for the role they play in hydrologic and chemical cycles, and in improving water quality (Mitsch & Gosselink, 1986). Wetlands have been shown to cleanse polluted waters, prevent or mitigate floods, protect shorelines and recharge groundwater aquifers. Additionally, wetlands provide unique and critical habitats for large numbers of flora and fauna. Thus, expansion and restoration of existing wetlands, and development of newly constructed wetlands have the potential to improve water quality, improve flood protection, restore or create habitat, and enhance groundwater recharge.

2.7.2 Riparian Habitat

Riparian habitat is typically a linear corridor of variable width that occurs along perennial, intermittent, and ephemeral streams. In undisturbed areas, two distinguishing features of riparian ecosystems are the hydrologic interaction that occurs between the stream channel and adjacent areas through periodic exchange of surface and groundwater, and the distinctive geomorphic features and vegetation communities that develop in response to this hydrologic interaction.

Due to the extensive urbanization on the coastal plain and the inland valleys, current riparian habitat within the Region bears little resemblance to the pre-development conditions. Faber et al. (1989) estimated that 90-95 percent of the riparian community has been lost. High quality native riparian habitat within the Region is generally restricted to the Santa Monica and San Gabriel Mountains. Other riparian corridors occur along the upper and middle reaches of the San Gabriel River, including portions of Walnut, San Jose, and Coyote Creeks, the Chino, Puente, and Simi Hills, and the Verdugo and Santa Susana Mountains. In-stream riparian habitat also occurs in the upper San Gabriel River and streams in the San Gabriel foothills, the Whittier Narrows, Sepulveda Basin, Hansen Dam, and the Glendale Narrows. Although these areas contain some large areas of quality riparian habitat, they are increasingly stressed by recreational use, exotic species, hydrologic modifications, and natural disturbance such as fires and drought. In the foothills and throughout other parts of the Region, patches of natural or nearly natural habitat of varying size remain, supporting native species of plants and animals. These are most prevalent in regional parks, recreation areas and other protected areas such as the national forest, but substantial natural areas remain unprotected within private lands.

Where riparian habitats remain within or adjacent to urbanized areas, conditions are often impaired by degraded water quality, altered hydrologic conditions, and modified sediment transport. Water quality impairments include increases of both non-toxic elements such as sediment, nutrients, and water temperature, as well as toxic contaminants such as pesticides and heavy metals. Since riparian vegetation and wetlands can improve water quality by removing or sequestering many contaminants, the widespread loss of riparian and wetland habitat has reduced the potential for these natural systems to enhance water quality.

2.7.3 Area of Biological Significance

In the mid-1970's, the State Water Resources Control Board designated thirty-four areas on the coast of California as Areas of Special Biological Significance (ASBS2), including the area between Mugu Lagoon in Ventura County and Latigo Point in Los Angeles County. Several watersheds in the North Santa Monica Bay drain to the eastern portion of this ASBS, between Sequit Point (near the Los Angeles County line) and Latigo Point, which begins at the intertidal zone and extends 1000 feet from the shore (or to a depth of 100 feet, whichever is greater). The California Coastal Commission has designated all watershed lands adjacent to an ASBS as Critical Coastal Areas (CCA). Thus, development in this CCA and runoff from that area is subject to special conditions.

The land form along this portion of the ASBS generally consists of a coastal bluff with cliffs along the shoreline, except at Zuma Beach, where the coastal bluff is separated from the shore by a wide sandy beach. Vegetation types in the adjacent onshore areas include coastal strand, coastal sage scrub and riparian woodland (where several intermittent streams reach the coast). Subtidal habitat types along this ASBS include exposed rock reefs and kelp beds, semi-protected sandstone reefs and kelp beds, shallow sands, and deeper sands along most of the ASBS (SWRCB, 1979).

Runoff in this area includes stormwater discharge from roads (including State Highway 1) and some dry-weather urban runoff from the mostly residential development along the coast and in upland areas. Most of the residential sites and commercial buildings in this area are on septic systems or are served by small secondary treatment systems. Several beaches along this area are 303(d)-listed for beach closures and high coliform bacteria counts.

The Public Resources Code prohibits the discharge of point source waste and thermal discharges into an ASBS, except by special conditions. In addition, the California Ocean Plan prohibits the discharge of dry-weather runoff from nonpoint sources into an ASBS, although the City of Malibu and the County of Los Angeles have both requested exemptions from this prohibition. If granted, the Regional Board may allow discharges to be covered under the appropriate NPDES permit, which could include provisions to minimize or eliminate dry weather flows and the reduction of stormwater pollutants draining to ASBS to maintain water quality in the receiving waters.

2.8 Open Space and Recreation

The Region's open space resources are extensive, due to the presence of large portions of the Angeles National Forest and the Santa Monica Mountains National Recreation Area. These largely natural areas provide large expanses of open space, which absorb rainfall and runoff that feeds local streams and the Region's two major rivers, and thus provide a substantial portion of the Region's water supply. The preservation of environmental resources within those areas is generally the responsibility of the Land Management Plan for the Southern California Forests and the Santa Monica Mountains Comprehensive Plan.

Excluding the large open spaces and other state lands in the upper portions of the watersheds, within the urbanized portions of the Region, there are over 1,000 parks with a combined total area of approximately 52,800 acres. With a current population of approximately 10.2 million, the Region has approximately 5.2

[2] In January, 2003, the SWRCB renamed ASBS as State Water Quality Protection Areas, although many sources still use the original term.

acres of parkland per 1,000 residents, although considerable variation exists between the sub-regions. In some communities which are proximate to large open spaces, access to parkland with active recreational opportunities is limited. The parkland to population ratio tends to be much lower in Disadvantaged Communities, where access to park space is as low as 0.8 acres per 1,000 residents. The National Recreation and Park Association suggests that a park system serving an urban area should, at a minimum, be composed of a "core" system of parklands, with a total of 6.25 to 10.5 acres of developed open space per 1,000 residents. Thus, current parkland in the Region is below this identified minimum recommendation. Major open spaces are depicted on Figures 2-7(A) through 2-7(E).

Open space used for recreation and public access has the potential to optimize use of local water resources (by preserving or enhancing groundwater recharge and thereby improving water supply reliability and providing opportunities to reuse stormwater or recycled water for irrigation) and improve surface water quality, to the extent that these open spaces filter, retain, or detain stormwater runoff (although few existing parks or open spaces include specific features to improve the quality of stormwater runoff).

2.9 Ecological Processes

Although large portions of the Region have been subject to urban and suburban development, ecological processes still play an important role in the management of water resources.

Fire is an integral and necessary part of the natural environment and plays a role in shaping the landscape. Chaparral, the dominant natural vegetation type on slopes throughout the region, is extremely fire-prone. Brush fires leave the soil exposed and unprotected. These bare areas, in combination with steep slopes and erosive mountains, enable runoff from winter rains to suspend large quantities of coarse mineral debris, rocks, and vegetation and wash it downslope and into streams. These debris flows can erode the landscape, clog stream channels, damage structures, and injure inhabitants in the canyons and lower foothill areas.

Invasive species in the Region have also substantially affected specific habitats and areas. Along with the rest of California, most the Region's native grasslands were long ago displaced by introduced species. The receptive climate has resulted in the widespread importation of plants from around the globe for landscaping. Some plant introductions have resulted in adverse impacts. In many undeveloped areas, non-native plants such as arundo (*Arundo donax*), tree of heaven (*Alianthus altissima*) tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), salt cedar (*Tamarix ramosissima*) and *Senecio mikanioides* are out-competing native species because they are not edible to wildlife or lack natural predators such as disease and insects. Arundo, a tall bamboo-like grass that is prolific and difficult to eradicate, is probably the most invasive of the exotic plant species. In riparian areas, it takes up large amounts of water, crowds out native plants, clogs streams, and disrupts the balance for aquatic species. The removal of this particular species, which requires focused and repeated efforts, can provide substantial dividends in water savings and restored species diversity.

As noted above, limited wetland and riparian habitat remain within those areas subject to development. At those locations where such habitat still exists, contact with water is critical to the long-term viability of such habitats. To the extent that channelization of streams prevents natural percolation of water into the soil, and in some locations, the return of baseflow to stream channels, then the continued presence of wetland and riparian vegetation cannot be assured. The presence of riparian vegetation within soft-bottom portions of the rivers (e.g., the Los Angeles River in the Sepulveda Basin and Elysian Valley and many locations along the San Gabriel River) creates habitat that has become dependent on runoff, which in some locations is supplemented by recycled water discharge from wastewater treatment plants. Thus, the removal or redirection of that flow could adversely affect habitat in those locations. In addition, the proposed restoration of steelhead fisheries in the Santa Monica Mountains, such as in Malibu Creek, may require that some recycled water discharge be maintained.

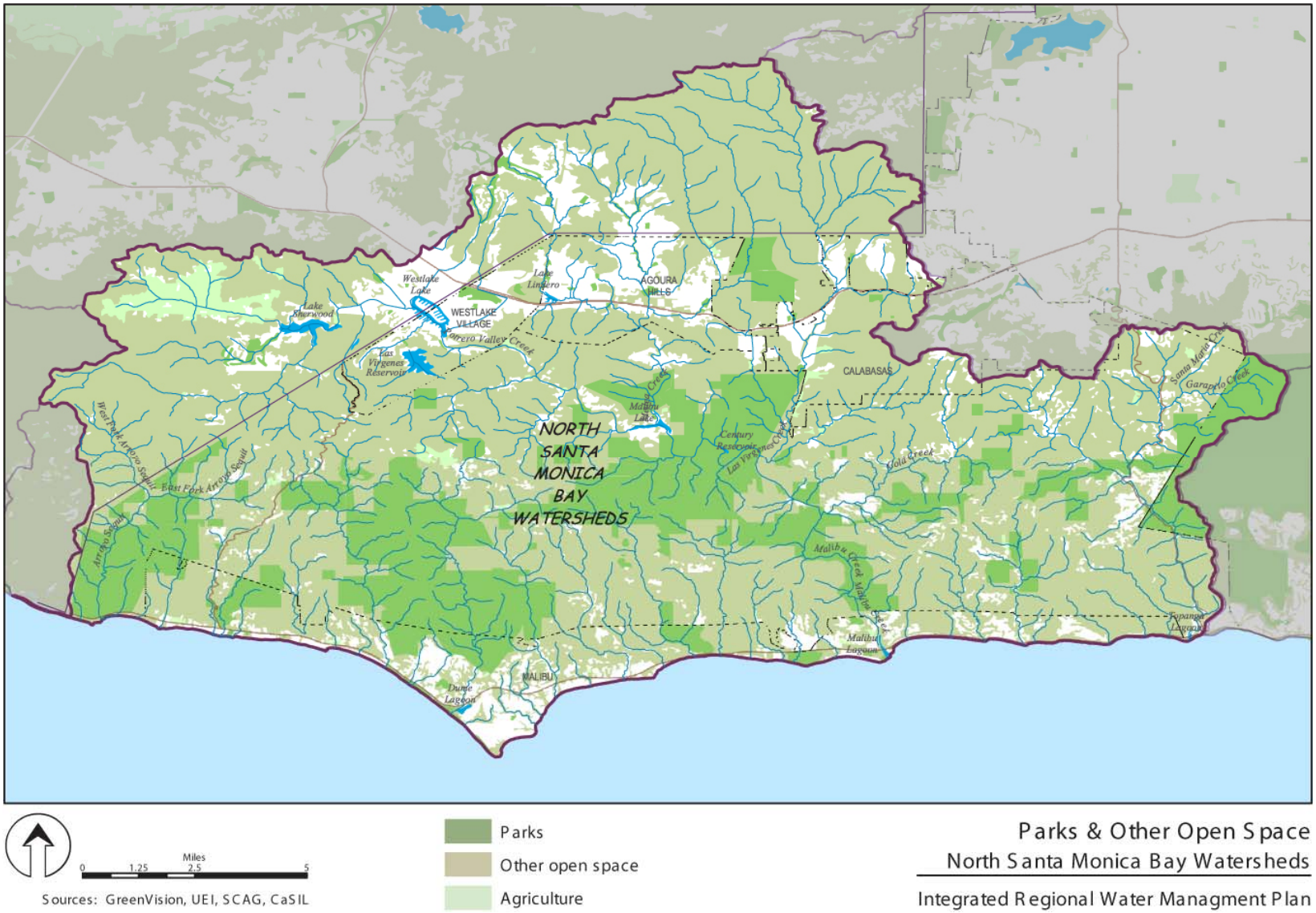

Figure 2-7(A). Parks and Open Space, North Santa Monica Bay Watersheds

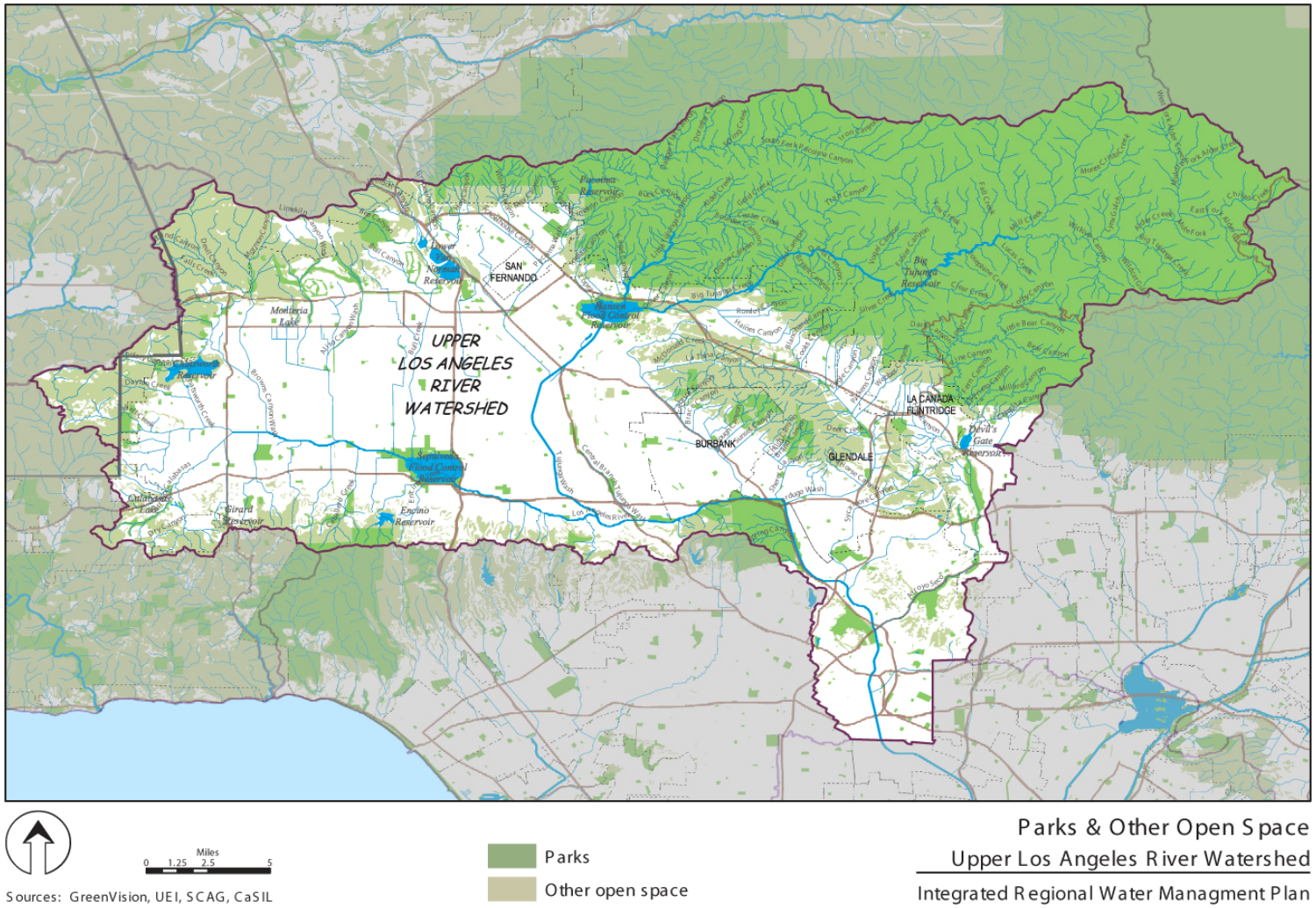

Figure 2-7(B). Parks and Open Space, Upper Los Angeles River Watershed

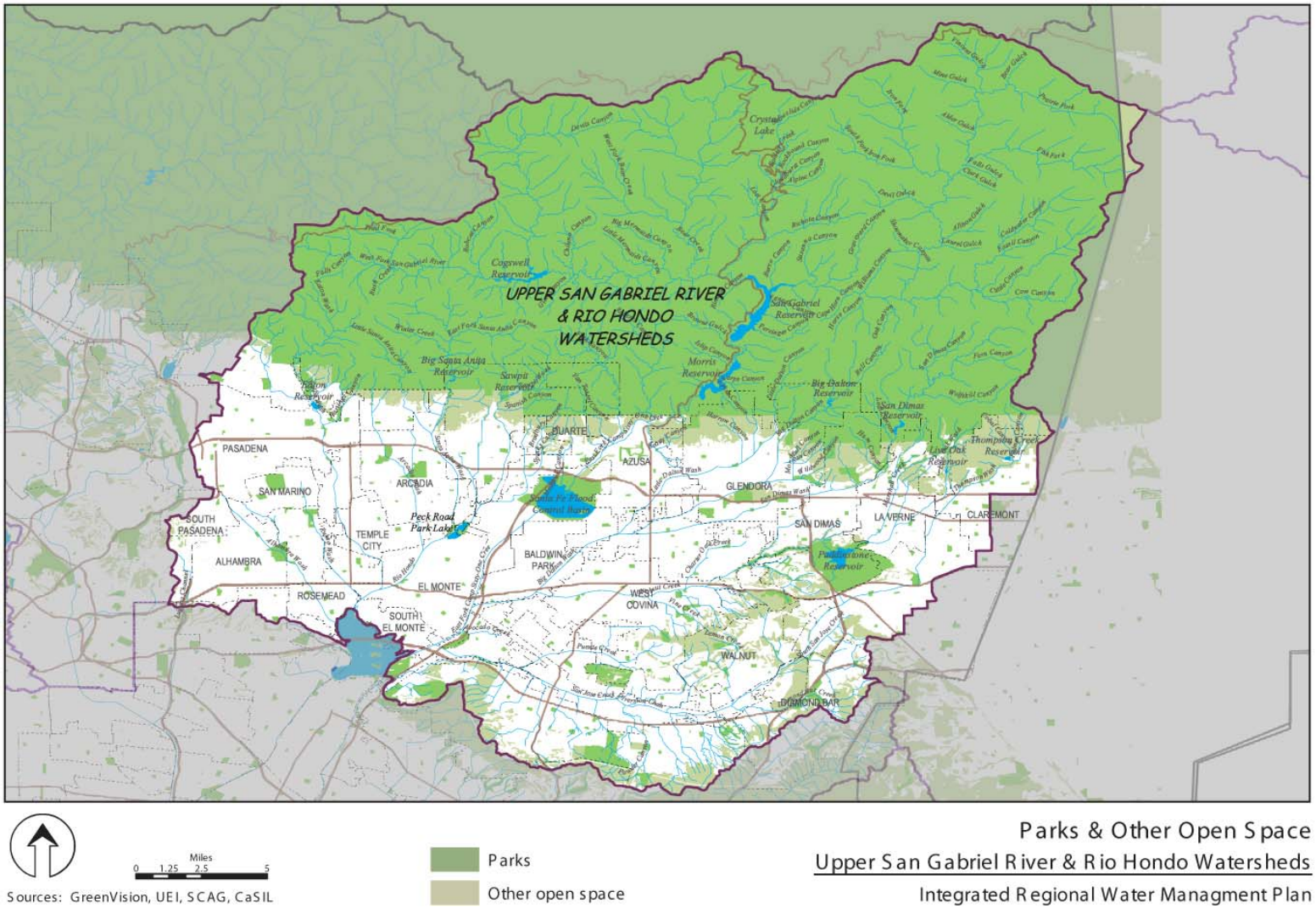

Figure 2-7(C). Parks and Open Space, Upper San Gabriel River and Rio Hondo Watersheds

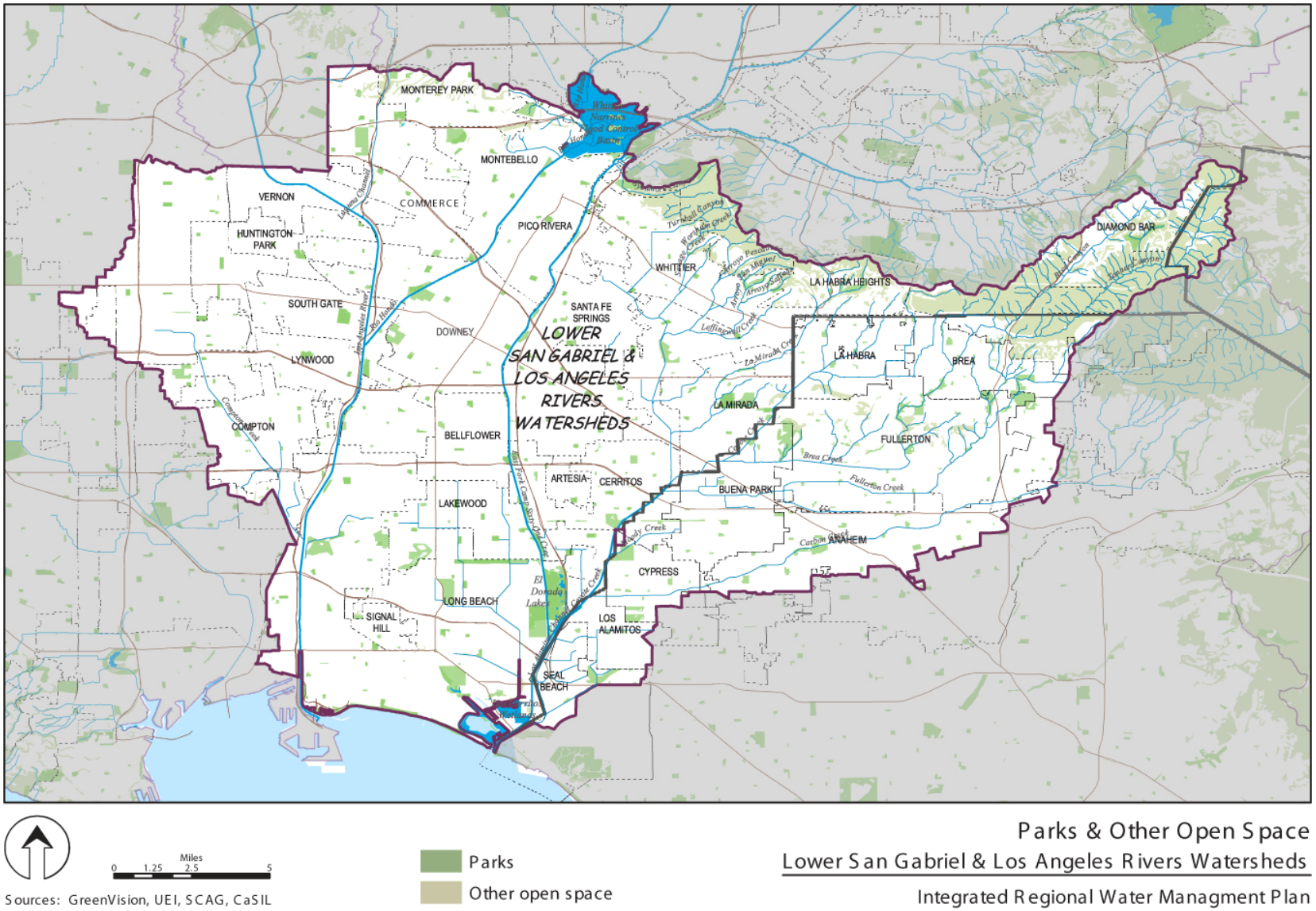

Figure 2-7(D). Parks and Open Space, Lower San Gabriel and Los Angeles Watersheds

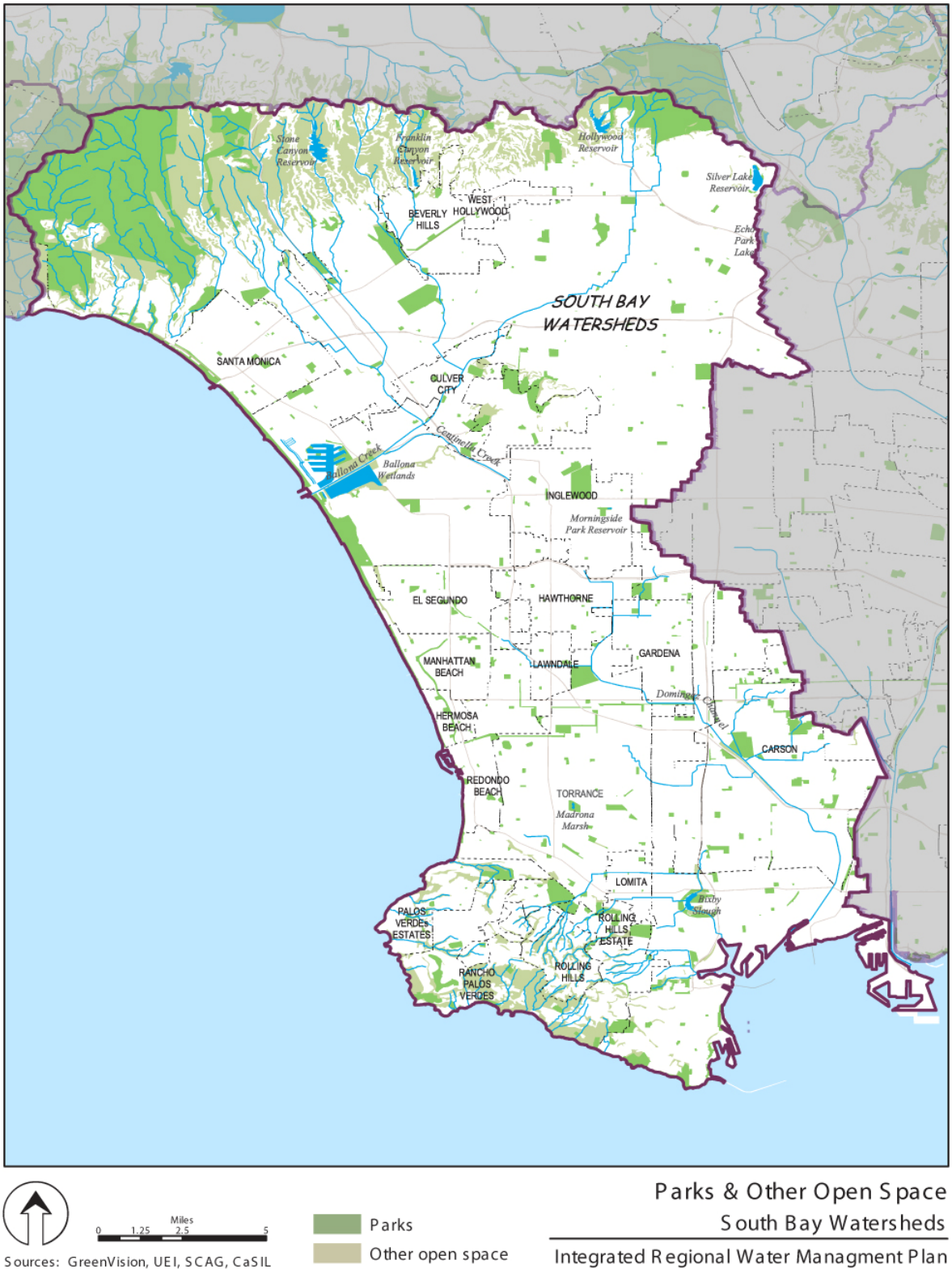

Figure 2-7(E). Parks and Open Space, South Bay Watersheds

Residential use of potable water, the importation of water, and the use of recycled water all have the potential to increase the level of salts (or total dissolved solids) in surface water, wastewater, and groundwater. With naturally-occurring elevated levels of TDS already present in both local surface and groundwater, the need to manage salt levels has been recognized for some time. The transfer of water within the Region and the recharge of imported water have both been limited due to concerns about potential water quality impacts from high salinity levels. Higher TDS source water also poses a problem for water recycling facilities because conventional treatment processes are designed to remove suspended, but not dissolved, particles, and thus more advanced treatment methods may be required. Several water and wastewater agencies in the Region are members of the Southern California Salinity Coalition, which in conjunction with the National Water Research Institute, seeks to coordinate efforts to address the critical need to remove salt from water supplies and preserve water resources.

2.10 Land Use

Land Use within the Region reflects the historic pattern of urbanization, as most of the coastal plain and interior valleys are occupied with residential, industrial, commercial, and institutional uses, and most of the foothills and mountains are principally open space. A breakdown of Land Use in the Region is provided in Table 2-4, and depicted on Figures 2-8(A) through 2-8(E).

Table 2-4. Land Use (in acres)

	North Santa Monica Bay Watersheds	Upper Los Angeles River Watershed	Upper San Gabriel and Rio Hondo Watersheds	Lower San Gabriel and Los Angeles Watersheds	South Bay Watersheds	Region Totals	Percent
Agriculture	1,990	2,190	3,468	2,886	1,046	11,580	0.89
Commercial	1,746	21,061	20,829	33,839	27,689	105,164	8.05
Industrial	231	14,408	12,107	30,042	19,906	76,694	5.87
Recreation	1,995	8,279	9,431	10,182	8,496	38,382	2.94
Residential	12,992	117,288	91,039	117,214	105,045	443,578	33.96
Transportation, Communication, and Utilities	772	16,495	11,021	15,283	11,024	54,595	4.18
Vacant/Open Space	108,494	190,134	212,887	18,605	33,868	563,988	43.18
Other	1,573	2,368	3,983	1,726	2,627	12,277	0.94
Totals	129,791	372,224	364,766	229,776	209,701	1,306,,258	100.00

Source: California State Los Angeles Urban Environment Initiative, Southern California Association of Governments

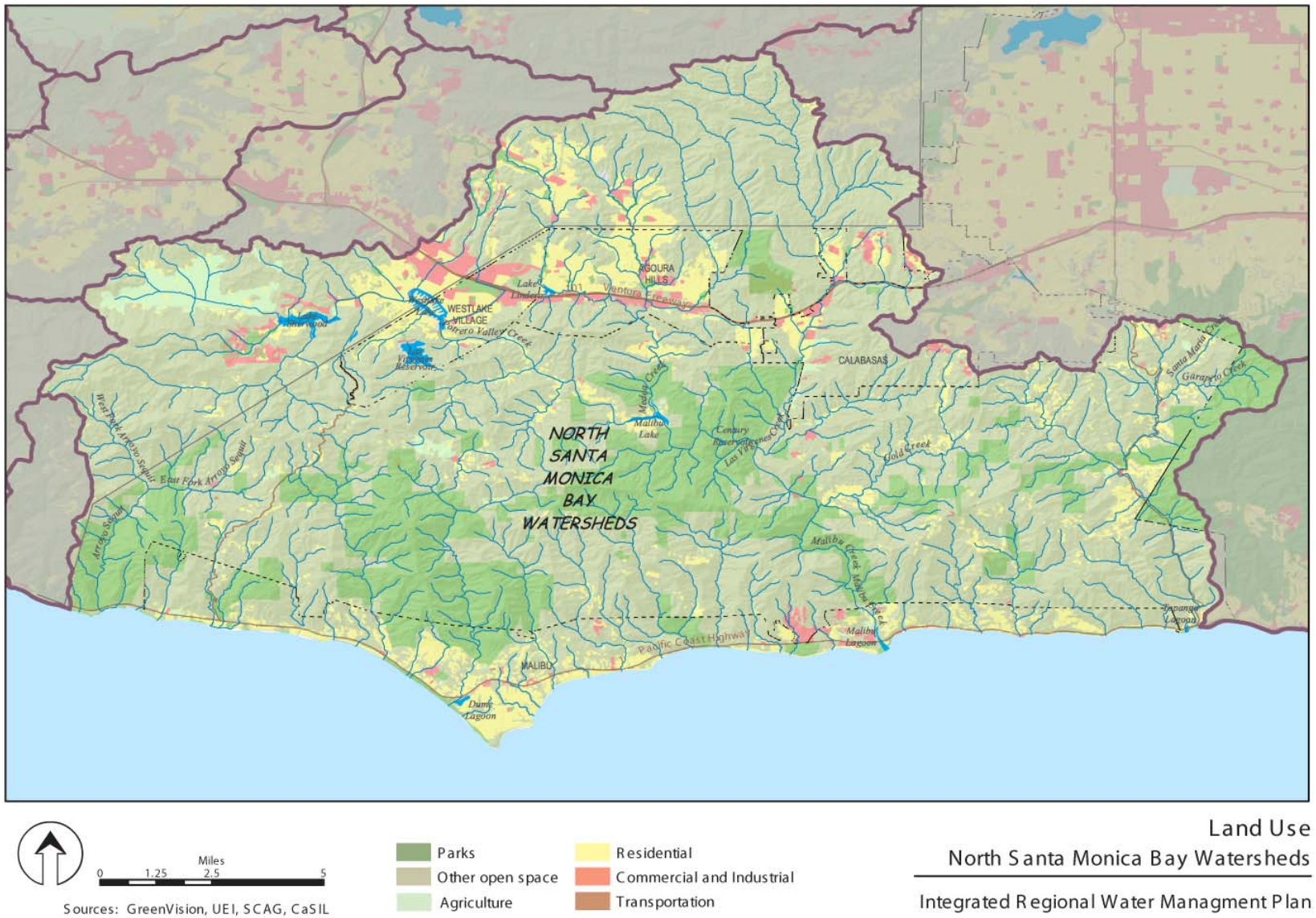

Figure 2-8(A). Land Use, North Santa Monica Bay Watersheds

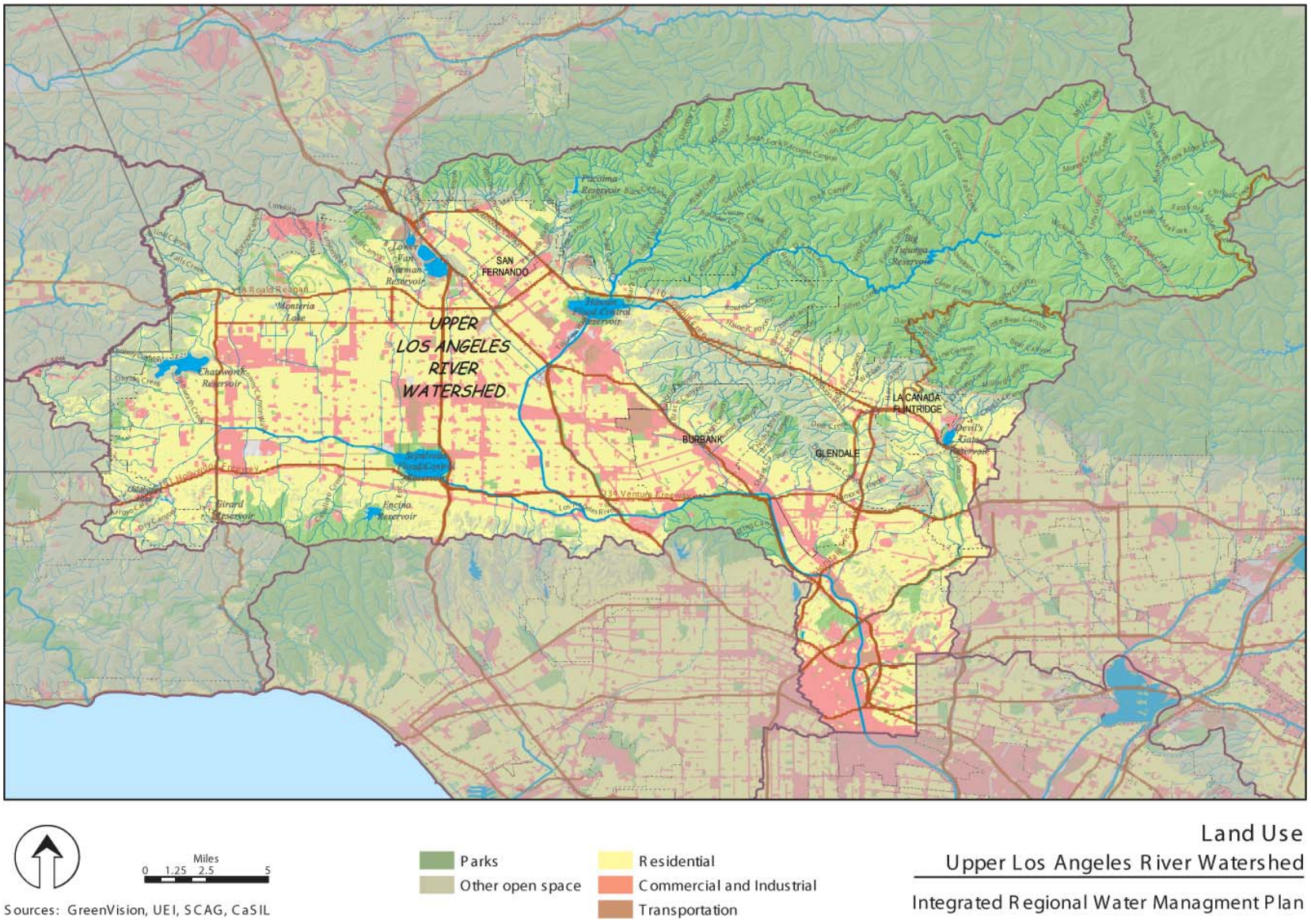

Figure 2-8(B). Land Use, Upper Los Angeles River Watershed

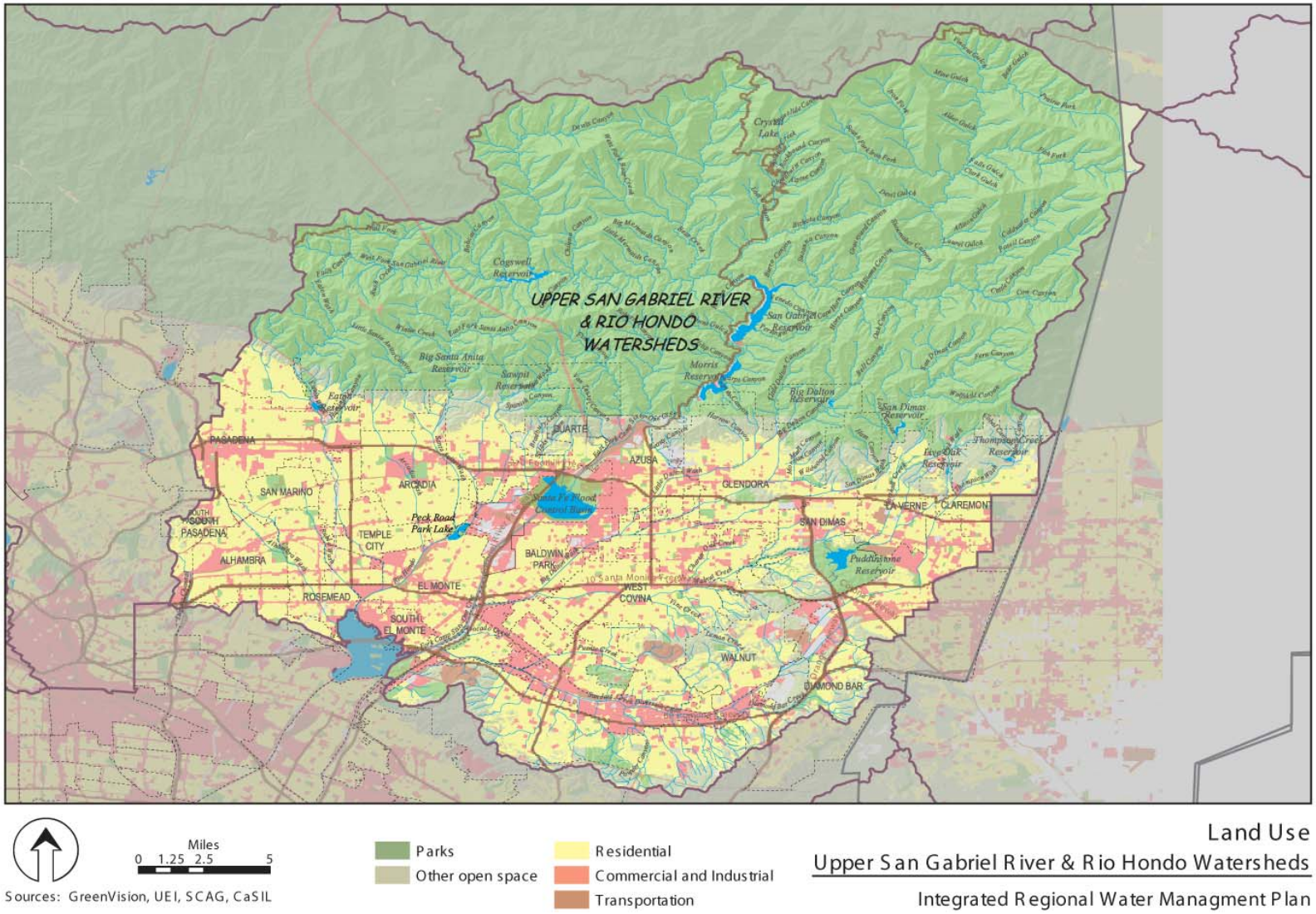

Figure 2-8(C). Land Use, Upper San Gabriel River and Rio Hondo Watersheds

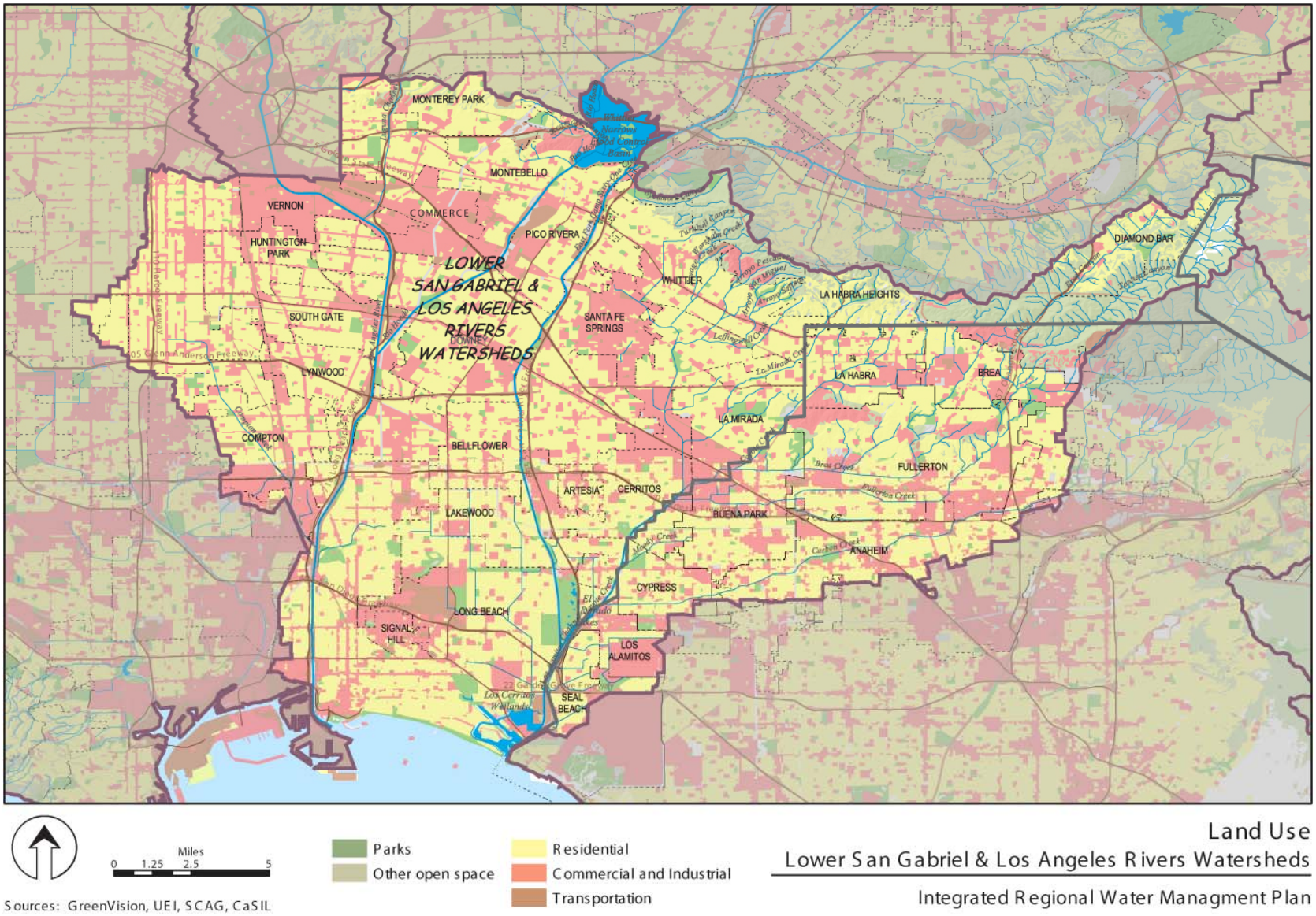

Figure 2-8(D). Land Use, Lower San Gabriel and Los Angeles Watersheds

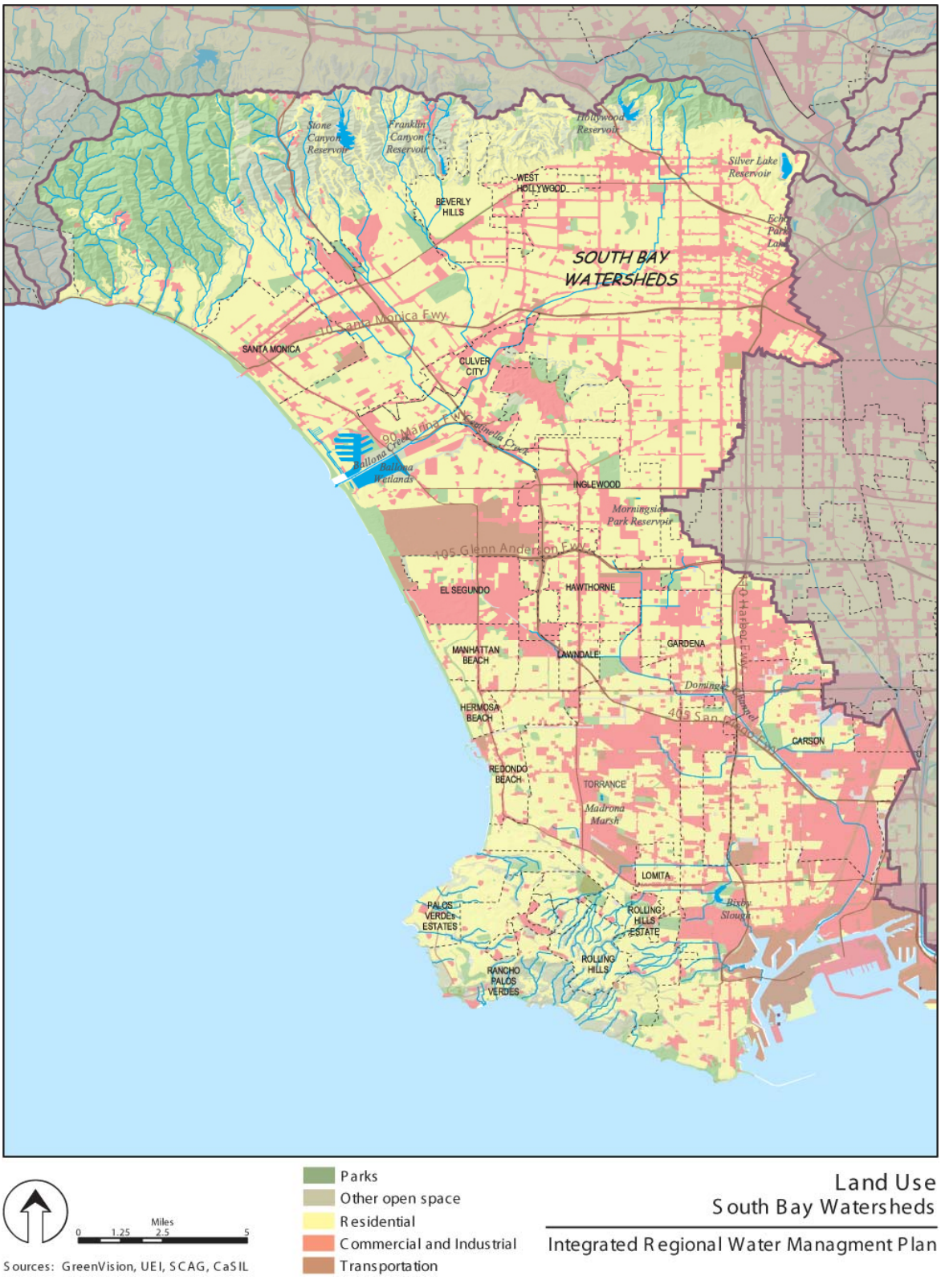

Figure 2-8(E). Land Use, South Bay Watersheds

2.11 Social Characteristics

The Region's population is currently estimated at approximately 10.2 million residents as depicted on Table 2-5, which represents approximately 27.5 percent of the State's estimated 2006 population.

Table 2-5. Estimated Regional Population

Area	Estimated 2006 Population
North Santa Monica Bay Watersheds	106,480
Upper Los Angeles River Watershed	2,338,290
Upper San Gabriel and Rio Hondo Watersheds	1,640,528
Lower San Gabriel and Los Angeles Watersheds	3,219,316
South Bay Watersheds	2,903,382
Greater Los Angeles County Region	10,207,996

Per State Guidelines, Disadvantaged Communities are those with an annual median household income (MHI) that is less than 80 percent of the statewide annual median household income (CWC § 79505.5 (a)). Using Census 2000 data, 80 percent of the statewide annual MHI is $37,994. Those communities meeting these criteria are depicted in Figure 2-9(A) through 2-9(D). Note that there are no Disadvantaged Communities in the North Santa Monica Bay Watersheds sub-region.

2.12 Social Trends and Concerns

The watershed management plans which have been prepared for many of the Region's major watersheds identify various goals, objectives, and guiding principles. Those various concepts are incorporated in this Plan as objectives in Section 3.1 below, but listed here as the are a reflection of the social and cultural values of the Region, including: reduce dependence on imported water, optimize use of local water resources, enhance water supply reliability, improve the quality of urban runoff and stormwater, maintain and enhance flood protection, increase watershed-friendly recreation and accessible open space for all communities, conserve and restore native habitat, manage public open spaces to reduce the risk of catastrophic wildland fires, and promote the application of watershed approaches to resource management issues

Social trends in the Region may be summarized on the basis of certain demographic trends. The Public Policy of California (PPIC, 2002) describes trends for regions in California, including the south coast, which includes Los Angeles, Ventura, and Orange Counties, and thus is representative of the Region. Population growth in the Region is slowing (a ten percent increase from 1990-2000, down from a 20 percent increase from 1980-1990). In the last decade, births represented the largest portion of population increase in the region, followed by international migration. Domestic migration was a net loss to the Region's population during that period. Population growth outpaced job growth (by more than 2:1) and growth in residential units, increasing the number of persons per household. Ethnic diversity continues to increase, as the percentage of Caucasian residents declines (from 58.0% in 1980, 47.0% in 1990, and 38.8% in 2000).

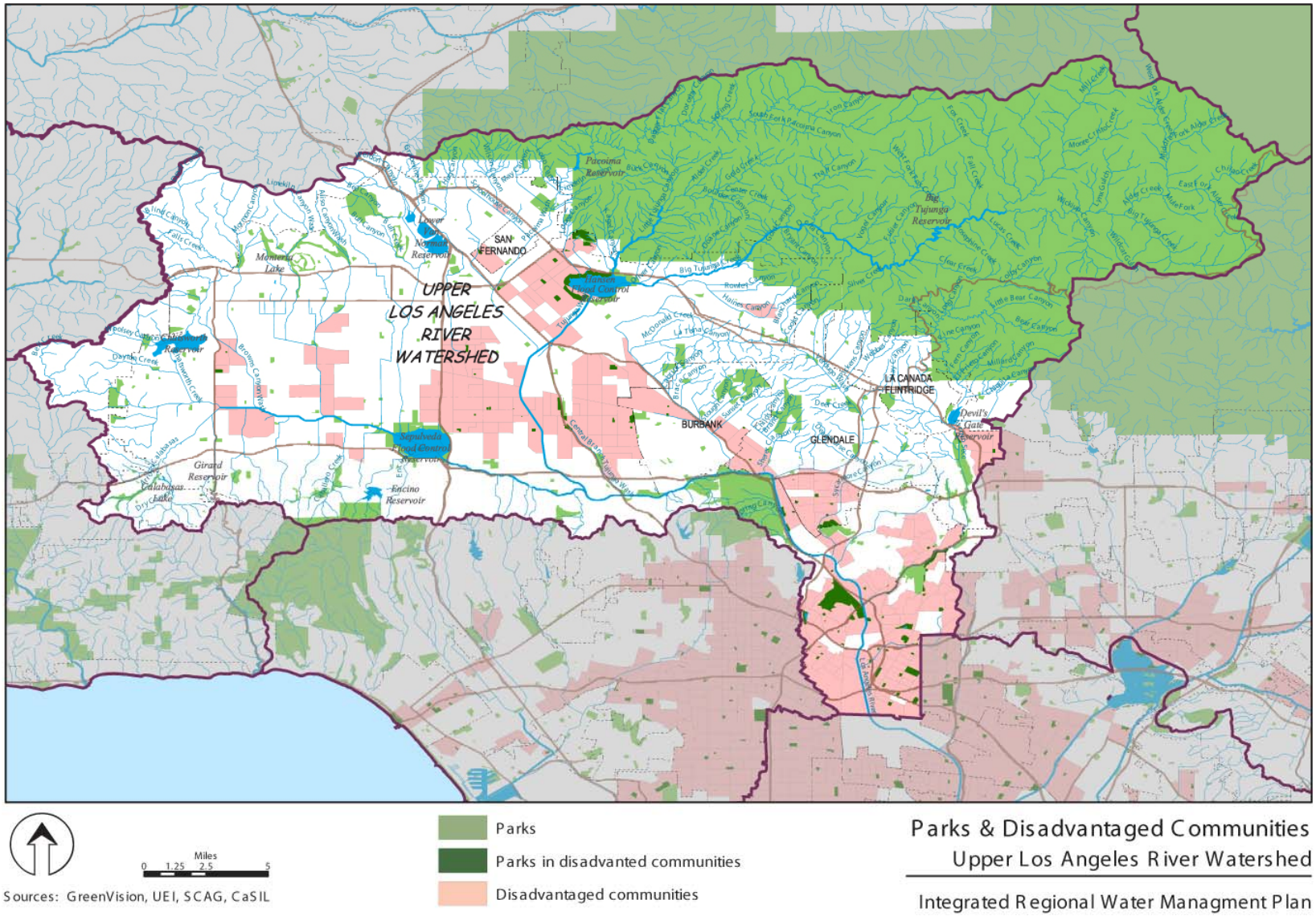

Figure 2-9(A). Disadvantaged Communities, Upper Los Angeles River Watershed

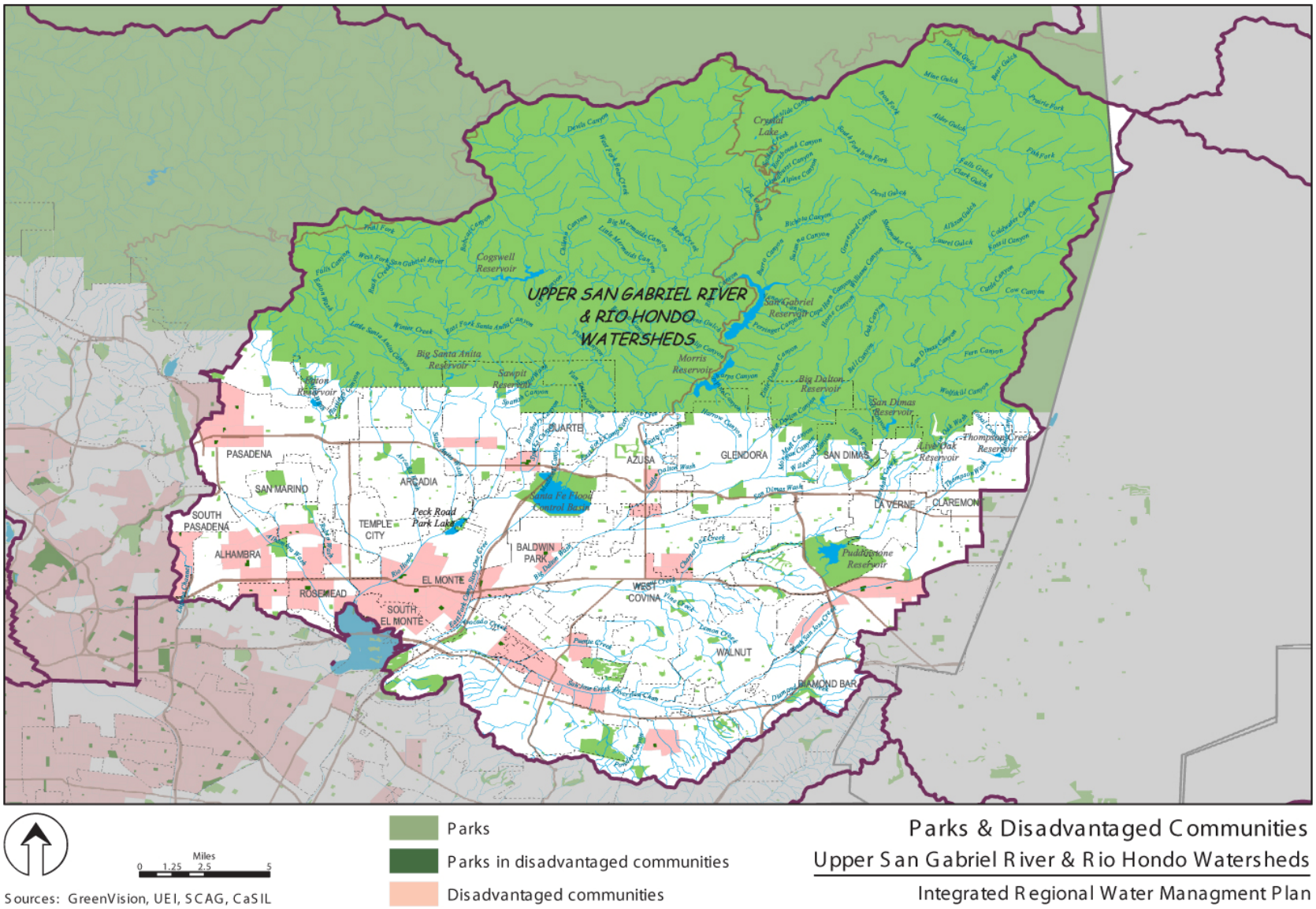

Figure 2-9(B). Disadvantaged Communities, Upper San Gabriel River and Rio Hondo Watersheds

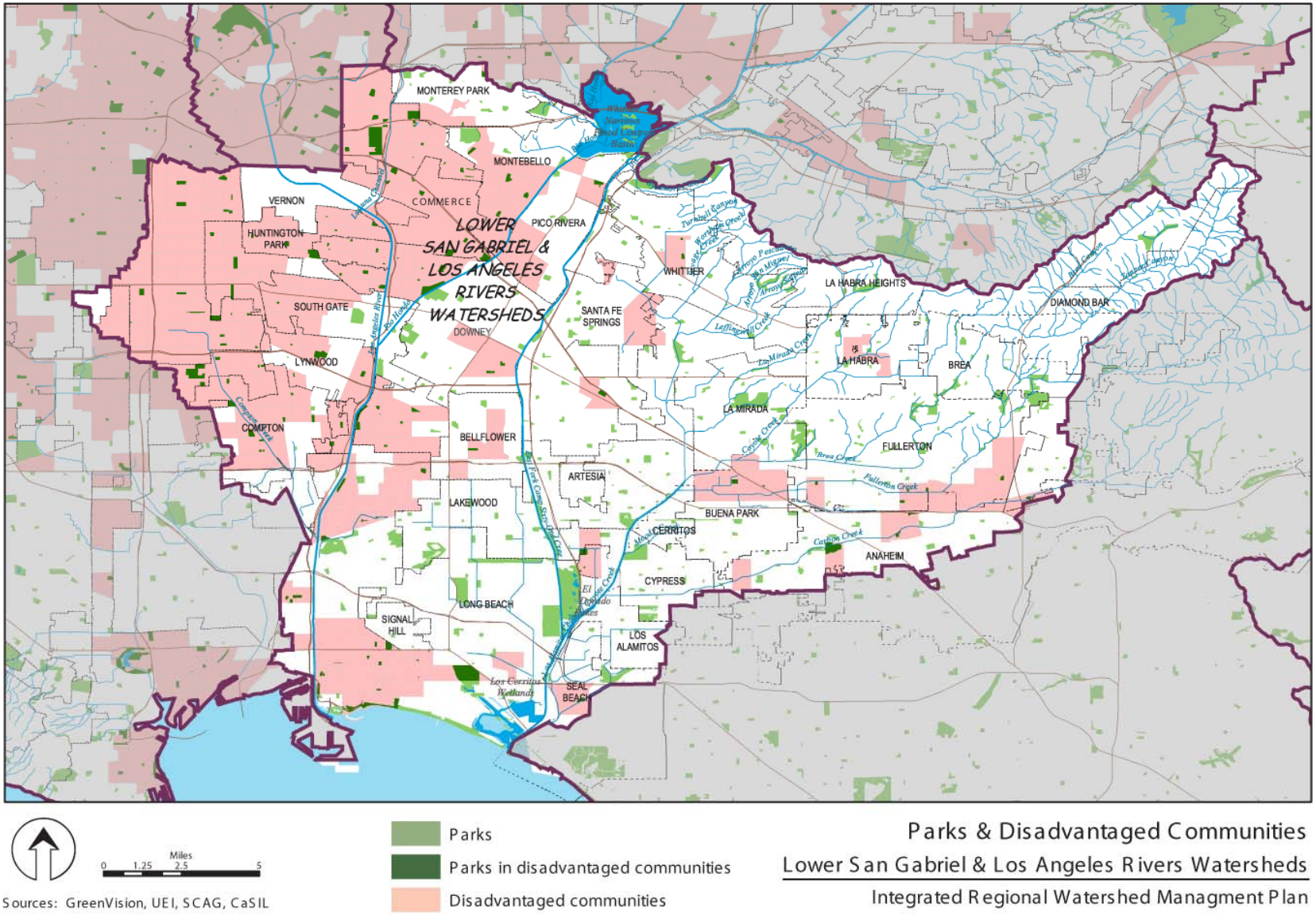

Figure 2-9(C). Disadvantaged Communities, Lower San Gabriel and Los Angeles Watersheds

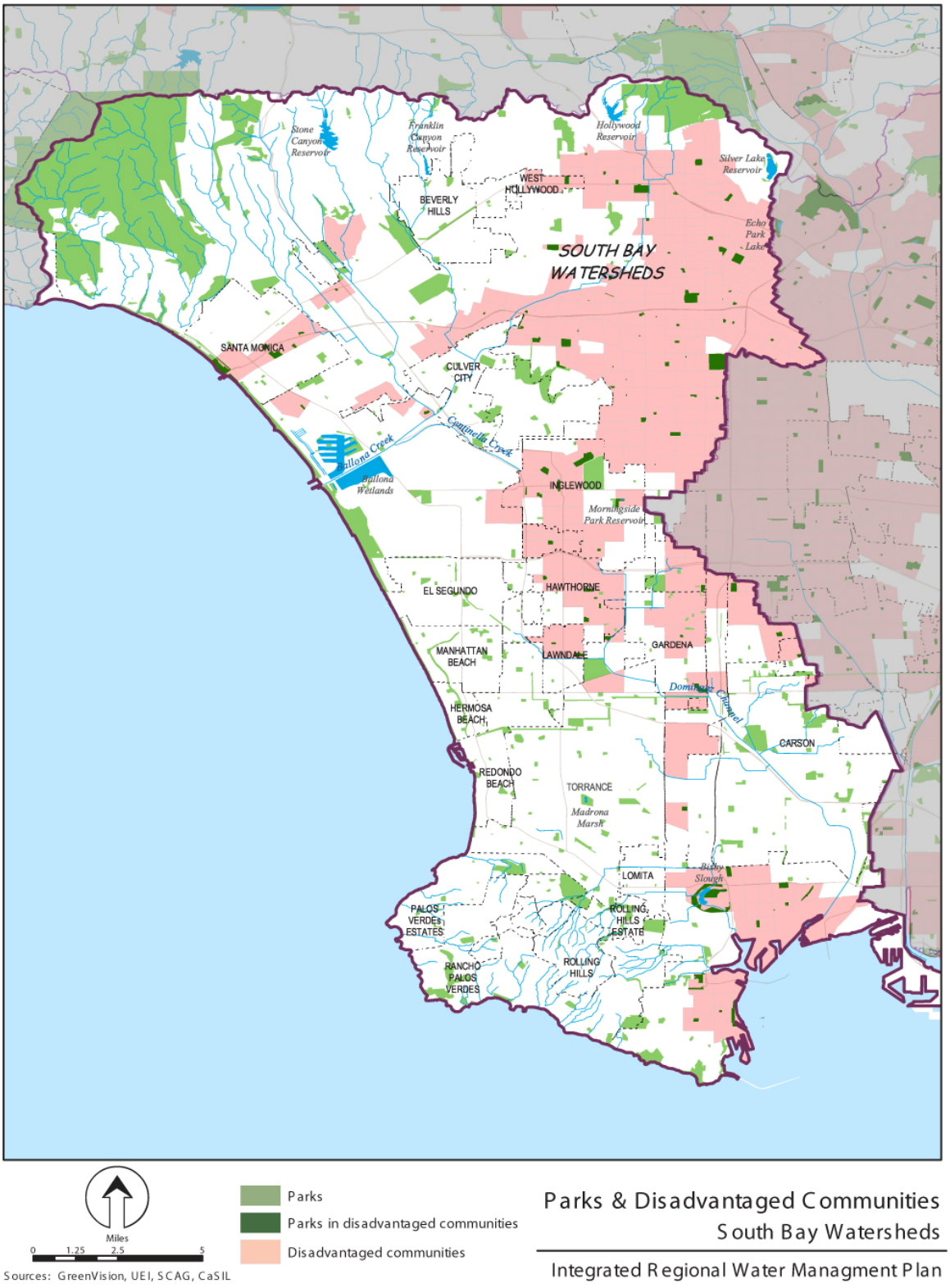

Figure 2-9(D). Disadvantaged Communities, South Bay Watersheds

Social concerns in the region may be reflected by a recent survey of Los Angeles residents (PPIC, 2005), which found that residents are unhappy with some key indicators of quality of life. Large majorities say traffic congestion on freeways and major roads (74%) and the availability of affordable housing (64%) are big problems in the county today. Majorities of residents still rate police protection (57%) and the quality of parks, beaches, and recreation facilities (58%) as excellent or good, but their assessments have fallen in recent years. Residents are far less charitable in their rating of other public services: Only one-third give excellent or good ratings to streets and roads (32% today, 51% in 2004) and public schools (36% today, 43% in 2004). In contrast, large majorities of residents in neighboring Orange County give excellent or good ratings to police protection (83%), recreational facilities (84%), streets and roads (64%), and public schools (64%). Los Angeles County residents are more likely to believe that Los Angeles County will be a worse place (37%) rather than a better place (24%) to live in twenty years, with 35 percent anticipating that quality of life in the county will stay the same. Fully one-third of county residents (33%) expect to leave Los Angeles County in the next five years, up from 17 percent in 2003. African Americans (41%) are far more likely than whites (30%), Latinos (34%), and Asians (25%) to see themselves as leaving the county.

3. OBJECTIVES AND PRIORITIES

3.1 Objectives

To enhance water supply, improve surface water and groundwater quality, improve water supply reliability, restore ecosystems, and improve recreational access, the following over-arching objectives for the Region have been articulated, based on recent water supply, resource management, and watershed plans. These include the UWMPs, the Metropolitan Water District's IRP, Common Ground, from the Mountain to the Sea (the watershed and open space plan for the Los Angeles and San Gabriel Rivers), and completed and in progress watershed plans for major tributary streams (Arroyo Seco, Ballona Creek, Compton Creek, Coyote Creek, Dominguez Channel, Rio Hondo, Tujunga Wash, and the Upper San Gabriel River). Objectives articulated in these documents were reviewed to generate an initial list, which was reviewed and supplemented by members of the Leadership Committee. An Objectives Subcommittee was subsequently formed to provide input to the Leadership Committee, provide response to comments received on draft objectives, and to maintain a current working set of objectives. Draft objectives were provided to the Steering Committees and presented at one regional stakeholder workshop and five sub-regional stakeholder workshops. Comments received at the workshops were incorporated into the draft objectives. Although at the time of this Draft Plan that list and the precise targets are still evolving, Table 3-1 and the following discussion represents a synthesis of the main concepts identified to date. An updated list will be provided in the Final Plan.

3.1.1 Reduce Dependence on Imported Water

The availability of imported water in the Region, from the Owens Valley and Mono Basin, the Colorado River, and the SWP, allowed many agencies to shift their reliance from local to imported supplies. The cost of imported water, periodic reductions in supply due to climatic variation, heightened environmental sensitivities in the areas where imported water originates, and increased competition limits, the sustainability of imported supplies. Although imported water will remain a major element of the Region's supply, the reliance on this source should continue to be reduced.

3.1.2 Optimize Use of Local Water Resources

Most years, the San Gabriel Mountains absorb substantial amounts of precipitation and slowly release that runoff, providing an important source of high-quality and low-cost water that can be treated for direct use or recharged into groundwater basins for later use. But in several locations, recharge is limited by the capacity of existing recharge facilities. Expansion of those facilities would permit additional recharge, improving water supply. Recharge of runoff from urbanized areas is currently limited by concerns about potential contamination. If surface water quality can be improved or stormwater captured and treated, another source of local water could be utilized, either for direct reuse or recharged to enhance groundwater storage. A large portion of the recycled water produced by wastewater treatment plants is discharged to the rivers or the

Table 3-1. Greater Los Angeles IRWMP Objectives, Planning Targets, and Strategies		
Objectives	Planning Targets	Strategies
• Reduce dependence on imported water • Optimize use of local water resources • Enhance water supply reliability	• Sustain current local water resources production capacity and quality and provide a minimum 850,000 acre-feet/year of additional water supply and/or demand reduction • Reuse or infiltrate a minimum of ?? acre-feet/year of additional reclaimed water (over and above the 120,000 acre-feet/year or 105 mgd of recycle currently occurring). This corresponds to a total target of ??% of the available reclaimed wastewater and would require adding tertiary treatment for about ?? mgd (over and above the 225 mgd currently). • Recycle ??% of the annual stormwater runoff from developed areas, approximately ?? acre-feet/year on average.	• Desalination • Ecosystem Restoration • Environmental and Habitat Protection and Improvement • Flood Management • Groundwater Management & Conjunctive Use • Imported Water • Land Use Planning • Nonpoint Source (NPS) Pollution Control • Recreation and Public Access • Stormwater Capture and Management • Surface Storage • Water and Wastewater Treatment • Water Conservation • Water Quality Protection and Improvement • Water Recycling • Watershed Planning • Water Supply Reliability • Water Transfers • Wetlands Enhancement and Creation
• Improve the quality of urban runoff and stormwater	• Reduce, capture, infiltrate and/or treat the ?? percentile dry weather urban runoff flow, approximately ?? acre-feet/year. • Reduce, capture, infiltrate, and/or treat stormwater runoff from developed areas for the ?? percentile storm event, approximately ?? acre-feet/storm event. A portion or all of this treated stormwater would be recycled to meet the water supply target above.	
• Maintain and enhance flood protection	• Repair and replace ?? portion of the aging infrastructure each year over the next 20 years. Limit the need to expand flood management capacity to the degree possible by capturing and treating flows in upstream reaches and reducing existing flood flows.	
• Increase watershed-friendly recreation and accessible open space for all communities	• Provide an additional ?? acres of watershed-friendly parkland and open space, focused in disadvantaged communities	
• Conserve and restore native habitat	• Restore ?? linear miles of riparian habitat and associated habitat buffer	
• Promote the application of watershed approaches to resource management issues		

ocean. That water could be used to augment local supplies through groundwater recharge or direct non-potable reuse. Many water systems in the Region have been operating for five decades or longer with differing attitudes about maintenance and infrastructure replacement. System maintenance and enhancements will improve the quality of water delivered to consumers, enhance system flexibility, and improve water supply reliability.

3.1.3 Enhance Water Supply Reliability

Climatic variations have historically resulted in substantial variation in the availability of both local and imported water supplies. Future climate changes may introduce even greater variation. To insulate the Region from these variations, the reliability of water supply must be enhanced. The Region is blessed with substantial groundwater basins in many locations, which provide opportunities to store significant amounts of

water when local precipitation is plentiful or excess imported water is available. Use of under-utilized local sources of water (e.g., stormwater runoff and recycled water) could be optimized as appropriate to offset demand for potable supplies and enhance groundwater storage.

3.1.4 Improve the Quality of Urban Runoff and Stormwater

The degraded quality of urban and stormwater runoff is degraded by the presence of various contaminants, and the substantial hydromodification of most river and stream channels impairs the designated beneficial uses of local water bodies. By improving the quality of urban and stormwater runoff, this local resource can augment local supplies and reduce demand for imported water. As most point sources are already regulated, non point sources must be targeted to reduce the presence of contaminants in runoff. With fewer contaminants, less treatment would be required to make this supply available for groundwater recharge or direct reuse (e.g., landscape irrigation). Utilization of urban runoff and stormwater to recharge groundwater basins or for direct reuse would improve local supplies and enhance water supply reliability.

3.1.5 Maintain and Enhance Flood Protection

Although abundant sunshine is one of the Region's main attractions, storm events have the potential to create substantial flood risks. An extensive flood management system must be operated and maintained, and enhanced where needed to protect lives and property. A well-maintained flood management system, including debris-basins in the mountains and foothills, reduces the amount of soil, rocks and other debris in downstream creeks and rivers. Any expanded utilization of urban runoff and stormwater for groundwater recharge or direct reuse must preserve, or improve, existing flood protection levels.

3.1.6 Increase Watershed-friendly Recreation and Accessible Open Space for all Communities

Open space used for recreation and public access may have the potential to optimize local water resources (by preserving or enhancing the area available for natural groundwater recharge), improve surface water quality, to the extent that these open spaces filter, retain, or detain stormwater runoff, and provide opportunities to reuse stormwater or recycled water for irrigation. Existing parkland and open space in the urbanized portions of the Region is insufficient to meet the needs of local residents, particularly in disadvantaged communities. Watershed-friendly recreation and open space includes native vegetation that creates habitat, provides passive recreational activities, and where feasible, contributes to stormwater detention and treatment and groundwater recharge.

3.1.7 Conserve and Restore Native Habitat

Urban and suburban growth in the Region has displaced extensive areas of natural habitat, including wetlands and riparian habitat that has substantially affected local watersheds and water resources. Native habitats and wetlands improve opportunities for groundwater recharge, allow native plants and animals to thrive, and provide opportunities for migratory animals to rest and forage. Linkages between the remaining areas of native habitat are needed to preserve long-term species diversity. Conservation of existing habitat areas and restoration of degraded habitat will preserve and restore hydrologic conditions that favor natural recharge of precipitation and protect the quality of local water resources.

Fire is an integral part of many local ecosystems, which have adapted to these occasional events in ways that renew vegetation and recycle nutrients. Historical patterns of open space management have relied heavily on fire suppression, which in some instances has increased fuel loads, transforming once-minor fires to major conflagrations that have severe impacts on habitat and create substantial risks to lives and property in adjacent developed areas. Once denuded of vegetation, exposed soils are susceptible to erosion and failure,

sometimes resulting in debris flows that clog channels and fill reservoirs with sediment, adversely affecting downstream water quality, and reducing the ability of these lands to absorb rainfall and recharge groundwater. Sensitive fuel management techniques, including controlled burns and fuel load management are needed to restore the ability of these lands to accommodate minor fires and preserve and protect habitat for sensitive species.

3.1.8 Promote the Application of Watershed Approaches to Resource Management Issues

Increasingly, agencies and stakeholders are recognizing the value of utilizing watersheds as an organizing element and adopting multi-purpose programs and projects to resource management issues, including water resources, habitat, and open space. Eight watershed management plans have been, or are being prepared in the Region, and plans for those areas that are not included should be developed. All plans should include appropriate monitoring of watershed conditions and incorporate adaptive management techniques that result in plan modifications as conditions change. This IRWMP can provide a framework for these local plans and support continued collaboration between, and integration of, these efforts. Counties, cities, agencies and stakeholders should be encouraged to plan and implement multi-purpose projects that provide multiple benefits.

3.2 Planning Targets

To establish benchmarks for implementation of the IRWMP, planning targets will be identified for the 20-year planning horizon. Quantitative evaluations of current water resource levels versus those needed or desired in 2026 will provide the basis for these planning targets. The quantitative difference between current and future resource needs represent a quantitative "gap" for water resources that is proposed to be satisfied through IRWMP implementation. A planning target representing the quantitative "gap" for water supply was confirmed based on input and feedback from IRWMP participants and stakeholders. The remaining planning targets are still in development as of this Draft. When completed, these planning targets will represent the Region's quantitative water resource needs over the 20-year planning horizon. Although the IRWMP is not specifically intended to address the identified open space and habitat targets, the Plan will determine the extent to which implementation of water supply and water quality programs and projects can assist in meeting these regional needs.

3.2.1 Sustain Current Local Water Resources Production Capacity and Quality and Provide a Minimum 850,000 acre-feet of Additional Water Supply and/or Demand Reduction

Projected population growth will expand demand for water resources in the Region over the next 20 years. Expansion of demand management activities (e.g., conservation) will decrease the need for new supplies and reduce demand for imported water. Existing infrastructure must adapt and expand to optimize local water resources.

3.2.2 Reuse or Infiltrate a Minimum of ?? Acre-Feet/Year of Recycled Water

Recycled water is the single most available source of water in the Region because existing capacity to recycle water exceeds demand. To the extent that opportunities to utilize recycled water can be created, this will displace the need to import, pump and/or treat "new" water and improve water supply reliability. This target

is based on the reuse or infiltratation of a minimum of X acre-feet/year of additional reclaimed water (over and above the 120,000 acre-feet/year or 105 mgd of recycle currently occurring).

3.2.3 Recycle ?? Percent of the Annual Stormwater Runoff from Developed Areas, Approximately ?? Acre-Feet/Year

Extensive urban and suburban development in the region has significantly increased impervious surfaces and increased runoff to the creeks and rivers. The flood management system has been designed to efficiently carry this runoff to the ocean. Due to the presence of trash, bacteria, metals, nutrients and organic chemicals in stormwater, this local resource has long been under-utilized and could augment local water supplies. Reducing impervious surfaces and utilizing swales and berms can enhance natural recharge. Otherwise, stormwater can be captured, treated and reused. This will require new infrastructure and must be designed to maintain, and where possible, enhance flood protection.

3.2.4 Reduce, Capture, Infiltrate, and/or Treat ??Percent of Dry Weather Urban Runoff Flow, Approximately ?? Acre-Feet/Year

During periods of dry weather, substantial volumes of runoff are discharged into local creeks and rivers. The urban runoff typically contains moderate levels of contaminants which degrade water quality and limit the potential to utilize this resource to augment local water supplies. To reduce adverse impacts to beneficial uses in the creeks and rivers, the volume of urban runoff could be reduced (with for example, more efficient landscape irrigation). Alternatively, this runoff could be captured, treated, infiltrated, or reused for other purposes, which would require the development of infrastructure for detention, treatment and infiltration. It should be noted that habitat in some creeks and rivers has become dependent on this year-round supply. Thus, the complete elimination or reuse of this supply could result in adverse impacts to this habitat and the native and migratory species that utilize it.

3.2.5 Reduce, Capture, Infiltrate, and/or Treat Stormwater Runoff from Developed Areas for the ?? Percentile Storm Event, Approximately ?? Acre-Feet per Storm Event

Extensive urban and suburban development in the region has significantly increased impervious surfaces and increased runoff to the creeks and rivers. The flood management system has been designed to efficiently carry this runoff to Santa Monica and San Pedro Bays. Due to the presence of trash, bacteria, metals, nutrients and organic chemicals in stormwater, this local resource has not been fully utilized to augment local supplies. Reducing impervious surfaces can enhance natural recharge. If stormwater can be captured before urban contaminants are introduced, it can be recharged to groundwater. Otherwise, stormwater can be captured, detained, and treated prior to recharge or other direct reuse. This will require new infrastructure and must be designed to maintain, and where possible, enhance flood protection.

3.2.6 Repair and/or Replace ??Portion of the Aging Flood Management Infrastructure Each Year

Various elements of the flood protection system, including debris basins, dams, reservoirs, pump stations, underground storm drains, and concrete-lined channels, have exceeded their design life span. As a result, many have signs of structural strains, or are showing deterioration or other aging effects. Results of years of channel and underground inspections and safety concerns have prompted agencies to monitor and perform immediate repairs to several channels and drains with various deficiencies. This target addresses the need for a systematic repair and replacement of this aging infrastructure.

3.2.7 Restore ?? Linear Miles of Riparian Habitat and Associated Habitat Buffer

Existing riparian habitat in the Region is mostly confined to the San Gabriel and Santa Monica Mountains. Although large portions of this habitat in the San Gabriel Mountains lie within the Angeles National Forest, much of the riparian habitat in the rest of the Region has been subject to modification. Historically, the streams that supported this habitat in coastal areas also supported native populations of steelhead trout. To help restore the population of species associated with these stream corridors, preservation and restoration of riparian habitat and associated habitat buffer and water quality improvements in those streams will be required. Although the IRWMP is not intended to address this specific resource issue, the inclusion of this planning target is intended to determine to what extent implementation of the Plan can assist in meeting this regional resource conservation need.

3.2.8 Provide an Additional ?? acres of Watershed-friendly Parkland and Open Space, Focused in Disadvantaged Communities

To address existing deficiencies in access to parkland and open space, and meet additional demand associated with projected population growth, additional parkland and open space will be required. As many disadvantaged communities lack sufficient park space, development of new parkland and open space should be focused in those communities. Watershed-friendly recreation and open space includes native vegetation that creates habitat, provides passive recreational activities, and where feasible, contributes to stormwater detention and treatment and groundwater recharge. Although the IRWMP is not intended to address the open space deficit, the inclusion of this planning target is intended to determine to what extent implementation of the Plan can assist in meeting the regional need for additional parkland and open space.

3.3 Regional Priorities

Based on input and review by the Leadership Committee, review of recent plans, including UWMPs, WMPs, and other regional plans, and input from agencies and stakeholders, the following list of short-term (e.g., three years) and long-term (20 years) priorities have been identified for the IRWMP. A specific list of project priorities is provided in Table 5-2.

3.3.1 Short-Term Priorities

- Utilize a regional and sub-regional committee structure for development and implementation of the IRWMP;
- Complete the Greater Los Angeles County IRWMP by January 1, 2007;
- Articulate quantifiable planning targets for water supply, water quality, flood management, and open space/habitat;
- Determine which water management strategies can contribute to meeting the identified objectives;
- Identify projects that will meet the gap between existing projects and the regional planning targets; and
- Maximize funding opportunities for project implementation from local, state and federal sources.

3.3.2 Long-Term Priorities

- Maintain a regional and sub-regional committee structure to oversee plan implementation and assure continued stakeholder input;

- Optimize use of recycled water, groundwater, desalination, and stormwater to enhance water supply reliability;
- Reduce demand on imported water sources;
- Protect groundwater supplies;
- Improve surface water quality to meet applicable water quality standards; and
- Preserve open space, conserve sensitive habitats, and protect special-status species.

3.4 Consistency with Statewide Priorities

Based on the IRWM Grant Program Guidelines (DWR, 2004), the state has identified a range of statewide priorities. Table 3-2 provides an assessment of how the IRWMP and the Region's priorities are consistent with statewide priorities.

Table 3-2. Consistency with Statewide Priorities

Statewide Priorities	IRWMP Consistency
Reduce Conflict between Water Users or Resolve Water Rights Disputes, including Interregional Water Rights Issues	Although the preservation and protection of water rights will continue to be a concern, given the long period of urban and suburban development in the Region, most of the major water rights disputes were settled long ago, often via litigation or adjudication of groundwater basins. As the IRWMP will optimize use of local supplies and expand conservation, which will enhance water supply reliability, implementation of the plan will reduce the potential for conflicts during periods of extended drought.
Implementation of TMDLs that are Established or Under Development	Several TMDLs have been established in the Region, and many more remain to be developed. Efforts are underway to implement those that have been established, but considerable uncertainty exists regarding the total effect of multiple TMDLs in local watersheds. The IRWMP includes planning targets to capture an estimated volume of dry- and wet-weather runoff and expand use of recycled water and will identify the costs, benefits and impacts of alternative methods to treat and recycle the estimated volumes. This process will provide specific and quantifiable information for the development of implementation plans to comply with existing and pending TMDLs, and resolve a major conflict for many local jurisdictions which are struggling to identify a fund source for TMDL compliance
Implementation of Los Angeles RWQCB Watershed Management Initiative Policies	
Alternative methods to demonstrate water quality improvement. Tie water quality improvement to beneficial use improvement as a preferred way to demonstrate effectiveness of grant projects that are multi-use or habitat restoration in nature.	The IRWMP proposes a planning target to restore riparian habitat and associated buffer habitat, which would support the goal of restoration of steelhead populations in streams in the Santa Monica Mountains. Thus, the IRMWP will support the preservation and/or restoration of beneficial uses throughout the Region as an alternative measure of water quality, rather than simple reliance on numerical standards.
Addressing the regional salt management/salt imbalance issue which is becoming increasingly critical in the region. Also, balancing this issue with the need to promote the use of reclaimed water.	The Draft Plan includes objectives to maintain quality of existing water sources, such as reservoirs and groundwater basins, and expand use of recycled water, and includes specific acknowledgement that the re-use of water increases salt content and that salt management issues must be recognized and addressed.

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
Development, adoption, and implementation of TMDLs is a high priority both regionally and statewide.	The Draft Plan proposes quantifiable planning targets to reduce, capture, treat and/or infiltrate dry-weather urban runoff, and stormwater runoff, and recycle wastewater effluent. The Final Plan will further expand methods to achieve that target, and thereby achieve compliance with existing, proposed, and pending TMDLs.
Municipal stormwater/urban runoff. Advancing stormwater and urban runoff programs through a variety of efforts. Current priorities include trash control and new development/re-development issues.	As noted above, the Draft Plan proposes quantifiable planning targets to reduce, capture, treat and/or infiltrate dry-weather urban runoff and stormwater runoff. The Final Plan will propose alternative methods to achieve that target, which will include a variety of programs and proposed projects.
Watershed monitoring and assessment. Coordination of existing resources and participation in the Surface Water Ambient Monitoring Program (SWAMP). More use of bioassessment as a tool.	The Draft Plan encourages the development of watershed plans for those areas not currently covered, which would include watershed assessments and appropriate monitoring of watershed resources. The Data Management element of the Final Plan will address issues of data consistency, including the inclusion of water quality monitoring data in the SWAMP.
Habitat loss/restoration. Even with strides in improving instream water quality, unless habitat is restored (riparian/wetlands, in particular), in many cases beneficial uses can not be fully restored.	The Plan proposes a target to protect and conserve existing habitat, including riparian and wetlands, and a planning target to restore riparian habitat and associated buffer, in support of the existing beneficial uses.
Preservation of high quality habitats. Ensure maintenance of beneficial uses at these sites through support of low-impact development coupled with minimized/avoided hydromodification.	The Draft Plan recognizes the need to support preservation and conservation of habitats, particularly those that support sensitive species and as noted above, includes a planning target for restoration of riparian habitat.
Priority NPS efforts. Several areas have been targeted for accelerated efforts including development of regional strategies to address agriculture, septic tanks, urban runoff, and marinas as contributors of NPS pollution.	The Draft Plan recognizes the need to continue existing programs, such as NPDES permits, and expand implementation of programs and projects to address NPS pollution, consistent with the State's NPS Program Strategy and Implementation Plan (1998–2013) which identifies actions to reduce nonpoint pollution, and the companion volume, the California Management Measures for Polluted Runoff.
Beach closures. Other impairments in the Region are the result of elevated coliform levels or beach closures. Monitoring the water quality of recreational areas along the coast, identifying land uses or drainages which generate pathogens, and reducing pollution within these areas is a targeted activity.	The Plan includes a planning target to capture an estimated volume of dry- and wet-weather runoff and recycle wastewater effluent and will identify the costs, benefits and impacts of alternative methods to treat the estimated volumes. This process will support development of implementation plans to comply with existing and pending TMDLs, including the dry and wet-weather bacteria TMDLs for Santa Monica Bay beaches, which should reduce potential beach closures associated with elevated bacteria levels.
Reduce, reuse, and recycle water. Maximize water conservation in the Region.	The Draft Plan includes objectives to maintain and enhance the reliability of local water resources and a planning target to increase the use of recycled water.
Implementation of Santa Ana RWQCB Watershed Management Initiative Policies	
The WMI identifies specific water quality concerns for the Coyote Creek Watershed (including nitrogen impairment, channel erosion and aquatic habitat degradation) and proposes development of a watershed management plan (in progress) to address these issues.	The Draft Plan includes objectives to improve surface water quality, conserve and restore native habitat, including wetlands and riparian habitat, and to promote the application of watershed approaches to resource management issues, including completion of watershed management plans for those areas without a current plan (such as Coyote Creek).

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
Implementation of the SWRCB's Non Point Source Pollution Plan	
Manage NPS pollution, where feasible, at the watershed level…where local stewardship and site-specific management practices can be implemented through comprehensive watershed protection or restoration plans.	As noted above, the Draft IRWMP recognizes the need to continue existing programs, such as NPDES permits, and expand implementation of programs and projects to address NPS pollution, consistent with the State's NPS Program Strategy and Implementation Plan and the companion volume, the California Management Measures for Polluted Runoff. Existing watershed plans, which have been developed for most of the major tributary watersheds address these concepts at the watershed level. The Draft Plan's quantifiable targets for dry-weather urban runoff and wet-weather stormwater runoff will lead to the identification of alternative methods to address runoff quality, including measures to address NPS pollutants, and integrate those methods into regional solutions. As water quality problems can be effectively implemented at a watershed scale, the project integration associated with the IRWMP is most likely to occur at the watershed scale.
Apply previous experiences to future decisions.	Existing efforts to develop and implement watershed plans and comply with NPDES and TMDL requirements are increasingly utilizing adaptive management techniques to learn from previous efforts and apply those lessons to future projects and programs. The Final Plan will identify a process for plan updates and incorporate information from monitoring of watershed conditions into consideration of future plan updates, so that the relative application of water management strategies, the list of projects that are proposed, and the relative priorities of those projects may be modified as appropriate.
Encourage innovative approaches to NPS pollution control and prevention through interagency, interdisciplinary, and volunteer activities.	As noted in Section 1, a variety of innovative approaches to surface water quality issues have been developed to date, which involve interagency collaboration, and often rely upon water quality monitoring programs which rely upon volunteer efforts to expand available information. The Final Plan will identify at least three alternative methods to achieve TMDL implementation and ultimate attainment of attain applicable water quality objectives, which will include programs and projects to address NPS pollution. Given the size of the Region and the pervasive effect of urbanization on surface water quality, collaborative efforts to address NPS pollution will likely require multi-agency efforts, which may take the form of projects with multiple sponsors, or perhaps even new administrative structures (such as a joint powers authority) to address surface water quality at the watershed scale.
Ensure the protection and restoration of the State's water quality, existing and potential beneficial uses, critical coastal areas, and pristine areas by implementing management measures to prevent and control NPS pollution.	As noted above, the Final Plan will include identification of programs and projects intended to achieve compliance with TMDLs and thus applicable water quality standards intended to preserve designated beneficial uses, including those in coastal and inland locations. The Plan acknowledges the presence of an Area of Biological Significance and associated Critical Coastal Area in the North Santa Monica Bay.

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
Promote the implementation of management measures and use of management practices for the NPS component of TMDLs or in Clean Water Act section 303(d) listed water bodies in order to improve water quality.	Existing TMDLs for trash and bacteria will require the extensive application of NPS pollution control techniques to achieve compliance. As noted above, the Final Plan will include identification of comprehensive programs and projects to achieve compliance with TMDLs for 303(d) listed water bodies, which are most of the Region's rivers and creeks.
Assist in Meeting Delta Water Quality Objectives	The Draft Plan includes a planning target to sustain current local water resources production capacity and quality and provide up to approximately 850,000 acre-feet of additional water supply and/or demand reduction. The Final Plan will identify programs and projects that will meet that target. However, it is anticipated that a substantial portion of that target will be met through expansion of water conservation programs, expanded use of recycled water (to offset potable water demand), and the optimized use of local supplies, including improved management and cleanup of groundwater basins and the potential to capture, treat, infiltrate or directly reuse urban and stormwater runoff. The combined effect of these proposals will be to minimize demand on imported supplies, and possibly even reduce demand for those sources. This will improve water supply reliability for the Region and concurrently reduce demand on State Water Project supplies, which will enhance the potential for improved management of the Bay-Delta system in order to meet identified water quality objectives, including salinity.
Implement Recommendations of the Floodplain Management Task Force	
In planning new or upgraded floodwater management programs and projects, including structural projects, local and State agencies should, where appropriate, encourage nonstructural approaches and the conservation of the beneficial uses and functions of floodplains. It is recognized that some structural approaches provide needed flood protection and opportunities for agricultural conservation and ecosystem protection and restoration.	The Draft Plan includes objectives to conserve and restore habitats (including riparian and wetlands) and expand parkland and open space, which have the potential to contribute to flood protection without specific structural enhancements. The Plan also includes a planning target to restore riparian habitat and associated habitat buffer (e.g., floodplain), which would support the preservation and restoration of steelhead trout habitat in the Santa Monica Mountains, consistent with a designated use of those streams, while recognizing the need to include the associated buffer habitat as part of the overall system. The Draft Plan's discussion of water management strategies includes a discussion of the potential for land use planning to be used as a tool for water quality (by reducing impervious surfaces) which would have a corollary benefit to flood protection.
Planning and development of ecosystem restoration projects should consider costs and impacts with respect to vector control and monitoring related to mosquito-transmitted diseases.	The Draft Plan's discussion of ecosystem restoration as a water management strategy recognizes that the ability to restore ecosystems within a largely urbanized region requires consideration of public safety issues, including vector management and the appropriate interface between wildlands and developed areas.
The State should encourage multi-jurisdictional partnerships when floodplain management projects are planned and implemented. Jurisdiction-based projects provide localized solutions, when a greater benefit might be achieved if the project adopted a watershed-wide approach. Communities and jurisdictions should work together to develop, implement, and monitor watershed-wide floodplain management programs.	The Final Plan will address implementation options for multi-purpose projects, which may include flood management benefits. Given the size of the Region and the number of local jurisdictions and agencies, collaborative efforts will be required, which may take the form of projects with multiple sponsors, or perhaps even new administrative structures (such as a joint powers authority) at the watershed scale.

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
Implement Recommendations of the Desalination Task Force	
Include desalination, where economically and environmentally appropriate, as an element of a balanced water supply portfolio, which also includes conservation and water recycling to the maximum extent practicable.	The Draft IRWMP includes a discussion of water management strategies, which acknowledges that brackish groundwater desalination is ongoing in the Region and that three agencies are currently investigating ocean water desalination as part of their water supply portfolio. As discussed above, substantial expansion of water conservation and reuse of recycled water is also part of the regional solution to enhance local supplies and improve water supply reliability.
Identify ways to improve water quality by mixing desalinated water with other water supplies.	Ongoing efforts to desalinate brackish groundwater already rely upon mixing the desalinated water with other supplies to provide high quality water. Pending and future proposals for ocean water desalination will also include plans to mix desalinated water with other supplies.
Where feasible and appropriate, utilize wastewater outfalls for blending/discharging desalination brine/concentrate.	Two of the three proposed ocean water desalination facilities in the Region propose to utilize existing wastewater discharge outfalls for brine discharge, which would reduce adverse effects associated with reduced salinity in the areas around the existing outfalls.
Evaluate all new water supply strategies including desalination based upon adopted community General Plans, UWMPs, Local Coastal Plans, and other approved plans that integrate regional planning, growth and water supply/demand projections. Environmental reviews should ensure that growth related impacts of desalination projects are properly evaluated.	The Draft IRWMP provides a comprehensive assessment of the Region's water supply needs based on urban water management plans and regional population projections. The Final Plan will acknowledge the need for integration of water resource management planning with other regional plans and activities, and recognition of the need to understand the intersection between such regional plans and the actions and proposals of individual water agencies.
Implement Recommendations of the Recycled Water Task Force	
Engage the public in an active dialogue using a community value-based decision-making model in planning water recycling projects.	The Draft IRWMP proposes expanded utilization of recycled water as part of the Region's future water supply portfolio and identifies an extensive stakeholder outreach process to discuss water resource management strategies for the Region. Individual proposals for new or expanded recycled water production or distribution systems will need to incorporate a stakeholder-involvement process in the identification and implementation of individual projects. One notable example of such a process is the City of Los Angeles' IRP, which utilized an extensive stakeholder process to identify alternative scenarios for wastewater, recycled water and stormwater that were subjected to California Environmental Quality Act (CEQA) analysis.
Develop a uniform method for analyzing projects and a consistent economic feasibility framework across funding agencies.	The Draft Plan includes a benefit assessment framework for projects that can be applied to all projects, including recycled water projects, across funding agencies and project sponsors.

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
State Species Recovery Plan	The State of California does not have a single Species Recovery Plan, as most species recovery plans are developed and implemented by the U.S. Fish and Wildlife Service pursuant to their responsibilities under the federal Endangered Species Act. The California Department of Fish and Game cooperates in the development of such plans, however, state efforts towards species recovery are focused on the development of Natural Community Conservation Plans (NCCP, formerly known as Habitat Conservation Plans). Only one such plan has been developed in the Region (the Palos Verde Peninsula Sub-Regional Plan). No projects included in the Draft IRWMP are located within the boundaries of the Palos Verdes NCCP plan, and therefore no conflicts with the NCCP would occur. The County of Los Angeles also has implemented the Significant Ecological Areas program, which identify special habitats and proposes measures to protect such habitat. The Draft Plan includes an objective to conserve and restore native habitat, which is consistent with state and federal programs related to species recovery. The Draft Plan includes a planning target to restore 20 linear miles of riparian habitat and associated habitat buffer, which is consistent with regional plans to restore steelhead fisheries in Malibu Creek and other streams in the Santa Monica Mountains. The Draft Plan also proposes to incorporate the following water management strategies in the IRWMP: Ecosystem Restoration, Environmental & Habitat Protection & Improvement, Watershed Planning, and Wetlands Enhancement and Creation. These strategies are consistent with federal, state, and local species preservation plans, projects and programs.
Address Environmental Justice Concerns	Various cities, agencies, and organizations have been working for some time to address environmental justice issues in the region and improve the lives of communities that have traditionally received little attention or amenities that more affluent communities have enjoyed. The Draft Plan includes objectives to: maintain and enhance the reliability of local water resources, improve quality of urban runoff and stormwater; maintain and enhance flood protection; and increase watershed-friendly recreation and accessible open space for all communities. The IRWMP is intended to address the substantive water supply and water quality issues in all communities, including Disadvantaged Communities. The planning target for parkland and open space specifically acknowledges the need to focus efforts to expand open space in under-served communities, which often fit the definition of Disadvantaged Communities identified in the Proposition 50 guidelines. One concept the Final Plan is likely to explore is the concept of river parkways, which could result in the creation of linear greenbelts along existing river and stream channels, which would provide opportunities for much-needed green space in densely urbanized communities along these channels, which are typically park poor.

Table 3-2. Consistency with Statewide Priorities	
Statewide Priorities	IRWMP Consistency
Assist in Achieving One or More Goals of the CALFED Bay-Delta Program	
Maximize use of available water supplies through conservation, water recycling, and water quality improvements.	The Draft Plan proposes to address future water resource needs through aggressive expansion of water conservation programs, expanded use of recycled water, optimized use of groundwater basins (which include measures to improve water quality) and improvements in surface water quality, which could make substantial local supplies available for recharge or other direct use.
Increase the flexibility of water systems at the state, federal and local level through improvements in conveyance, storage and water project operations.	The Draft Plan recognizes the need to increase flexibility of the Region's water infrastructure, which may include expansion and extension of conveyance facilities, projects or programs to modify reservoir operations and increase local storage, and optimized operation of wells, pumps, and treatment facilities to enhance water supply and improve water supply reliability.
Develop groundwater and surface water storage projects to boost flexibility and provide additional supplies for agriculture, urban and environmental use.	As noted above, the Draft Plan proposes optimized use of groundwater basins to increase storage capacity, and may suggest projects or programs to modify reservoir operations and increase local storage. These measures would both provide additional supplies for agricultural, urban and environmental use.
Reduce water demand through "real water" conservation.	The Draft Plan includes a planning target for future water supply, through the development of new supplies and demand reduction. A substantial portion of this future target will be provided by aggressive expansion of water conservation and water recycling programs.
Promote collaboration and integration among community based watershed efforts.	The Draft Plan includes an objective to promote the application of watershed approaches to resource management issues, which suggests that watershed plans be completed for those local watersheds that do not currently have a plan (although many individual watersheds currently have such plans), and acknowledges that the IRWMP creates an over-arching framework for these local plans and support continued collaboration and integration between these efforts.

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4. REGIONAL WATER RESOURCE MANAGEMENT

4.1 Water Management Strategies

The IRWM Grant Program Guidelines (DWR, 2004) identify 20 water management strategies that may be utilized to enhance water supplies and improve water supply reliability, and specifies that eleven of those strategies must be discussed at a minimum. The following section describes the current and potential future applicability of the strategies identified in the Proposition 50 guidelines within the Region. If they are part of the current water resource management portfolio, opportunities for expansion of their application, to enhance water supply and/or improve water supply reliability, are identified.

The identification of which water management strategies are included in this Plan is based on review of strategies, actions and opportunities identified in the Metropolitan Water District's IRP, the UWMPs of regional water wholesale districts, Common Ground, from the Mountains to the Sea, the watershed and open space plan for the Los Angeles and San Gabriel Rivers prepared by the California Resources Agency, and recent watershed plans on eight major creeks and tributaries.

As no relative priority has been established, the strategies are listed below in alphabetical order. For the purposes of this Plan, all 20 of the water management strategies identified in the Grant Program Guidelines are discussed in this plan, although groundwater management and conjunctive use are combined as a single strategy below.

4.1.1 Desalination

Brackish groundwater desalination (i.e., the removal of salts by forcing water through porous membranes) has been in practice in the Region for many years, in part due to financial incentives provided by the Metropolitan Water District. The Central Basin MWD and the West Basin MWD operate brackish water desalters that produce significant water supplies from local groundwater sources. Until recently, seawater desalination has not been an economic alternative to conventional sources of water supply. As improvements in high pressure reverse osmosis membrane technology have lowered operating pressure and, the cost of producing drinking water from seawater may become attractive. Considering the vast supply of seawater available to coastal regions, and the demand for "new" water, ocean desalination would appear a logical element of the Region's water supply. Several water providers are currently examining the feasibility of desalinating seawater through pilot and demonstration scale projects.

In order to diversify the regional water resource mix further, the Metropolitan Water District has developed a program to provide $250 per acre-feet for water produced from desalination and thereby defray the production cost, which is particularly sensitive to the cost of electrical power. Ongoing research to improve membrane efficiency may lower power costs and therefore the total cost of ocean desalination.

Challenges to the expanded use of desalination in the Region include disposal of saline discharge water (or brine), which from inland locations, typically requires a pipeline and ocean outfall; environmental concerns about entrapment and entrainment of fish, fish larvae and plankton by seawater intake structures; sensitivity of desalination facilities to the cost of electrical power, as much of the Region's power is currently generated by natural gas, which is subject to market-driven variations; and a need for new infrastructure to deliver water from ocean desalination facilities to more inland locations.

Opportunities for expanded use of desalination in the Region include expanded desalination of brackish groundwater; and new ocean desalination facilities, including the LADWPs proposal for a 25,000 acre-feet/year reverse osmosis seawater desalination facility at the City's Scattergood Power Plant in El Segundo; the West Basin MWD's planned 20,000 acre-feet/year reverse osmosis seawater desalination plant at an adjacent El Segundo Power Plant (currently in pilot-scale testing), and a 1,000 acre-feet/year dual pass nanofiltration technology plant at the Haynes Generating Station (currently in the demonstration-scale phase testing), a joint proposal by the City of Long Beach and the LADWP.

4.1.2 Ecosystem Restoration

Despite their exceptional importance and value, many of the region's inland, riverine, and coastal ecosystems have suffered from over a hundreds years of human impacts—development activities that have destroyed or degraded many ecosystems. Rivers, streams, and wetlands have been diked, ditched, and filled. Dams and flood control channels have been built to contain and direct waterways; fundamentally altering the natural processed that created, preserved, and restored these systems. Coastal dunes, woodlands, wetlands, grasslands, and estuary ecosystems have succumbed to coastal development and declines in water quality.

In recent decades, technologies have emerged to restore productivity to degraded or destroyed ecosystems. Scientists, engineers, and community groups have begun working with federal, state, and local governments to restore ecosystem function to the Regions native ecosystems. The fundamental goal of ecosystem restoration is to return the selected ecosystem to a condition that resembles its natural predisturbance state as closely as possible. Achievement of this goal entails restoration of the target ecosystem's structure and function both locally and within its broader landscape or watershed context.

Restored ecosystems result in physical, chemical, and biological changes to both the specific system, and the areas that it influences. The benefits of ecosystem restoration are difficult to quantify, but, depending upon the type of ecosystem restored (e.g., aquatic vs. terrestrial), they can include capturing and storing stormwater, groundwater recharge, flood protection, increasing water supply reliability, wildlife habitat creation and enhancement, water quality enhancement, flood control, and recreation. Economic benefits can also be realized through increased property values and the reduced cost of water quality enhancement compared to conventional wastewater and stormwater treatment systems.

To achieve long-term success, ecosystem restoration needs to address the causes and not just the symptoms of ecological disturbance. Sometimes these causes are obvious; sometimes they are subtle and far removed in space and time from the ecological damage, as in the case of many southern California coastal wetlands. The watersheds that drain into the Region's coastal wetlands were hydrologically modified as a result of urbanization and flood protection measures. Runoff quantities and velocities were increased by the straightened, more efficient drainage system which in turn increased the movement of pollutants and sediments downstream. These materials entered the coastal wetlands, estuaries and bays, causing water quality problems that resulted in fundamental changes in how these ecosystems functioned. These large-scale cause and effect relationships produce some major constraints to ecosystem restoration such as; the scale of the impact and restoration project, the cost of the restoration and maintenance, and the magnitude and potentially permanent nature of the environmental changes that resulted in the loss of ecosystem function. In addition, although human activities in watershed have altered important ecological processes, some of these

activities provide important public benefits (e.g., flood protection and water supply). Ecosystem restoration must therefore also occur within the parameters established by these human activities and provide resources for future consumptive use with the need to provide high quality environments that fulfill the needs of plant, animal, and human communities.

Opportunities for ecosystem restoration in the Region include as examples: the Los Angeles and San Gabriel River Master Plans, the Los Angeles River Revitalization Master Plan; the DeForest-Dominguez Wetlands Restoration Preliminary Plan; the Hazard Park Wetlands Restoration; Devil's Dip Creek Restoration and Daylighting; Topanga Creek Restoration Program; Malibu Creek and Tributary Restoration, Las Flores Creek Restoration; Solstice Creek Restoration, Arroyo Sequit Restoration, Whittier Narrows Nature Center Ecosystem Restoration; Malibu Lagoon Habitat Enhancement Program; Ballona Creek Ecosystem Restoration Project; Hydrodynamic Study for the Restoration of the Tujunga Wash; Taylor Yard Multi-Objective Feasibility Study, the Limekiln Canyon Stream Restoration and Habitat Improvement Project, Puente Chino Hills Wildlife Corridor, and the Los Cerritos Wetlands Restoration.

4.1.3 Environmental and Habitat Protection and Improvement

Risks to the environment and riparian habitat in the Region include urbanization and the loss of green space, invasive species, hydrological alterations, channel hardening, incompatible land uses, and other common problems associated with urbanization and pollution. The results of riparian and aquatic habitat degradation can lead to increased erosion of banks and channels; diminished water quality for wildlife and domestic use; loss of habitat for wildlife; alteration in flood protection; loss of aquatic productivity and health; and loss of recreational, educational, and aesthetic values. For some surface water bodies, water quality impairments include increases of both non-toxic elements such as sediment, nutrients, and water temperature, as well as toxic contaminants such as pesticides and heavy metals. Degraded water quality requires substantial treatment to remove the pollutants that may potentially affect fish and wildlife habitat quality, and limits recreational use of southern California beaches, bays, and lagoons.

In addition the loss of habitat throughout the coastal watersheds has aggravated water supply and reliability problems as riparian vegetation and wetlands can act to slow and retain stormwater flows and allow the water to recharge groundwater.

The long-term restoration, improvement and protection of the Region's riparian and aquatic habitat and environment would alleviate or eliminate the water quality, water supply and biological impacts of environmental degradation. Because many of the issues involved in environmental and habitat protection and improvement cut across traditional political and organizational boundaries success will only be accomplished through cooperative planning efforts like the IRWMP that include non-governmental organizations, private landowners, industry, and state and federal government.

The potential for aquatic and riparian restoration is limited by extensive development in the Region, as well as by geologic and topographic constraints. Restoration in such a heavily urbanized region is hindered by the fact that the physical and hydrological landscape has been irreversibly altered and it is often impossible to re-establish historic conditions. Hydrologic and land use changes in the watersheds also continue to impact stream corridors and downstream aquatic habitats and many created habitats that were designed to mitigate for losses from development seldom perform the same ecological functions as those that were removed.

Opportunities for restoration, improvement, and protection of the Region's riparian and aquatic habitat include the following examples: Las Virgenes Creek Naturalization and Restoration, Restoration of Southern Steelhead Habitat in Solstice Creek, Triunfo Creek Riparian Enhancement, Hahamongna Watershed Park Habitat Restoration and Best Management Practice (BMP) Implementation; the Flint Wash Restoration; the Central Arroyo Park Habitat Restoration and BMP Implementation; the Lower Arroyo Park Habitat Restoration and BMP Implementation; the San Rafael Creek Restoration; Santa Fe Dam Recreation Area and

Habitat Enhancements; Rio Hondo Vision Plan (Emerald Necklace Concept); Wilmington Drain Restoration Multiuse Project; Machado Lake Improvements; Stone Canyon Creek Restoration; the Long Beach RiverLink; the Sepulveda Basin Habitat Enhancement; and the Arroyo Seco Watershed Feasibility Study.

4.1.4 Flood Management

Flood management in the Region is the responsibility of the LACFCD (whose responsibilities are now performed by the LACDPW), the Orange County Flood Control District, the Ventura County Flood Control District, the U.S. Army Corps of Engineers, and cities in the Region. The LACFCD was formed in 1915 in response to a devastating flood in 1914, the Orange County Flood Control District was formed in 1927, and the Ventura County Flood Control District was formed in 1944. In 1936, federal legislation gave specific flood protection duties to the U.S. Army Corps of Engineers.

Flood management measures in the Region began in earnest in the 1920s, but the major elements of the current system were developed beginning in the 1930s. The current flood management system generally consists of concrete river and stream channels designed to expedite flow, dams and reservoirs on the rivers to regulate flow, debris basins on streams to capture sediment washed down from the mountains, and hundreds of miles of channels to direct flow into spreading basins, the rivers, or directly to the ocean. Flood management measures are less developed in those portions of the Region within the Santa Monica and San Gabriel Mountains, were most streams are in their natural state, except for dams on the San Gabriel River and several major tributary streams.

Despite the extensive network of flood management structures and channels, the counties track areas throughout the Region where flooding or drainage problems persist. Information is reported by the cities or through individual complaints, or directly to each county in unincorporated areas. Unmet drainage needs have been identified throughout the Region, but mostly in localized urban areas. If the situation requires a new drainage structure, the cities and the counties, sometimes in conjunction with the U.S. Army Corps of Engineers, will do a study to determine the best solution. The recently completed Los Angeles County Drainage Area project, which enhanced flood protection on the Los Angeles River, is one such example.

Constraints to the expansion of flood management programs include: the lack of undeveloped land within the urbanized portions of the region which could be used for flood management improvements, and steep slopes within the local mountains, which combined with the potential for heavy rains, can result in substantial soil erosion or debris flows which may affect downstream drainage facilities.

Opportunities to enhance flood management include the Sun Valley Watershed Plan, which addresses an area of chronic flooding with alternative approaches to construction of a flood conveyance channel, such the use of gravel pits and underground drains below parkland to infiltrate runoff and thereby enhance groundwater recharge. If successful, the Sun Valley Plan can serve as a model for future localized flood management improvements.

4.1.5 Groundwater Management and Conjunctive Use

Groundwater represents a significant portion of local supplies in the Region, although the extent of impervious surfaces resulted from urban and suburban development has greatly curtailed natural recharge. Growth and development has caused significant declines in groundwater basin levels, seawater intrusion, other water quality concerns, and the inability for some producers to continue producing from the basin without drilling deeper wells. As conditions deteriorated, and producers were not willing to settle on a compromise to protect the groundwater basin and reduce production, one of the appropriators in the basin would file a lawsuit against the other appropriators to adjudicate the groundwater basin and seek title to a portion of the water rights in the basin. Through engineering investigations, a safe yield is typically

established by a court and rights to the safe yield are allocated to the parties in the lawsuit. Given long-standing groundwater demand, very few basins remain unadjudicated in the Region.

Many of the groundwater basins in the Region use artificial recharge as a means of maintaining basin levels and pumping levels. This artificial recharge can occur with either local water (e.g., surface runoff, storm events, and discharges of groundwater) or imported water. Spreading grounds are typically used to recharge local water whereas imported water recharge can occur through direct means using spreading grounds or injection wells or in-lieu means. In some instances, spreading is limited because of the capacity limitations of the spreading facilities rather than water supply. Recharge by in-lieu means does not require facilities. It simply requires that an agency suspend production from its wells and meet retail demand needs through deliveries of imported supplies into its distribution system. Groundwater levels in the basin can then build up because of the reduction in pumping. However, this limits the amount of water that can be recharged in the basin to overlying demands.

Groundwater basin water quality is a significant issue in the Region. Many factors have contributed to the deterioration of water quality in portions of certain groundwater basins including historic overdrafting of groundwater basins causing seawater intrusion, industrial discharges, farming and the chemical usage associated with farming, chemicals contained in urban runoff, and naturally occurring organics. The cost of treating these contaminants so that groundwater basins can be optimized is often significant. Additionally, effective treatment has not yet been identified for some chemicals and various agencies are currently testing different treatment to identify the preferred treatment alternative.

Opportunities for the optimized use of groundwater basins in the Region include a reduction in impervious surfaces to increase native infiltration, expansion of existing, or construction of new, conjunctive use facilities to spread or inject both local and imported water when available, expansion of advanced wastewater treatment (e.g., micro-filtration or reverse osmosis—and associated brine disposal—or granular activated carbon) to increase recycled water supplies available for groundwater recharge, enhancement of seawater intrusion barrier facilities to increase their effectiveness, implementation of projects to recharge treated stormwater, and inter-basin transfers of recycled water, to the extent that institutional challenges can be overcome and cost-effectiveness can be demonstrated.

4.1.6 Imported Water

The Region is heavily dependent on imported surface water for drinking water supply. The primary sources of imported water supplies are the SWP, the Colorado River, and the Mono Basin and Owens Valley. Although these sources have been instrumental in the growth of much of the Region, each of these sources faces various challenges and issues, including concerns about the higher salt content of some sources.

The California SWP is a system of reservoirs, pumps and aqueducts that carries water from north of the Sacramento area to areas north, west and south of the Sacramento-San Joaquin Delta. Although originally designed to deliver slightly more than 4 million acre-feet of water a year, as the system was never fully completed, it typically delivers less than designed. The decline of key fish populations in the Bay-Delta system (e.g., the Delta smelt) has limited the volume of water that can be pumped to the SWP. The potential impact of further declines in ecological indicators in the Bay-Delta system on SWP water deliveries is unclear. Additionally, uncertainty about the long-term stability of the levee system surrounding the Delta system raises concerns about the ability to transfer water via the Bay-Delta to the SWP.

The 242-mile Colorado River Aqueduct, completed in 1941 to deliver water to the southern California coastal plain, has a capacity of 1.3 million acre-feet. Annually, California is allotted 4.4 million acre-feet of Colorado River water. California has traditionally received in excess of that amount when there is excess water available, in wet years or when other states drawing from the Colorado River do not use their full allotment. Future water allotments to California supplies from the Colorado River may be reduced as other states

increase their diversions in accord with their authorized allotments. California's Colorado River Water Use Plan and the Quantification Settlement Agreement identify measures to increase the beneficial uses of the water and offset potential reductions in future deliveries to California.

The Los Angeles Aqueduct delivers high-quality water from the Mono Basin and Owens Valley to the City of Los Angeles. Construction of the 233-miles Los Angeles Aqueduct from the Owens Valley was completed in 1913. In 1940 the aqueduct was extended 105 miles north to Mono Basin. A second aqueduct from Owens Valley was completed in 1970 to further increase capacity. Approximately 480,000 acre-feet of water can be delivered to the City of Los Angeles each year, however the amount the aqueduct delivers varies from year to year due to fluctuating precipitation in the Sierra Nevada. In addition, the diversion of water from Mono Lake has been reduced by a decision of the SWRCB and export of water from the Owens Valley limited by the Inyo-Los Angeles Long Term Water Agreement (and related MOU) and an additional MOU between the Great Basin Air Pollution Control District and the City of Los Angeles (to reduce particulate matter air pollution from the Owens Lake bed). As a result of these restrictions on water transfers, future deliveries are expected to be reduced to an average of 321,000 acre-feet annually over the next twenty years.

Thus, although imported water continues to be an important component of the Region's water supply, as each of the major sources are fully allocated or have constraints on deliveries, it is unlikely that additional imported water will be available to meet the Region's future needs.

4.1.7 Land Use Planning

The California state constitution confers responsibilities for land use planning to the cities and counties (for unincorporated areas). The Government Code establishes requirements for the development of General Plans to guide land use decisions, which must include seven required elements: land use, circulation, housing, conservation, open space, noise and safety. Because of this structure, water resources may be discussed within the conservation element (as relates to water supply and stormwater management), the open space element (as relates to water-based recreation or the use of lands that may protect water supply or enhance groundwater recharge), and the safety element (as relates to flood protection). Thus, most jurisdictions' policies with respect to water resources and their management are typically fragmented throughout several elements. The State of California's General Plan Guidelines (GOPR, 2003) describe the concept of an optional water resources element, which would combine water supply and demand, water quality, wastewater treatment and disposal, watershed features and processes, flood management, and stormwater management.

In 2001, two water supply planning bills were enacted that require greater coordination and more extensive data to be shared between water suppliers and local land use agencies for large development projects and plans. Senate Bill 610 (California Water Code §10631, §10656, §10910, §10912, §10915, §10657) requires a water supply assessment (as part of the CEQA review) for any development project or related land use plan of more than 500 housing units, 500,000 square feet of retail use, 250,000 square feet of office use, 500 hotel rooms, 40 acres, or 650,000 square feet of business park use or a mixed-use project with any combination equal to the scale noted above. Senate Bill 221 (Government Code §66410, et seq.) prohibits any land use agency from approving a subdivision map of more than 500 housing units unless there is written verification from a water provider that a sufficient and reliable water supply is available. Sufficient water supply is defined as adequate water to supply the new growth in normal, dry, and multiple dry years. As large portions of the Region are already developed and most of the remaining developable land is located in the foothills and mountains, few development projects in the Region exceed the thresholds identified in either bill. Thus the preparation of Water Supply Assessments or written verifications has been somewhat limited in the Region.

Given the pervasive nature of some NPS pollutants, land use planning, in the form of ordinances, could be used to reduce stormwater runoff volume and/or the discharge of pollutants from development or redevelopment sites. For those portions of the Region within Los Angeles and Ventura Counties, certain

development (on sites one acre or greater in area, or automotive repair shops, retail gasoline outlets, restaurants, home subdivisions with ten or more homes, parking lots with 25 or more spaces or are greater than 5,000 square feet in area, single-family hillside residences, and locations within, or directly adjacent, or discharging to, environmentally sensitive areas) require the development of a Standard Urban Stormwater Mitigation Plan (SUSMP), to retain the runoff from storms of approximately 0.75 inches. SUSMP requirements could be amended to require both retention and treatment of runoff with individual jurisdictions extending these requirements to development/redevelopment on smaller sites or additional development types. Existing stream corridors, open spaces, or other valued watershed resources could be protected via ordinance(i.e., a stream protection ordinance) or incentives could be provided to reduce impervious surfaces and increase natural recharge. A more comprehensive approach to natural resource management, which could provide corollary benefits to water resources, is provided by the City of Santa Monica's Sustainable City Plan, which promotes a well-maintained open space system that can support natural functions, wildlife habitat, passive and active recreation, and supports implementation of land use and transportation planning and policies that encourage compact development and mixed-use projects.

Constraints to the use of Land Use Planning to enhance the integrated management of water resources include: the lack of fiscal resources to support development of optional general plan elements, the potential for disparities amongst local jurisdictions to subtly affect development patterns (as developers may choose those jurisdictions with less stringent requirements); and the absence of model programs to demonstrate the effectiveness of such measures.

Opportunities to expand the use of Land Use Planning in the integrated management of water resources include the adoption of natural resource protection measures (e.g., floodplain or stream protection ordinances), the preparation of Water Resource Elements in city and county General Plans, and the adoption of Sustainability Plans by jurisdictions, agencies, and organizations.

4.1.8 Nonpoint Source Pollution Control

To conform to the requirements of the federal Clean Water Act and the federal Coastal Zone Act Reauthorization Amendments of 1990, the State of California has developed the NPS Program Strategy and Implementation Plan (1998–2013) (or PROSIP) which identifies actions to reduce nonpoint pollution, and a companion volume, the California Management Measures for Polluted Runoff (CAMMPR) Review Document, which identifies a range of management measures for agriculture, forestry, urban areas, marinas and recreational boating, hydro-modification (including modification of stream channels, water impoundments, and stream bank erosion), and wetlands, riparian areas and vegetated treatment systems. Additional information on sources of nonpoint pollution and measures to reduce and/or treat polluted runoff is provided in the California NPS Encyclopedia, developed by the SWRCB.

Within most of the portion of the Region within Los Angeles County, a comprehensive program to reduce stormwater pollution has been established by the Stormwater and Urban Runoff NPDES permit (Order No. 01-82, CA50004001) issued to the County of Los Angeles (and most other incorporated cities, except the City of Long Beach, which has a separate permit with similar provisions), which regulates the discharge of runoff from municipal storm sewer systems (MS4s), otherwise known as storm drains. The permit prohibits non-stormwater discharges into the storm drain system, limits discharges to receiving waters that would cause or contribute to a violation of water quality standards, and requires implementation of a Stormwater Quality Management Program (SQMP) that includes the use of BMPs to reduce the discharge of pollutants identified. The SQMP includes seven programs, including:

- The Industrial/Commercial Facilities Control Program, which covers industrial and commercial facilities, including restaurants, automobile service facilities, retail gasoline outlets, automobile dealerships and other federally-mandated facilities;

- The Development Planning Program, which requires implementation of post-construction BMPs and site-specific mitigation measures for commercial developments on sites one acre or greater in impervious area, automotive repair shops, retail gasoline outlets, restaurants, residential development with ten or dwelling units, parking lots with 25 or more spaces (or are greater than 5,000 square feet in area), single-family hillside residences, and locations within, or directly adjacent, or discharging to, environmentally sensitive areas;
- The Development Construction Program, which requires control of erosion and the prevention of runoff from construction sites, the containment of construction materials, equipment fuel, maintenance and washing fluids through a combination of BMPs, inspections, and for projects over one acre in area, preparation of a Stormwater Pollution Prevention Program, per the Construction Activities Stormwater General Permit (Order No. 99-08-DWQ);
- The Illicit Connections and Illicit Discharges Elimination Program, which requires the County and the cities to identify and investigate illicit discharges, resolve undocumented connections to the storm drain system, and take enforcement action;
- The Public Agency Activities Program, which consists of maintenance, inspection, and response to minimize stormwater impacts from public agency activities;
- The Public Information and Participation Program, which requires measures to increase awareness, change behavior, and involve the public in mitigating the impacts of stormwater pollution; and
- The Countywide Monitoring Program, which requires measures to assess receiving water impacts, identification of sources of pollution, evaluation of BMPs, and measure of long-term trends in mass emissions.

In addition, in response to the identification of water quality impairments (via the 303(d) list), the RWQCB's have begun to establish TMDLs for contaminants including trash, metals, organic compounds, nutrients, and bacteria. Given the pervasive nature of some contaminants, development of implementation plans for some TMDLs may need to include measures to address NPS pollutants. In addition, the discharge of dry-weather runoff is prohibited in a portion of the North Santa Monica Bay as an Area of Biological Significance, which may require specific measures to address NPS pollutants in upland areas draining to the ASBS.

Constraints to the implementation of NPS pollution control programs and projects include the substantial portion of the region that has been subject to urban and suburban development, the pervasive nature of surface water contaminants, and the need for widespread individual action for some aspects of NPS pollution control.

Opportunities include: the continued implementation of existing programs in accordance with NPDES permits; and establishment and implementation of TMDLs, which may expand funding and implementation of NPS programs and projects.

4.1.9 Recreation and Public Access

Open space used for recreation and public access has the potential to enhance water supply (by preserving or enhancing groundwater recharge and thereby improving water supply reliability) and improve surface water quality, to the extent that these open spaces filter, retain, or detain stormwater runoff (although few existing parks or open spaces include specific features to improve the quality of stormwater runoff, and poorly managed open space has the potential to be a source of sediment which can degrade water quality).

Not including the Angeles National Forest, the Santa Monica Mountains Recreation Area and other state lands, the Region as a whole has approximately 52,800 acres of parks. With a current population of approximately 10.2 million, the Region has approximately 5.2 acres of parkland per 1,000 residents, although considerable variation exists between the sub-regions. The parkland to population ratio is much lower in

Disadvantaged Communities, with park space as low as 0.8 acres per 1,000 residents. The National Recreation and Park Association suggests that a park system serving an urban area should, at a minimum, be composed of a "core" system of parklands, with a total of 6.25 to 10.5 acres of developed open space per 1,000 residents. Thus, current parkland is below even this minimum recommendation. With a projected population increase of approximately 15.4 percent (SCAG, 2004), it is estimated that approximately 30,380 acres of additional parks and open space will be needed to meet the minimum recommendation for parkland.

Although much of the remaining open space in the Region is located in the foothills and the mountains, the bulk of the need exists within the densely developed coastal plain and the inland valleys. If new parkland and open space can be created within these urbanized areas, and particularly within or near Disadvantaged Communities, then public access to parkland could be improved. To increase open space, the acquisition of land will be necessary. Opportunities for acquisition could include vacant parcels, under-utilized public land, brownfields, and the lands along rivers, creeks or tributaries.

Current plans and proposals for new parks, trails and recreational projects in the region include: Rio de Los Angeles State Park, Annandale Golf Course Habitat Restoration and Infiltration; Welch Site BMP and Habitat Restoration; Lincoln Heights Freeway Interchange Restoration and BMP; Morris Dam Peninsula Park; Azusa Canyon River Wilderness Park; San Gabriel Canyon Spreading Grounds; Maywood Riverfront Park; San Gabriel River Discovery Center at Whittier Narrows Regional Park; Woodland (Duck) Farm Park; Pio Pico State Historic Park; Paseo del Rio at San Gabriel and Rio Hondo Spreading Grounds; Santa Fe Springs Park Expansion; Downey Landing, City of Downey; Bellflower Riverview Park; Pacoima Wash Greenway Project Parkside Drive Park; South Los Angeles Wetlands Park; Puente Creek Nature Center; Strathern Pit Multiuse Project; North Atwater Creek Restoration and Water Quality Enhancement; Marsh Street Park; Walteria Lake Enhancement; and Lafayette Creek Daylighting.

As new parks or open space are created, these places may also provide opportunities to meet other regional needs, including:

- Creation or preservation of native habitat and habitat linkages;
- Preservation or enhancement of groundwater recharge, to the extent that new parks preserve existing open space or reduce impervious surfaces;
- Improvement of the quality of urban runoff or stormwater runoff, to the extent that new parks or open space are designed to include runoff quality features, such as vegetated swales or other BMPs; and
- Preserve or enhance flood management; as the preservation of open space can avoid potential increases in runoff associated with new development, or reduce runoff if impervious surfaces are reduced.

4.1.10 Stormwater Capture and Management

Historically, the capture and management of stormwater has been viewed either as an element of flood management, or as a means to augment water supply, via the managed transfer of runoff from river or stream channels into adjacent groundwater recharge basins. However, that component of stormwater that is not already used for groundwater recharge (and is therefore discharged via the flood control network to the ocean), is a potential candidate for capture and treatment, to improve surface water quality in the rivers and other bodies of water, and to further augment local water supplies.

Given the extent of urbanization in the Region (with approximately 54 percent developed), runoff quality has been notably degraded in most of the rivers, tributaries, and creeks. The capture (and subsequent treatment) of stormwater, as a structural solution to surface water quality impairments, could be implemented as one element of a comprehensive water quality improvement program.

In some locations, concerns about the quality of stormwater runoff have limited the willingness of water supply agencies to consider recharge of stormwater from urbanized areas. To address these concerns, the Los Angeles and San Gabriel Rivers Watershed Council is conducting the Water Augmentation Study, a long-term research project to explore the potential for increasing local water supplies and reducing urban runoff pollution by increasing the upstream infiltration of stormwater runoff. The project began in January 2000 to assess the impact of runoff-transported pollutants on rivers, coastal water, and beaches; the viability of adding these stormwater resources to local water supplies, and the challenge of capturing stormwater for infiltration, in terms of groundwater quality and quantity. As an alternative, the City of Los Angeles' IRP for the Wastewater Program, has identified the potential to direct dry-weather flows to wastewater treatment plants for treatment, and subsequent reuse as recycled water.

Challenges to the expansion of stormwater capture and management include the need to maintain flood protection for any potential modification of storm drain systems that would expand or enhance capture of stormwater in detention basins, cisterns, or recharge basins, concerns about the potential for contaminants in stormwater to migrate to groundwater, limited land availability, which limits options for development of structures to capture and manage stormwater, and short duration/high intensity storm events which make storage difficult.

Opportunities for expansion of stormwater capture and management include development of local and regional facilities to capture and treat stormwater as part of a TMDL compliance strategy. This could include package treatment plants to remove contaminants, filtration systems, or natural treatment systems such as constructed wetlands. Water cleansed by such facilities could either be recharged to groundwater, or stored for delivery to local uses, such as landscape irrigation.

4.1.11 Surface Storage

As the water supply in the Region is heavily dependent on imported surface water, various surface reservoirs (managed by Metropolitan Water District and the SWP) located outside the Region are used to facilitate water delivery to various local water agencies. Several smaller reservoirs have been developed within the Region to assist in the management of water supplies. However, most of these local reservoirs are limited in their ability to capture local runoff. Most of the remaining dams in the Region have been developed for flood management purposes and are not used for long term surface storage.

LACDPW oversees several surface water storage facilities, which were created to improve flood protection and store runoff for subsequent release and diversion to groundwater spreading grounds for recharge. Eleven dams were constructed as part of the San Gabriel River and Montebello Forebay water conservation system to impound runoff from the San Gabriel Mountains prior to release for downstream spreading and groundwater recharge. Runoff is captured in the upstream end by three dams in San Gabriel Canyon: Cogswell Dam on the West Fork, San Gabriel Dam below the confluence of the east and west forks of the San Gabriel River and, Morris Dam, a few miles downstream of San Gabriel Dam. Once released from the canyon facilities, stormwater flows to the Santa Fe Dam and may be diverted to the Santa Fe spreading grounds, located off-river along the northern boundary of dam. On tributaries to the Los Angeles River, the Big Tujunga, Pacoima, and Devil's Gate dams provide similar storage functions. LACDPW also oversees 17 inflatable rubber dams, which are primarily used to divert flows into the spreading grounds, although several rubber dams in the San Gabriel watershed promote short-term instream recharge. Las Virgenes MWD purchases pretreated water from Metropolitan and stores it in the Las Virgenes Reservoir, in the City of Westlake Village. The reservoir also provides seasonal water storage allowing Las Virgenes MWD to purchase supplies off-season and deliver at times of peak demand to meet high summer irrigation needs.

The in-city water distribution systems of the City of Los Angeles once included 15 open distribution reservoirs. Due to concerns from DHS about open water storage, nine reservoirs have been bypassed,

replaced, or covered. The Upper and Lower Hollywood Reservoirs that used to serve the Hollywood area were replaced by two buried 30-million gallon tanks. The Encino Reservoir was removed from service and replaced by a small storage tank and small microfiltration plant. The Stone Canyon Reservoir Complex has undergone system improvements to bypass the Lower Reservoir. Los Angeles Reservoir is one of the major remaining open reservoirs. It replaced the Van Norman Reservoirs which were damaged in the 1971 earthquake. It has a capacity of 10,000 acre-feet and is a primary water source of the San Fernando Valley area. Removal of the Los Angeles Reservoir was not considered a viable option and to protect its water quality a floating cover was proposed.

Constraints on the development of additional surface storage in the Region include: the lack of suitable sites for surface impoundments, as most of the mountainous areas are protected open space, constraints on open reservoirs to reduce potential contaminants, and the cost of developing new reservoirs.

Opportunities to enhance surface storage include: modification of local reservoirs, canals, and dams to increase storage capability and operational flexibility; installation of additional in-channel rubber dams to improve management of flows, and the development of unused resource extraction sites (e.g., gravel pits) as surface impoundments.

4.1.12 Water and Wastewater Treatment

As noted above, the principle sources of water supply in the Region are imported water and groundwater, with recycled and surface water providing small amounts. Thus, the majority of water utilized in the watersheds is potable water which must meet drinking water standards. The federal Safe Drinking Water Act (SDWA), passed by Congress in 1974, requires the U.S. Environmental Protection Agency (USEPA) to develop drinking water standards that must be implemented nationwide. In California, EPA has delegated implementation of drinking water regulations to the State. The California DHS has responsibility to protect the quality of drinking water, in accord with California's Drinking Water Source Assessment and Protection Programs, which were developed in response to the 1995 reauthorization of the Federal Clean Water Act. Drinking water standards for the State of California are specified in the Health and Safety Code (Division 20, Chapter 6.75, Sections 25299.57 to 25299.99.3, and Division 104, Part 12, Sections 116270-117130). Responsibility for treatment of potable water supplies rests with the approximately 120 retail water agencies and districts in the Region. Compliance with SDWA rules may require improvements to potable water supply treatment facilities, to reduce disinfection by-products and reduce inflow of surface runoff to surface impoundments. Considerable uncertainty exists over the timing and extent of possible future requirements related to contaminants which are not currently regulated, such as endocrine-disrupting compounds, pharmaceuticals, and components of common household products, such as shampoo, which have been detected in various source waters.

The treatment of wastewater in the Region is governed by provisions of the federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, the California Toxics Rule, the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, the Water Quality Control Plan for the Los Angeles Region (and Santa Ana Region), NDPES discharge permits, and individual Waste Discharge Requirements for wastewater treatment plants established by the Regional Boards. Wastewater treatment services within the Region are currently provided by:

- County Sanitation Districts of Los Angeles County;
- City of Los Angeles Department of Public Works, Bureau of Sanitation;
- The Las Virgenes MWD (under a joint partnership with Triunfo Sanitation District);
- The City of Burbank; and
- The Los Angeles County Department of Public Works.

In addition, various other entities operate small treatment facilities (e.g., less than 0.2 mgd) or onsite package plants.

Constraints to the expansion of water and wastewater treatment programs include antidegradation issues, land constraints, uncertainty over pending regulatory developments, and the cost of implementation.

Opportunities to expand water treatment include projects designed to meet SDWA requirements, and projects and programs for TMDL implementation. Opportunities to expand wastewater treatment include expansion of recycled water programs.

4.1.13 Water Conservation

Water conservation is a critical water resource management strategy for the Region. The strong reliance on imported water and the inherent variability in both imported and local supplies has spurred efforts throughout the region to minimize the use of water where possible through water efficiency measures. Conservation is an element in drought planning as well as an ongoing strategy to ensure long term availability of local supplies in the face of additional demand generated by population growth.

Given the substantial progress already made by local agencies, further expansion of water conservation will need to incorporate economic incentives and the incorporation of new technology. Conservation techniques must offer the consumer opportunities to save money as well as save water. In some cases – such as subsidies to change out older, water-using appliances such as washing machines and toilets – the subsidizing agency can reduce demand as an alternative to building infrastructure. The expanded utilization of native plants and xeriscaping in local landscapes may also benefit from economic incentives such as rebates. Newer technologies, such as irrigation controllers that use current weather information to modify irrigation patterns, have worked well in commercial applications, but have proven to be expensive for homeowners without the use of rebates. As this technology evolves, it is anticipated that such controllers will become more widespread. Care must also be taken in projecting potential conservation savings in the cases of hospitals, restaurants and other applications where specific, high-water use protocols have been established to protect the public's health.

Since the drought of 1987-1992, conservation efforts have stepped up significantly within the Region. Most local agencies have adopted specific goals for water conservation which suggests that additional conservation is still feasible. The California Urban Water Conservation Council has established a set of 14 BMPs for water conservation, although not all agencies in the region are signatories to a MOU to implement these BMPs.

Opportunities to expand water conservation generally fall into two categories – active and code-based. Active conservation comes from programs offering things such as rebates, device installation, and plumbing retrofit. Although many agencies have ongoing programs, expanding active conservation can be directly influenced by water agencies. Expansion of code-based conservation can occur either through local ordinances or new State laws that require either certain water conservation actions or penalize the theft or waste of water.

4.1.14 Water Quality Protection and Improvement

For the purposes of the IRWMP, the protection and improvement of water quality includes the quality of potable water, the quality of groundwater, and the quality of stormwater and urban runoff.

The USEPA requires all states to establish and implement a Source Water Assessment Program (SWAP) for all public water systems, as promulgated in the 1996 Amendments to the federal Safe Drinking Water Act. In California, the federal SWAP requirement is administered by the DHS (Health and Safety Code Chapter 4, Section 116270). DHS developed the Drinking Water Source Assessment and Protection (DWSAP)

Program, to evaluate the vulnerability of water sources to contamination and prioritize activities for protective measures. Surface water used for local water supplies may be susceptible to potential contamination from a variety of land use practices, such as agricultural and urban runoff, recreational activities, residential and industrial development and wildland fires. The California DHS requires that water suppliers complete a Watershed Sanitary Survey every five years, to examine possible sources of drinking water contamination and recommend how to protect water quality at the source.

Protection of groundwater quality has historically been a local concern, most notably reflected by seawater intrusion along the coast. Los Angeles County operates and maintains three seawater intrusion barrier systems along the coast that rely primarily upon treated wastewater to reduce the intrusion of saline water in underground aquifers. In recent decades, there has been a growing recognition that historical and current agricultural and industrial activities have the potential to adversely affect groundwater quality, which is reflected in expanded enforcement of other regulatory programs to implement clean-up of contaminants. Public water supply wells are also subject to the Wellhead Protection Program, which requires the identification of potential water quality threats (in close proximity to the wellhead) and measures to address the identified threats.

The protection of surface water quality (e.g., in the rivers, creeks, and storm drains) is regulated by the RWQCB's, via the applicable Basin Plan, which identifies surface and groundwater bodies, designates applicable beneficial use classifications to each water body, establishes general and water body-specific water quality objectives; and suggests an implementation plan for maintaining or restoring the water quality objectives. The RWQCB's utilize NPDES permits and Waste Discharge Requirements to limit the discharge of contaminants and protect surface water quality.

Constraints to the implementation of water quality protection and improvement programs and projects include the extent of urbanization, pressure for development within the foothills and adjacent mountains, contamination of soils from previous land uses, and importation of water, which contributes to salt management issues.

Opportunities for the expansion of water quality protection and improvement programs and projects include SDWA projects, programs and projects to remediate groundwater contamination, and addressing surface water impairments through the establishment and implementation of TMDLs.

4.1.15 Water Recycling

Recycled (or reclaimed) water will become an ever more important source of water in the Region primarily for non-direct potable uses, but also displacing the need for "new" potable water. Several agencies currently produce more reclaimed water than is currently being reused within their systems; other agencies are leveraging the economic and environmental benefits of this water source. Although the cost of developing needed infrastructure (storage facilities, pump stations, and distribution lines) to distribute recycled water has limited the use of reclaimed water, some agencies, including the Metropolitan Water District and the U.S. Bureau of Reclamation, provide grant funding for such facilities. As the cost of "new" water increases because of market forces, reclaimed water will become increasingly economic and environmental choices.

Current recycled water annual average flows (including both tertiary and advanced treated water) total approximately 225 mgd, which represents approximately 25 percent of the current secondary treated effluent annual average flows. Of these 225 mgd, approximately 105 mgd are currently reused for municipal and industrial applications, environmental uses, groundwater replenishment, or seawater barrier. The reused flows represent approximately 45 percent of the available recycled water flows. The rest of the recycled water flows are currently discharged to the local streams/rivers.

Key challenges for the use of recycled water in the Region include: disposal of advanced treatment waste products (e.g., brine), seasonal variations in recycled water demand for irrigation; cost-effectiveness of building additional infrastructure (storage facilities due to seasonal variations in demand, pump stations, and distribution lines); water quality treatment requirements; regulatory trends (which suggest increasingly stringent wastewater discharge standards); requirements to maintain minimum in-stream flows; proximity of reclaimed water production to area of demand, and political/public support. In addition, one constraint on LACSD's recycling program is their inability to serve the recycled water due to restrictions imposed by Service Duplication Act. The State's Recycled Water Task Force suggested various regulatory changes, research needs, and increased funding to overcome many of these obstacles.

Opportunities to expand recycled water use include:

- Adoption of an incremental approach to recycled water distribution networks, which could include: (1) serve large recycled water users in the close vicinity of wastewater treatment plants; (2) develop City-focused distribution systems; (3) develop regional distribution systems; (4) merge regional systems as triggered by growth; and (5) develop groundwater recharge and seawater intrusion projects (although these could implemented at any time during the life of a recycled water program);
- Development of regional partnerships and projects, such as those as identified in the Southern California Comprehensive Water Reclamation and Reuse Study (which identified proposals for several regional projects within the Region, including Calleguas/Las Virgenes, East San Gabriel, West Basin, and Central Basin).

4.1.16 Watershed Planning

Numerous watershed plans have been prepared in the Region, including the Arroyo Seco Watershed Restoration Feasibility Study, the Ballona Creek Watershed Management Plan, Common Ground, from the Mountains to the Sea, Compton Creek Watershed Management Plan, Dominguez Channel Watershed Management Master Plan, Malibu Creek Watershed Management Area Plan, Rio Hondo Watershed Management Plan, Sun Valley Watershed Plan, and the draft Upper San Gabriel River Watershed Management Plan. Draft plans are under development for the Tujunga Wash, the Headwaters of the Los Angeles River, and Coyote Creek, along with the Green Visions Plan for Los Angeles County and portions of Orange and Ventura Counties. As noted by the 2005 update of the California Water Plan: "…Los Angeles County [is] the most productive county in the state in terms of watershed planning" (DWR, 2005).

The primary focus of these plans has been improvement of surface water quality, with additional emphasis on preservation of open space, and the promotion of multi-purpose projects. Most of these efforts have been stakeholder-driven, so that the list of recommended actions reflects local concerns and priorities.

Constraints on the development of additional watershed plans include: availability of funding, absence of established stakeholder groups for some of these areas; and a defined minimum scope to assure regional consistency.

Opportunities for the preparation of new watershed plans include, Burbank (east and west) Wash, Verdugo Wash, the mainstem of both the Los Angeles and San Gabriel Rivers (although the respective river Master Plans cover the river corridors and some adjacent lands), Los Cerritos Channel, and numerous smaller watersheds that drain directly to Santa Monica Bay and San Pedro Bay.

4.1.17 Water Supply Reliability

The availability of imported water in southern California, beginning with the LADWP's system from the Owens Valley and later continuing with Metropolitan's Colorado River Aqueduct and partnership in the California SWP allowed many agencies throughout the study area to shift their reliance to imported water and

away from local supplies. Increasing costs for imported water, enlightened environmental attitudes in areas where imported water originates, and increasing competition for potable water resources, has resulted in a rekindling of interest in local resources. In some cases, new reservoir storage, expansion of groundwater recharge basins, or the implementation of conjunctive groundwater projects, have all been developed to take advantage of surplus imported water (water not required to satisfy immediate consumptive demand). These measures can decrease reliance on imported water and improve local water supply reliability during periods of drought.

Pumping and treating brackish groundwater can expand local supplies and create opportunities to enhance water supply reliability, by removing and replacing the brackish water with higher quality water. This could be accomplished through well injection operations (to replace the removed brackish water with fresh or treated water) or expanded groundwater spreading operations to recharge surplus runoff or imported water. Such operations must be carefully designed, to avoid adversely affecting the quality of the injected or recharged water.

Urban growth necessarily displaces open space and increases impervious surfaces, thereby reducing natural recharge of precipitation. The channelization of streams, particularly when the channel bottom becomes impervious, reduces natural percolation of streamflow into underlying soils. Thus, the preservation of open space, particularly in those areas that directly recharge aquifers used for water supply, and the preservation of natural stream channels, preserves groundwater recharge in many areas, and thus contributes to the long-term reliability of existing groundwater supplies. The creation of new parkland, which may reduce impervious surfaces (e.g., via removal of existing development) may also reduce runoff and enhance groundwater recharge. The creation of new habitat, such as wetlands, can improve groundwater recharge by reducing the velocity of runoff and increasing natural percolation.

Constraints to the improvement of water supply reliability include the limited availability of undeveloped land for the expansion of recharge facilities or creation of constructed wetlands and the clay content of soils throughout large portions of the coastal plain, which inhibit natural percolation and groundwater recharge.

Opportunities to improve water supply reliability include the expansion of groundwater recharge basins, the implementation of conjunctive groundwater projects, and the development of natural treatment systems, such as constructed wetlands, to improve both surface water quality and storage capability.

4.1.18 Water Transfers

Prior to 1991, water transfers within the Region had mostly been limited to transfers of annual groundwater basin rights (which continue to occur, although conditions imposed by groundwater basin adjudication sometimes restricts exports of groundwater outside the basin's boundaries), and transfers of water to enhance operational flexibility. Additionally, the Metropolitan Water District's transmission facilities have not been used to transfer local water from one agency to another mainly because of water quality issues and potential downstream impacts. Lastly, regulations limit mixing of different source waters in transmission lines used for potable water, which sometimes imposes restrictions on the movement of water.

With the 1991 drought, the Governor's Water Bank was developed. Metropolitan Water District and other SWP contractor's took advantage of that resource to augment supplies and lessen the severity of the impacts of the drought. Since that time, Metropolitan has participated in water transfers as a water management strategy to augment supplies. The City of Los Angeles plan to developed water transfers as part of its supply strategy rather than purchasing water from Metropolitan during dry years. Should the costs of purchasing and wheeling transfer water from outside the region be lower than purchasing Metropolitan water, other agencies would likely be interested in such a supply strategy.

Constraints to the use of water transfers within the Region include: institutional constraints related to the wheeling (or transfer) of water, which may affect various transmission elements, and the limitation on using Metropolitan facilities because of potential water quality impacts to downstream users.

Opportunities for the use of water transfers include: the continued use of water transfers by Metropolitan Water District's, which improve water supply reliability, techniques to mitigate water quality impacts from use of Metropolitan Water District's transmission facilities; and the potential to integrate water transfers with other management strategies, such as conjunctive use programs.

4.1.19 Wetlands Enhancement and Creation

The Region has lost more than 90 percent of its historic wetlands. Those remaining are threatened by development, changes in hydrology, invasive species, and poor water quality. The results of degradation of remaining wetlands and the associated environment can lead to increased erosion of banks and channels; diminished water quality for wildlife and domestic use; loss of habitat for wildlife; alteration in flood protection; loss of aquatic productivity and health; and loss of recreational, educational, and aesthetic values. Water quality impairments include increases of both non-toxic elements such as sediment, nutrients, and water temperature, as well as toxic contaminants such as pesticides and heavy metals. The degraded water quality requires substantial treatment to remove the pollutants which may affect aquatic and terrestrial habitat quality, and limits recreational use of southern California beaches, bays, and lagoons. In addition, the loss of wetlands throughout the coastal watersheds has aggravated water supply and reliability problems, since riparian vegetation and wetlands can act to slow and retain stormwater flows and allow the water to recharge groundwater.

The long-term restoration, improvement and protection of the Region's wetlands would help ameliorate the water quality, water supply and biological impacts of environmental degradation. Because many of the issues involved in wetland restoration and enhancement cut across traditional political and organizational boundaries, success can more easily be accomplished through cooperative planning efforts like the IRWMP that include non-governmental organizations, private landowners, industry, and state and federal government. Education and public outreach will be critical in helping the public understand their role in protection and achieving buy-in on the necessary improvements.

Wetland restoration and enhancement is constrained by existing development over much of historical wetland areas, private ownership, permanently altered hydrology, and lack of funding. Meeting water quality and flood management needs, water supply needs and habitat and recreation targets over the next 20 years will strain the Greater Los Angeles community. Projected growth, a tight fiscal environment and limits to water supply will all contribute to the difficulty. In today's funding environment, it is probably not possible that all of the required projects can be completed as single purpose projects. With planning, cooperation, and vision, projects can be integrated to achieve multiple goals. Wetlands and habitat projects can provide water quality, groundwater recharge, flood management and recreational opportunities, for example. Integrated projects may be more likely to be funded, in that funding agencies may treat them more favorably, or various fund sources available to fund individual elements of projects.

Opportunities for enhancement and creation of the Region's wetlands include: Los Cerritos Wetland Restoration (Bryant, Bixby, and Hellman); Gardena Willows Restoration; Ballona Wetlands Restoration; Colorado Lagoon Enhancement; DeForest-Dominguez Wetlands Restoration; Hansen Dam Recreational Area Wetlands Restoration Project; Los Angeles River Headworks Wetlands and Water Protection Project; the Multiuse Wetlands Project at Children's Museum of Los Angeles; Hansen Dam Recreation Park; and El Dorado Park Wetlands.

4.1.20 Summary

As discussed above, all 19 of the water management strategies identified in the Proposition 50 Guidelines are currently being utilized in the management of water resources in the Region, although the relative utilization of these strategies varies. The relative application of each of these strategies on a regional basis is summarized in Table 4-1, although substantial sub-regional variation exists.

Based on the current application of the water management strategies in the Region, the following strategies are currently being implemented on a widespread basis: Flood Management, Imported Water, Water and Wastewater Treatment, and Water Quality Protection and Improvement. These strategies will continue to be implemented in the Region, although substantial expansion of the utilization of these strategies is not anticipated.

The following water management strategies are being implemented in the Region, but their application may not be widespread, and substantive opportunities exist for expanded integration of these strategies: Groundwater Management/Conjunctive Use; Nonpoint Source (NPS) Pollution Control; Surface Storage; Water Conservation; Water Recycling; Watershed Planning; and Water Supply Reliability. However, as noted above, opportunities for expansion of Surface Storage are limited.

Table 4-1. Current Application of Water Management Strategies in IRWMP Region

Water Management Strategy	Low	Moderate	High
Desalination	X		
Ecosystem Restoration	X		
Environmental & Habitat Protection & Improvement	X		
Flood Management			X
Groundwater Management/Conjunctive Use		X	
Imported Water			X
Land Use Planning	X		
Nonpoint Source Pollution Control		X	
Recreation and Public Access	X		
Stormwater (Quality) Capture and Management	X		
Surface Storage		X	
Water and Wastewater Treatment			X
Water Conservation		X	
(Drinking) Water Quality Protection and Improvement			X
Water Recycling		X	
Watershed Planning		X	
Water Supply Reliability		X	
Water Transfers	X		
Wetlands Enhancement and Creation	X		

The following water management strategies are currently being implemented in the Region, but their application is limited: Desalination; Ecosystem Restoration; Environmental & Habitat Protection & Improvement; Land Use Planning; Recreation and Public Access; Stormwater Capture and Management;

Water Transfers; and Wetlands Enhancement and Creation. Expanded utilization of these strategies could be implemented to enhance water supplies and improve water supply reliability.

Thus, all of the water management strategies identified by the Proposition 50 Guidelines should be incorporated in the IRWMP. To the extent that the application of these strategies is expanded or enhanced, then benefits to both water supply and water supply reliability are anticipated.

4.2 Opportunities for Integration

The integration of the identified Water Management Strategies could occur in several ways:

1. Similar projects or programs could be geographically-integrated (e.g., to form a regional project or program);
2. Individual agencies, cities, counties, or organization could incorporate multiple strategies into specific projects or programs (e.g., multi-purpose projects); or
3. Agencies, cities, counties or organizations could together work on collaborative projects or programs (e.g., multi-agency projects).

A discussion of the opportunities to implement these three methods follows.

4.2.1 Geographic Integration

In a region of more than 2,000 square miles, opportunities for geographic integration are numerous. Two major river systems (the Los Angeles and San Gabriel) with several major tributaries (Arroyo Seco, Compton Creek, Coyote Creek, Dominguez Channel, Rio Hondo, San Jose Tujunga Wash, and Walnut Creek) drain approximately three-quarters of the Region. Several other major creeks (Ballona, Dominguez Channel, Malibu, and Topanga) drain substantial portions of the remainder. These watershed (and sub-watershed) boundaries provide an obvious opportunity for geographic integration in the Region, particularly for projects and programs that address surface water quality.

The adopted (wet- and dry-weather) bacteria TMDLs for Santa Monica Bay beaches and the metals TMDL for the Los Angeles River require the establishment of jurisdictional groups, which are organized on watershed boundaries, or other logical geographic groupings (e.g., smaller watersheds in the South Bay, or an individual reach of a river). Pending future TMDLs may include a similar requirement. Thus implementation plans for some TMDLs will result in the geographic integration of projects and programs related to surface water quality. The Los Angeles RWQCB has suggested that it may consider adoption of watershed-based NPDES permits, which would provide additional impetus for coordination of stormwater and NPS programs on a geographic basis.

Integration of water supply projects and programs on a geographic basis has been occurring in the region for some time, due to the geographic boundaries of the major wholesale water supply agencies, including the Upper San Gabriel Valley MWD, the Municipal Water District of Orange County, the Central Basin MWD, and the West Basin MWD, the broad scale of the Metropolitan Water District, and the size of the City of Los Angeles. Opportunities for expanded integration exist between the major wholesalers, groundwater management entities, and sanitation agencies which have available excess recycled water.

4.2.2 Multi-Purpose Projects and Programs

Individual agencies, cities, and counties have the ability to implement projects and programs that address more than one of the identified water management strategies. As many resource management agencies typically have single-purpose missions, the implementation of multi-purpose projects may be a challenge,

although given affinities between some of the strategies (e.g., for water supply, water quality, or habitat and open space), some agencies have opportunities to integrate multiple strategies.

Table 4-2 identifies potential affinities between the identified water management strategies, which suggest opportunities to create multi-purpose projects and programs that integrate more than one strategy.

4.2.3 Collaborative Projects and Programs

Partnerships provide opportunities for agencies, cities, communities, and groups to work together for common goals. Cities can, and sometimes do, coordinate planning with adjacent jurisdictions. Agencies can work with cities and other agencies to coordinate studies and implement projects. Interest groups may band together to work on issues of common interest. Neighborhoods and associations can strive to identify consensus on broad goals. These all represent forms of collaboration, which can result in partnerships that increase the strength of individual voices, expand the influence of groups, and extend benefits of projects and programs beyond individual cities or jurisdictions.

Table 4-2. Potential Affinities between Water Management Strategies																			
Water Management Strategies	Desalination	Ecosystem Restoration	Env. & Habitat Protection & Improvement	Flood Management	Groundwater Mgmt / Conjunctive Use	Imported Water	Land Use Planning	NPS Pollution Control	Recreation and Public Access	Storm Water Capture and Management	Surface Storage	Water and Wastewater Treatment	Water Conservation	Water Quality Protection / Improvement	Water Recycling	Watershed Planning	Water Supply Reliability	Water Transfers	Wetlands Enhancement and Creation
Desalination												●		●			●	●	
Ecosystem Restoration			●	●	●		●	●	●	●				●		●	●		●
Environmental & Habitat Protection & Improvement		●		●	●		●	●	●	●				●		●	●		●
Flood Management		●	●		●		●			●	●			●		●	●		●
Groundwater Mgmt/Conjunctive Use		●	●	●		●	●	●	●	●	●			●		●	●		●
Imported Water					●				●		●	●		●			●	●	
Land Use Planning		●	●	●	●			●	●	●			●	●	●	●	●		●
NPS Pollution Control		●	●		●		●		●	●				●		●	●		●
Recreation and Public Access		●	●		●	●	●	●		●			●	●		●	●		●
Storm Water Capture and Management		●	●	●	●		●	●	●		●			●		●	●		●
Surface Storage				●	●	●				●				●			●		
Water and Wastewater Treatment	●					●							●	●	●		●		●
Water Conservation							●					●			●		●		
Water Quality Protection/Improvement	●	●	●	●	●	●	●	●		●	●	●			●		●		●
Water Recycling					●		●					●	●	●		●	●		●
Watershed Planning		●	●	●	●		●	●	●	●					●		●		●
Water Supply Reliability	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	
Water Transfers	●					●											●		
Wetlands Enhancement and Creation		●	●	●	●		●	●	●	●		●		●	●	●			

Given the large number of agencies, cities, and counties with jurisdiction in the Region, and the diversity of neighborhoods and interest groups, the range of interests and issues is very diverse and extends beyond water resource management. Instead of differences, it is possible to focus on common themes on which virtually everyone can concur: protect the environment, protect water supply and water quality, and provide more parks and open space. It is possible to work together to plan and develop multi-purpose projects and programs that meet both local needs and agency mandates while also helping to enhance water supplies and improve water supply reliability.

Although informal associations of agencies, cities, counties, and stakeholder groups may be sufficient for the discussion and identification of issues, formulation of plans (such as watershed plans), more formal arrangements are typically required to plan, implement, operate, and maintain projects and programs. Options for the creation of formal arrangements include a MOU, typically for single projects or programs, and a Joint Powers Authority (JPA), which typically is used for multiple actions and/or for long-term activities. Such a structure could also address the equitable distribution of costs, in proportion to the benefits received by individual agencies or jurisdictions.

The following specific opportunities within the Region to integrate water management strategies with each other are provided below:

4.2.4 Ecosystem Restoration

- Opportunities for ecosystem restoration in the Region have been identified within local watershed management plans as well as city, state and federal projects and programs such as the California Coastal Conservancy, Rivers and Mountains Conservancy, Baldwin Hills Conservancy, Mountains Recreation and Conservation Authority, Santa Monica Bay Restoration Project, and the Santa Monica Mountains Conservancy. Examples of some of these opportunities include the DeForest-Dominguez Wetlands Restoration project, Ballona Creek Ecosystem Restoration Project, Los Angeles River Revitalization Master Plan, and the Limekiln Canyon Stream Restoration and Habitat Improvement Project. The common thread within these and other ecosystem restoration projects are the goal of preserving and restoring large areas of habitat to increase and restore the natural functions of both the project and surrounding areas.

4.2.5 Environmental and Habitat Protection and Improvement

- Opportunities for aquatic and riparian restoration are limited by extensive development, as well as by geologic and topographic constraints. Restoration in such a heavily urbanized region is hindered by the fact that the physical and hydrological landscape has been irreversibly altered and it is often impossible to re-establish historic conditions. Hydrologic and land use changes in the watersheds also continue to impact stream corridors and downstream aquatic habitats and many created habitats that were designed to mitigate for losses from development seldom perform the same ecological functions as those that were removed.
- Opportunities for restoration, improvement, and protection of the Region's riparian and aquatic habitat and environment have been identified within local watershed management plans. Examples of some of these opportunities include the Rio Hondo Vision Plan (Emerald Necklace Concept), the Wilmington Drain Restoration Multiuse Project, the Sepulveda Basin Habitat Enhancement program, and the Flint Wash Restoration project.

4.2.6 Existing Imported and Local Surface Water Supplies

- Seek and maintain a diversified water supply portfolio. Diversification should include creating opportunities to bring in new sources in the portfolio. Urban runoff management, conjunctive use,

spreading basin and groundwater storage opportunities, etc., should be evaluated based on local availability and constraints.

- Develop community based educational and motivational strategies for conserving water for irrigation.
- Expand conjunctive use capability to capture excess surface water supplies. Also, where feasible, consider naturalizing concrete-lined channels, while maintaining flood protection, to increase percolation and reduce loss of water through evaporation.
- Improve the river water quality in Los Angeles River and San Gabriel River to the extent feasible through ecosystem restoration and the control of contamination from urban and stormwater runoff. With improved water quality, these rivers can improve reliability of the Region's water supply portfolio.
- Maintain and enhance recharge facilities such as spreading basins, and preserve major open spaces that provide for natural groundwater recharge.
- Identify more recycled water use customers through education, public participation, and incentives. Recycled water is drought-proof, and supply increases with growth. Use of such reliable supply source will reduce dependence on other sources vulnerable to drought and competition among utilities.
- Seek opportunities for system re-operation. This includes probable modification of reservoir, canal and dam operations to better manage storm flows.
- Develop comprehensive urban runoff management programs at local levels to store and use stormwater as a resource.
- Leverage stormwater quantity/quality management for maximum supply yield.
- Develop comprehensive programs to manage salinity in surface and groundwater related to imported and recycled water.

4.2.7 Flood Management

- Enhance flood management to provide multipurpose benefits. Apply innovative, alternative approaches to enhance flood management facilities to provide multiple benefits. As one example, the Sun Valley Watershed Plan addresses an area of chronic flooding with alternative approaches to construction of a flood conveyance channel, such the use of gravel pits and underground drains below parkland to infiltrate runoff and thereby enhance groundwater recharge. If successful, the Sun Valley Plan can serve as a model for future localized flood management improvements.
- Develop dual purpose storage and treatment facilities. Evaluate opportunities to site and design constructed wetlands adjacent to existing rivers and streams to provide treatment of urban runoff during normal rainfall conditions and to also function in a manner that could provide off-channel storage, and increase the level of flood protection during infrequent flood events. These facilities could also be designed to provide riparian habitat along these water bodies. The U.S. Army Corps of Engineers may provide significant funding of these facilities. Also, consider other types of stormwater facilities that can serve the dual purpose of capture and treatment during normal rainfall conditions and flood storage during high flow conditions.
- Expand aging infrastructure repair and replacement projects to provide multiple benefits. As the flood control infrastructure continues to age and potentially exceed its design life span, there is an opportunity to evaluate the best use of future financial resources on the repair and replacement of these facilities. Evaluate opportunities to redesign flood control infrastructure to provide multiple benefits including stormwater pollution control, riparian habitat, trails, and recreation.

4.2.8 Groundwater, Groundwater Management, and Conjunctive Use

- Provide stormwater quality treatment, if needed, to reduce contaminant contribution to groundwater.
- Evaluate opportunities to develop multipurpose facilities built by one agency by extending, enlarging or connecting another facility to the original facility. An example of this would include inter-basin transfer of recycled water. Institutional challenges such as the operation of the facility and cost-sharing would need to be addressed. This could be done by contract or forming a JPA. Legislation could be introduced which would make it less burdensome for the agencies to form a JPA.
- Evaluate the use of existing gravel pits for use as water supply reservoirs, stormwater capture facilities, or groundwater recharge facilities, assuming no threats to groundwater contamination are present.
- Expand and upgrade existing spreading grounds and seawater intrusion barrier systems to enhance recharge.
- Evaluate opportunities to provide recreational, open space, and habitat features to groundwater recharge facilities.

4.2.9 Land Use Planning

- Expand Land Use Planning to support water management strategies. Opportunities to expand the use of Land Use Planning in the integrated management of water resources include: the adoption of natural resource protection measures (e.g., floodplain and stream protection ordinances), the preparation of Water Resource Elements in city and county General Plans, and the adoption of Sustainability Plans by jurisdictions, agencies, and organizations.

4.2.10 Ocean and Freshwater Desalination

- Use desalination supply to actively manage groundwater basin quality through conjunctive use or active injection.
- Supplement surface and groundwater supplies throughout the year or hydrologic cycles as necessary to minimize reliability on imported water.
- Meet environmental and habitat water needs during times of stress on the other water supplies.
- Research technologies to reduce the use and thus the costs of energy for desalinating ocean water.
- Perform further research on membrane technology to improve salt removal and thus reduce the need for energy and drop costs.
- Research methods and technologies for disposal of desalting waste products (e.g., brine)

4.2.11 Recreation and Public Access

- To increase open space, the acquisition of land is needed to provide the many neighborhoods in the watershed who have limited open space, with more opportunities for recreating in a variety of forms. Vacant parcels, under-utilized public land, Brownfields, and land along river, creeks or tributaries will need to be acquired to provide new parks, including large traditional parks, pocket parks and community gardens. These sites will provide opportunities for both, active and passive recreation, public education, local farming, habitat creation, as well as provide opportunities for addressing water supply and water quality improvements.
- Utility Rights-of-Way is the most significant open space opportunity along some river corridors which can be enhanced for passive recreational habitat and water quality improvement purposes. There is

precedent for utility corridors being used in this manner. In Sun Valley, LADWP easements are being considered for treatment wetlands to assist local cities in meeting water quality regulatory requirements.

- Flood plain restoration is another opportunity to increase open space while also providing water supply and quality benefits. Restoration efforts may include property acquisition to set back the banks of the rivers and daylight streams to restore flood plain function, including meandering channels and sandbars. Utility easements and spreading basins offer opportunities to increase flood channel capacity while contributing to floodplain restoration efforts.
- For park poor communities it is necessary to improve access to open space and recreation, with safe, convenient bicycle and public transit facilities. Pedestrian, bicycle and transit access to existing parks needs to be improved, and future parks and open spaces should be planned at locations that can be easily accessed without a vehicle. Where technically feasible, the greening of flat roofs should be considered as a resource for increasing open space and habitat.
- It is vital to long term success as a Region to create a comprehensive network of open spaces or greenbelts by developing continuous pedestrian and bicycle trails along rivers, creeks, tributaries as well as transportation and freight corridors, such as the Alameda and metro rail corridors. It will also be necessary to create gateways and links from the residential areas and commercial districts to the greenways by a network of bridges, gateways and connections which are cohesive design elements of the park system.
- The cumulative benefit of a regional and local-serving greenway network of parks and trails will be improved access for all communities as well as opportunities for improved groundwater protection and recharge for future generations, improved water quality for aquatic habitats and recreation and increased economic development potential.
- There are a significant number of parks, trails and recreational projects happening in the region. There is also an opportunity to weave together these disparate sets of projects into an integrated whole that presents opportunities to complement the objectives of improved water supply and quality.
- Current and planned projects throughout the Region demonstrate local awareness of the value of integrating habitat creation and preservation with passive and active recreation as well as other water management objectives such as increased infiltration and natural treatment of runoff. Integrating these local efforts into a regional water management plan will result in more effective projects resulting from the sharing of information and resources between the various local proponents, increase available resources by facilitating new partnerships and increase individual project benefits through integration with other projects into regional efforts.

4.2.12 Recycled Water

- Expansion of recycled water distribution lines, including the development of a regional distribution backbone and implementation of incentives to provide infrastructure in redevelopment project.
- Expand uses of recycled water, including: groundwater recharge and irrigation of all large public use or institutional sites
- Integration with other water management strategies – Three potential pathways for integration with other water management strategies are currently envisioned: co-location of seasonal recycled water storage and flood control facilities and expansion of recycled water use for environmental restoration such as lake or wetland enhancement or creek restoration.
- During the continued development of the IRWMP, the potential application of these pathways through actual projects will be considered and the list of pathways will be refined and/or expanded. An example illustrating the integration with other water management strategies is a potential lake restoration project in the South Bay region. This project would use advanced treated recycled water from a satellite facility

to a local institution or commercial site for irrigation and Harbor Lake for recreational lake replenishment/enhancement.

4.2.13 Surface Water Storage

- Seek opportunities for system re-operation. This includes probable modification of reservoir, canal, and dam operations to better manage storm flows, although current dam safety regulations may limit long-term storage of surface water until facilities are brought into compliance.
- Seek ways to add surface storage to the Region for supply and other water management strategy benefits.
- Integrate gravel pits into storage and stormwater treatment strategies.
- Rehabilitate dams and debris basins to increase storage and operational flexibility.
- Develop recreational opportunities with surface storage opportunities.
- Develop areas surrounding the lake or reservoir for habitat and to protect the water supply.

4.2.14 Water Conservation

- Emphasize landscape irrigation conservation. Landscape irrigation is one of the areas that offer significant opportunities for further conservation within the planning area. The recent efforts of the AB2717 Landscape Task Force provided a list of opportunities for further conservation in landscaping. The recommendations from the Task Force report can be incorporated into regional programs. When designing landscape irrigation projects, efforts should first be made to target areas that are beyond the reach of recycled water projects. Increased coordination between the City and County parks representatives with water agencies will help to establish region-wide conservation programs.
- Develop improved methods to measure conservation. Another opportunity lies in developing better ways to monitor water savings from conservation. This would allow water conservation projects to be more performance-based and would enable Regional targets to be set and progress measured. The ability to conduct cost-benefit analysis would be improved. It would also help promote water conservation by allowing water agencies, developers, businesses, and institutions to receive credit for their contributions.
- Consider stakeholder suggested actions. Other ideas for water conservation brought up during stakeholder workshops included assessing fines for runoff and providing public recognition for water conservation. Another opportunity lies in changing the Covenants, Conditions and Restrictions (CCR) restrictions in many homeowner agencies that restrict the ability to utilize native or xeriscape landscaping. A goal for water conservation could be tied directly to the Region's share of imported water. A final opportunity identified was to develop programs to make information about landscape conservation more accessible.
- Develop conservation master plans. The development of conservation master plans, which have been undertaken by some water agencies, is an important step in integrating conservation efforts regionally.
- Implement pilot programs. A pilot program could be developed to demonstrate the efficiency of large landscape irrigation devices and to draw interest from potential partners. Training and installation can be consolidated on a sub-regional basis. Since there are micro zones that exist throughout the Region, a comprehensive installation and potential sharing of data would allow creation of a locally improved system. Since the weather-based irrigation controllers will also reduce dry weather urban runoff, the large landscape irrigation programs can be combined with and be counted as part of urban runoff reduction efforts. The Central Basin MWD currently has a pilot program for a commercial landscape wireless valve end use management research program.

4.2.15 Water Transfers

- Water transfers within the Region provide a high degree of flexibility and can be a valuable tool to implement many of the integrated water strategies developed in this IRWMP. Regulatory restrictions on mixing water supplies in transmission lines and potential water quality impacts to Metropolitan facilities pose potential limitations to these internal regional transfers. If these water quality concerns can be mitigated, opportunities for transfers will increase and water supply reliability can be improved.
- A water supply transfer that is being completed through direct replenishment has opportunities for integration with other water management strategies where the areas around the recharge basins are developed for habitat or other beneficial uses.

4.2.16 Water Supply Reliability

- Increase education efforts to inform the public of reliability supply issues and potential consequences of low reliability supplies.
- Further develop drought response supplies such as desalination and proactive groundwater banking.
- Funding from the State to help defray some of the costs of developing supplies.
- Streamlining and removing roadblocks from the permitting process for new projects.
- Stakeholder groups working together to overcome institutional complexities and water quality challenges.
- Further research to develop new technologies to overcome barriers to projects.

Integrating these strategies and concepts with the various supply and demand management strategies will enhance the viability of all the integration efforts.

4.2.17 Water Quality Protection and Improvement, Stormwater Capture and Management, and NPS Pollution Control

- Develop local and regional facilities to capture and treat stormwater as part of a TMDL compliance strategy. This could include package treatment plants to remove contaminants, filtration systems, or natural treatment systems such as constructed wetlands. In either case, it will be necessary to identify existing publicly-owned open spaces, or acquire/develop new open spaces downstream of urban runoff to retain the design storm proposed in this Plan. Water cleansed by such facilities could either be recharged to groundwater or stored for delivery to local uses, such as landscape irrigation.
- Develop multipurpose TMDL solutions. Coordinate with regulatory agencies to establish and implement science-based TMDLs and reasonable schedules for implementation, which will encourage multipurpose solutions.
- Evaluate opportunities to share funding resources. The funding for the installation and maintenance of single-purpose facilities (i.e., CDS units, catch basin inserts, low flow diversion systems, and end-of-pipe treatment plants) is typically supported by single-purpose agencies. Evaluate opportunities to develop multipurpose solutions which allow for the sharing of funding resources among several partner agencies.
- Retrofit existing publicly owned lands for stormwater capture. Identify public lands, such as parks, schools, or power line or utility easements that can be retrofitted to provide a secondary function of stormwater capture either above or below ground.
- Develop joint use stormwater capture facilities. Identify and acquire available land in heavily urbanized areas to be used for collection and treatment of polluted stormwater runoff for the short rainy season, and then as parks and recreational facilities for the remainder of the year. Potential partners may include parks departments and stormwater management agencies.

- Expand river corridors to include more area for riparian habitat and stormwater storage. Develop a policy to acquire lands over the next few decades adjacent to existing rivers and creeks to allow for restoration of riparian habitat, reconfiguration of concrete channels to restore ecosystem functions, provision of stormwater storage, creation of parks along these improved facilities, conversion of existing urban land use to more densely developed urban land use adjacent to these facilities, and improvement of adjacent property values. Partners may include stormwater management agencies, Redevelopment Agencies, private developers, and the Department of Housing.
- Develop joint use groundwater recharge facilities. Consider packaging groundwater recharge facilities, which can require significant land acquisition, to provide treatment of influent urban runoff pollution for recharge, as well as wildlife habitat and recreational features. Also, consider locating facilities in areas to provide recharge of wastewater effluent in the non-storm season. Partners may include water supply, stormwater management, wastewater management, parks, habitat, and open space agencies.
- Expand water quality protection and improvement programs and projects, such as Safe Drinking Water Act (SDWA) projects, to address broader water quality issues. Also, coordinate with implementation of programs and projects to remediate groundwater contamination.

4.2.18 Water and Wastewater Treatment

- Opportunities to expand and/or enhance water treatment include projects designed to meet SDWA requirements and recent and pending TMDLs. As enhancements for wastewater treatment facilities are considered, evaluate other multipurpose opportunities to help treat dry weather and/or stormwater runoff.
- Evaluate the joint use of constructed wetlands for treatment of urban and/or stormwater runoff and treated wastewater effluent. Identify and acquire available land in heavily urbanized areas to might be needed for advanced treatment/polishing of wastewater treatment plant effluent to meet expected future TMDLs for nutrients. Evaluate the ability of these facilities to be designed to also provide treatment of urban runoff. Partners may include wastewater management and stormwater management agencies.
- Coordinate efforts to expand river corridors for multiple uses (see water quality strategy section above). Coordinate with stormwater management and development agencies to allow for development of treatment wetlands that might also be used to polish treated wastewater plant effluent along expanded river corridors and integration of these facilities with restoration of riparian habitat and reconfiguration of concrete channels to restore ecosystem functions.

4.2.19 Watershed Planning

- Incorporate water management strategies in new watershed plans. Opportunities for the preparation of new watershed plans include: Burbank (east and west) Wash, Verdugo Wash, the mainstem of both the Los Angeles and San Gabriel Rivers (although the respective river Master Plans cover the river corridors and some adjacent lands), Los Cerritos Channel, and numerous smaller watersheds that drain directly to Santa Monica Bay and San Pedro Bay.

4.2.20 Wetlands Enhancement and Creation

- The long-term restoration, improvement and protection of the Region's wetlands would help ameliorate or eliminate the water quality, water supply and biological impacts of environmental degradation. Because many of the issues involved in wetland restoration and enhancement cut across traditional political and organizational boundaries, success will only be accomplished through cooperative planning efforts like the IRWMP that include non-governmental organizations, private landowners, industry, and state and federal government. Education and public outreach will be critical helping the public understand their role in protection and achieving buy-in on the necessary improvements.

- Wetlands and habitat projects can provide water quality, groundwater recharge, flood management and recreational opportunities, for example. Integrated projects are more likely to be funded, in that funding agencies may treat them more favorably, or multiple funding sources can be used to fund individual project elements.
- Numerous opportunities for enhancement and creation of the Region's wetlands have been identified within local watershed management plans as well as city, state and federal projects and programs such as the California Coastal Conservancy and Southern California Wetland Recovery Project. Examples of some of these opportunities include the Los Cerritos Wetland Restoration, the DeForest-Dominguez Wetlands Restoration Preliminary Plan, Headworks Los Angeles River Wetlands and Water Protection project, and The Long Beach RiverLink project. Each of these projects not only look to restore wetland habitat, but also to integrate additional multi-purpose features such as recreation and open space opportunities, upland and riparian habitat restoration, and water quality and water supply benefits.

4.3 Benefits of Integration

Although Table 4-2 suggests potential affinities between the various strategies, it does not clarify how the potential implementation of some strategies could result in benefits to other strategies. For this purpose, the various strategies can be grouped with respect to their potential to:

- **Improve surface water quality and/or flood management.** flood management; land use planning; NPS pollution control; stormwater capture and management; water quality protection and improvement; and watershed planning
- **Expand and preserve open space and habitat.** ecosystem restoration; environmental and habitat protection and improvement; recreation and public access; watershed planning, and wetlands enhancement and creation
- **Improve water supply and enhance water reliability.** desalination; groundwater management/conjunctive use; imported water; surface storage; water and wastewater treatment; water conservation; water recycling; water supply reliability; and water transfers

The integrated implementation of strategies to improve surface water quality and/or flood management has the potential to improve water supply and enhance water supply reliability. If surface water quality is improved, concerns about potential adverse impacts from the recharge of stormwater would be reduced, and thus additional runoff could become available for recharge. If stormwater capture and management is expanded, options for the treatment of stormwater include detention basins and constructed wetlands, both of which have the potential to enhance groundwater recharge. If flood management is improved, additional stormwater runoff could be detained and thereby become available for recharge (as current recharge capacity limits the volume of runoff that may be recharged at some locations). To the extent that groundwater recharge is expanded, then water supply reliability would be enhanced, as groundwater basins can be drawn down in periods of drought and replenished during periods of above-average rainfall.

The integrated implementation of strategies to expand and preserve open space and habitat also has the potential to improve water supply and enhance water supply reliability. Open space in the mountains and foothills act as sponges to soak up rainfall and slowly release the water and natural outflow over a relatively long period. Restored habitat areas tend to soak up more rainfall than degraded habitat. The Santa Monica and San Gabriel Mountains, and to a lesser extent, other mountains and foothills in the region provide a substantial source of local water supply. Although large portions of these areas are already preserved, in the form of the Angeles National Forest and the Santa Monica Mountains National Recreation Area (and associated state and local parks), large portions of the mountains and foothills remain in private hands, and thus are subject to potential development. The preservation of open space, restoration of habitat, and the

creation of new habitat (such as constructed wetlands) all have the potential to increase groundwater recharge, and thus improve water supplies and enhance water supply reliability.

The improved integration of the various water management strategies also can enhance the Region's ability to contribute to statewide priorities, as more fully discussed in Section 3.4 (Statewide Priorities).

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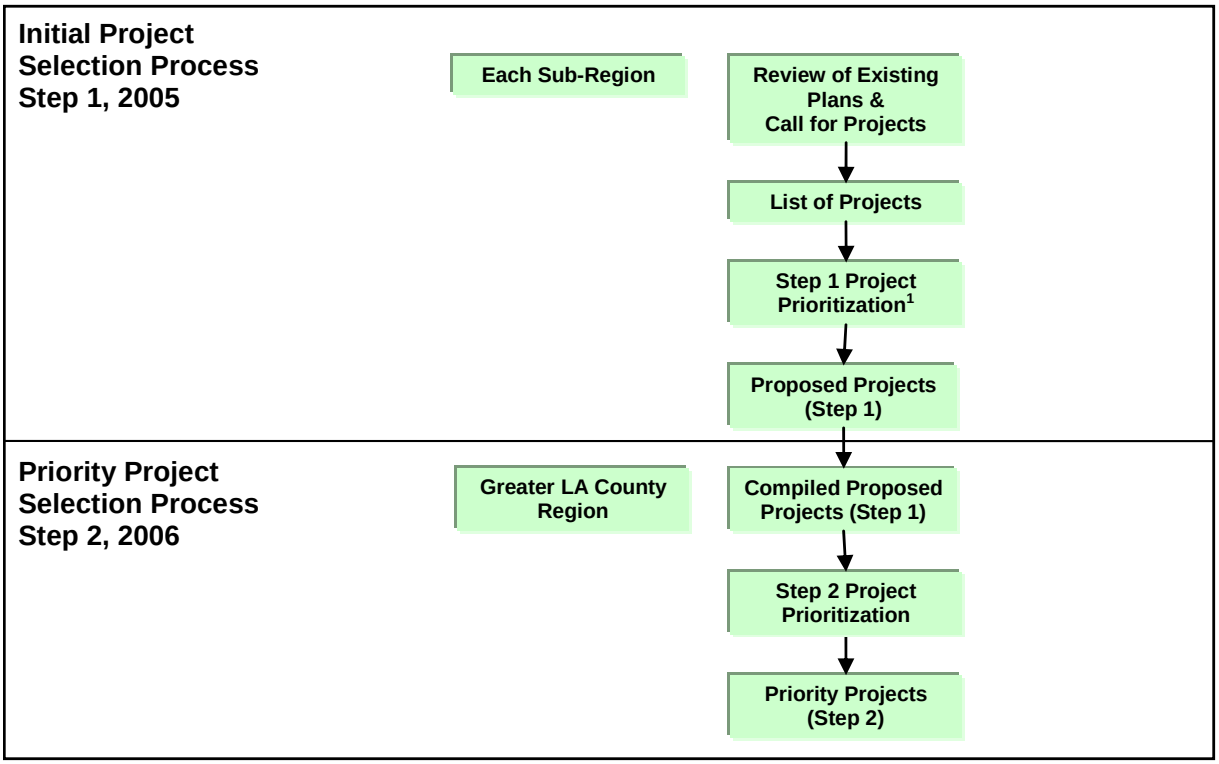
5. INTEGRATED REGIONAL PROJECTS

This Section focuses on describing how the priority projects for the Proposal for Implementation Grant, Step 2 – First Funding Cycle were identified. The final IRWMP will present a more comprehensive approach to project identification and integration.

Figure 5-1 illustrates the overall process that took place as part of the Step 1 application process and as part of the initial phase of the IRWM planning effort to identify priority projects. This Section briefly summarizes the project identification and prioritization process that took place during the Step 1 application process and led to the identification of proposed projects. It then focuses on the prioritization process that took place to identify priority projects.



Notes:
1. The Step 1 prioritization approach varied by sub-Region. Specific details on the prioritization process are provided in the Step 1 grant applications.

Figure 5-1. Project Identification and Prioritization Process

5.1 Proposed Projects

In recent years, dozens of water supply, watershed management, water quality compliance and other water management planning documents have been prepared in the Region. Stakeholders within each sub-Region used these planning documents as well as a "call for projects" process to identify potential IRWMP projects. The call for projects was an invitation to stakeholders to submit projects for inclusion in the IRWMP.

These initial efforts yielded a list of 149 projects. These projects were then prioritized within each sub-Region to select sets of priority projects to be considered for a first stage (Step 1) of IRWMP implementation funding. Although specific prioritization methods varied between the sub-regions, each used an objective scoring process to quantitatively rank projects using criteria based on IRWMP Guidelines and Statewide Priorities. The process was designed to select well developed, stakeholder supported projects that address a wide range of water management strategies and meet Regional and statewide priorities. Using these prioritization methods, the sub-regions proposed a total of 58 projects as the basis for Step 1 funding.

Recognizing opportunities for increased integration the state encouraged the consolidation of the 4 sub-regions into the one Region. The initial 58 projects identified in Step 1 formed the nucleus for the IRWMP effort and defined the starting point for further integration and prioritization to achieve a list of thirteen priority projects. A complete list of the proposed projects considered in this Draft IRWMP is provided in Appendix A.

This complete list of all projects in the Region will be expanded through the Plan implementation, which will involve future calls for projects.

The proposed projects were organized into five water management programs that correspond to the Regional objectives covered in Section 3 of the Draft IRWMP to facilitate the prioritization process (see Section 5.2):

- Imported Water Reduction and Supply Reliability (Objectives 3.1.1, 3.1.2 and 3.1.3);
- Urban Runoff and Stormwater Water Quality Improvements (Objective 3.1.4);
- Flood Protection Maintenance & Improvements (Objective 3.1.5);
- Watershed-Friendly Recreation and Open Space Creation (Objectives 3.1.6 and 3.1.8); and
- Natural Habitat Conservation and Restoration (Objective 3.1.7.)

The primary benefit of each project was used to assign the project to a particular program, recognizing that most projects offer multiple benefits that can contribute towards meeting the objectives associated with the other programs. The program associated with each of the 58 projects (since consolidated into 56 projects) is indicated in Appendix A.

5.2 Project Prioritization Approach

The proposed projects submitted with Step 1 applications were prioritized utilizing the two-phase process illustrated in Figure 5-2. Each of these prioritization steps are further described below. As noted earlier in this Section, this project prioritization approach only applies to the identification of priority projects for the Proposal for Implementation Grant, Step 2 – First Funding Cycle. The final IRWMP will present a more comprehensive approach to project identification and integration.

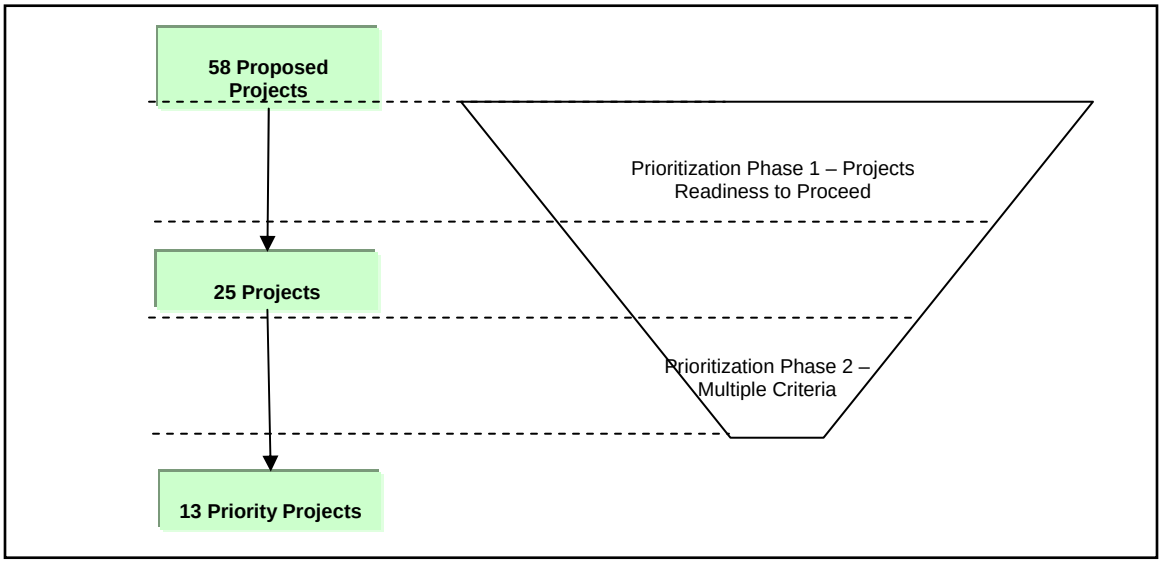


Figure 5-2. Project Prioritization Approach (Step 2)

5.2.1 Prioritization Phase 1

Within each sub-region, stakeholders ranked each of the 58 proposed projects from the Step 1 application within each water management program based on readiness to proceed by reviewing the status of planning, environmental documentation, and design percent complete. Financial commitment of project sponsors was also considered in evaluating the readiness to proceed. Twenty-five top-ranked projects out of the 58 proposed projects were selected through this first step.

5.2.2 Prioritization Phase 2

The Leadership Committee and sub-regional Steering Committees reviewed the 25 top-ranked projects and ranked them by sub-region and by water management program based on their ability to provide the greatest benefits. The benefits were measured in terms of water supply created, volume of water treated, and area of wetlands/habitat created as shown in Table 5-1.

Table 5-1. Benefits Considered in the Prioritization Phase 2

Benefit	Unit
Water Supply Created	Acre-feet/year
Volume of Water Treated	mgd
Area Drained	acres
Open Space, Recreation Opportunities Created	acres
Area of Wetlands/Habitat Created	acres

Given the project ranking based on benefits and various other criteria (e.g., available grant funding, desire to identify a minimum of two projects per sub-regions to build consensus, need to identify a minimum of one project per water management program to maximize linkage and integration, ability to implement based on public, political and stakeholder support, and value of project as a demonstration project), the Leadership Committee and sub-regional Steering Committees identified 13 priority projects that will constitute the Proposal for Implementation Grant, Step 2 – First Funding Cycle.

5.3 Priority Projects

The 13 priority projects that constitute the Proposal for Implementation Grant, Step 2 – First Funding Cycle are listed in Table 5-2. Table 5-2 includes a brief project description and the name of the implementing agencies. The project location is illustrated on Figure 5-3.

Additional information on each project as well as their economic and technical feasibility, their status, and their contribution to statewide or state agency priorities is provided in the Proposal for Implementation Grant, Step 2 – First Funding Cycle.

Linkages and interdependence between the priority projects is discussed below. For the purpose of the Draft IRWMP it is assumed that two or more projects are linked or inter-dependent if they verify one or more of the following conditions:

- A project is a precursor to the other(s), or a project is a component of a larger project;
- Projects are part of one integrated action plan developed to resolve a local or Regional issue;
- Project(s) have a potential impact on Regional policy;
- Projects are physically linked (e.g., tertiary treatment plant and recycled water distribution system); and
- Synergies exist between project's implementation strategies (e.g., public outreach efforts can be combined, specific measurement methods can be shared, regulatory agencies can be approached at once with similar issues).

Per discussion with DWR and SWRCB, projects that have common functions (e.g., two water conservation projects) but do not meet one of the conditions listed above were not considered linked.

Because of funding limitations, the final list includes only 13 projects which were selected for a Region that is home to more than 10 million people and covers over 2,000 square miles. Thus, limited non-programmatic linkage and interdependence between the 13 priority projects exist. To maximize linkage and interdependences amongst such a limited pool of projects, projects located within a single sub-region would have been preferable. This approach was understandably not acceptable to the stakeholders from the other sub-regions; hence limiting potential linkage and interdependence between the 13 priority projects.

However, linkage and interdependence between the 13 priority projects and the integrated Regional projects to be developed through the IRWMP planning process are believed to be of more significant relevance than the linkage between the 13 priority projects themselves. For example, should the Large Landscape Water Conservation, Runoff Reduction and Native Flow Restoration Project effort led by West and Central Basin MWD be successful, it will support a programmatic approach at the Regional level to implement similar projects. Additional examples will be provided in the final IRWMP.

Hence, the 13 initial priority projects, although not strongly linked or interdependent, are critical to stimulate further integrated planning, create learning opportunities for professionals and the public as to how to best address water management in the Region, and initiate the overall program implementation.

Table 5-2. Priority Projects			
Project Name		Abstract	Implementing Agency
1	Central Basin Southeast Water Recycling Project	Construction of a 12-mile recycled water line from San Jose Creek WRP to distribute up to 16,000 acre-feet/year of recycled water (13,500 acre-feet/year for City of Vernon refinery) and complete Central Basin Recycled Water System.	Central Basin MWD
2	JWPCP Marshland Enhancement Project	Restoration of vegetation and wildlife habitat value of the 17 acre freshwater JWPCP marshland that provides storm water treatment, flood control; Project includes educational and recreational facilities.	County Sanitation Districts of Los Angeles County
3	Large Landscape Water Conservation, Runoff Reduction and Educational Program	Installation of 1,950 weather-based irrigation controllers at 500 locations in the watershed to achieve up to 2,000 acre-feet/year in water conservation and 500 acre-feet/year in runoff reduction; Establish a rebate program (2,700 units); Develop 17 demonstration gardens and a public outreach program.	West & Central Basin MWD
4	Las Virgenes Creek Restoration Project	Reestablish a native creek side habitat to enhance the water quality and biological environment of the area; Reestablish direct connectivity between the two existing riparian communities.	City of Calabasas; Mountains Restoration Trust
5	Malibu Creek Watershed, Water Conservation, Runoff Reduction, and Native Flow Restoration Project	Promotes indoor water conservation by replacing low-efficiency irrigation systems, clothes washers and toilets with more efficient systems. Promotes outdoor conservation by offering rebates and incentives for Weather Based Irrigation Controllers (WBICs) and drip irrigation systems. Also replaces citywide irrigation controllers in the City of Westlake Village as part of a larger citywide conservation plan.	City of Westlake Village and Las Virgenes MWD
6	Morris Dam Water Supply Enhancement Project	Lower the operational pool behind Morris Dam by upgrading the dam's control structures to allow more storm water to be captured for recharge at downstream spreading grounds.	Los Angeles County Flood Control District
7	North Atwater Creek Restoration Project	This project will construct water quality physical and structural improvements to an area along the Los Angeles River. The project will restore the creek at the North Atwater Park for storm water runoff capture and treatment and provide wetlands habitat linkage to the LA River. Two acres of wetland habitat will be created.	City of Los Angeles Bureau of Sanitation
8	Pacoima Wash Greenway Project: 8th Street Park	Convert 3 acres of undeveloped land into a natural park that collects, treats, and infiltrates residential runoff onsite and create recreational, educational, and aesthetic benefits to disadvantage community.	Mountains Recreation and Conservation Authority
9	San Gabriel Valley Riparian Habitat *Arundo* Removal Project	Eradicate 24 net acres of Arundo at 3 riparian areas in the San Gabriel Valley; Project will complete eradication efforts in the valley and prevent Arundo expansion to 120 acres of uninfested areas.	Los Angeles/San Gabriel Rivers Watershed Council
10	Solstice Creek Southern Steelhead Habitat Restoration Project	Complete the Solstice Creek Steelhead Habitat Restoration Plan by restoring Solstice Creek to a more natural condition through removal of debris, sediment, invasive species and creek barriers.	National Park Service, SMMNRA
11	South Los Angeles Wetlands Park Project	Converts a former MTA maintenance facility into a multi-benefit community resource with a water quality treatment element, a constructed wetland, and a community and education center.	City of Los Angeles Bureau of Sanitation
12	Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	Address NDMA concentrations in tertiary effluent to allow continued groundwater recharge of up to 10,000 acre-feet/year for indirect potable reuse by converting from chloramination to UV disinfection.	County Sanitation Districts of Los Angeles County
13	Wilmington Drain Restoration Multiuse Project	Proposes wetlands restoration in the Dominguez Channel Watershed. The project will: 1. preserve and restore coastal wetlands ecosystems, 2. recover native habitat and species diversity, and 3. prevent future degradation and/or loss of wetlands resources	City of Los Angeles Bureau of Sanitation

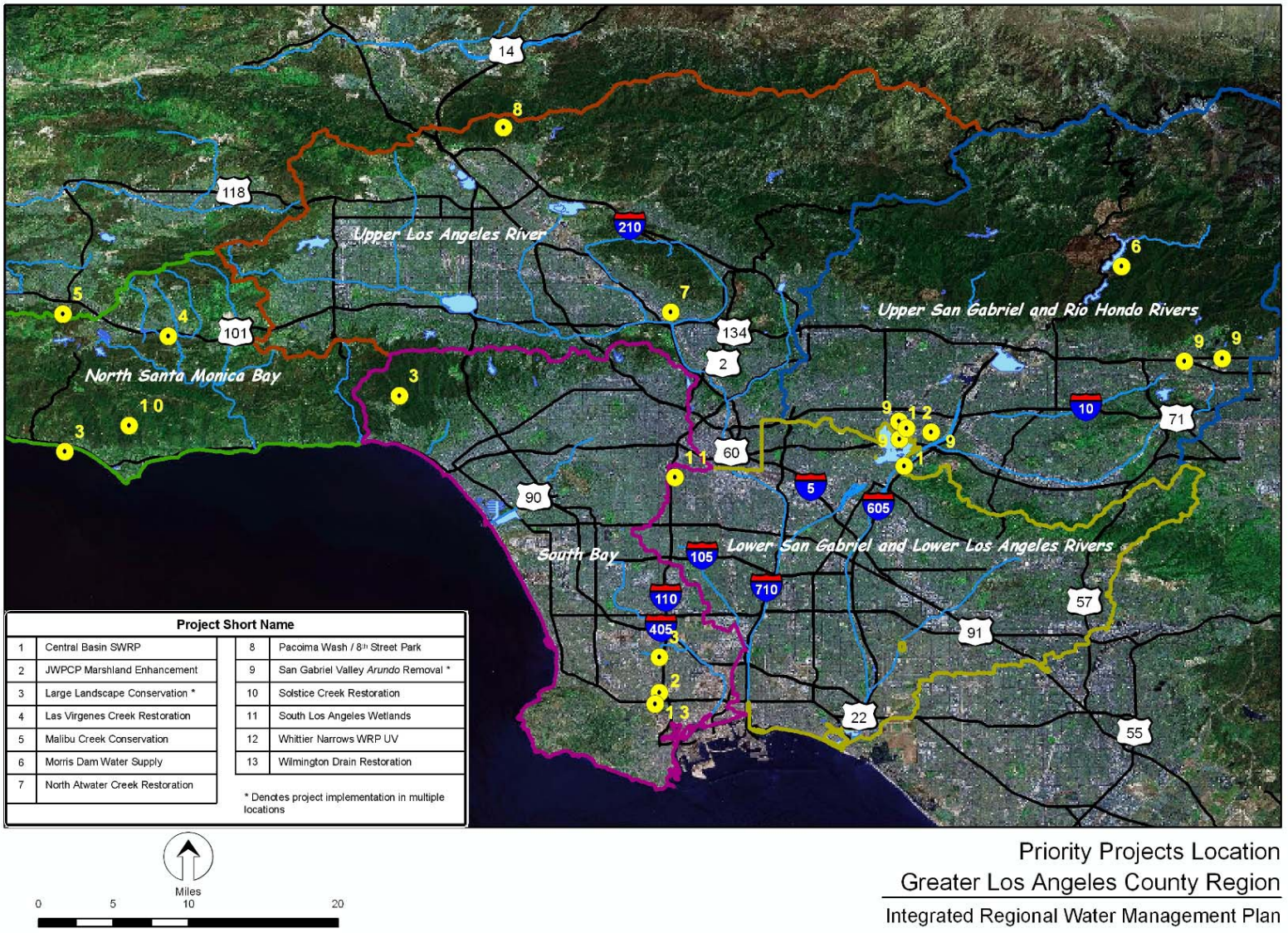


Figure 5 3. Priority Projects Location

The linkages and interdependences between the 13 priority projects are discussed below:

- The Las Virgenes Creek Restoration Project is a component of a larger project and part of two integrated action plans (Calabasas Creek Master Plan and Las Virgenes Gateway Master Plan) developed to resolve a local or Regional issue. The project will also have Regional impact on policy for urban stream restoration in the Santa Monica Mountains and, potentially, the Region as a whole.
- The San Gabriel Valley Riparian Habitat Arundo Removal Project is a component of a larger project: it is a continuation of a campaign to eradicate all Arundo from urban riparian areas of San Gabriel Valley. In addition, the project is linked to the Morris Dam Water Supply Enhancement Project has it will contribute to increasing the stream capacity downstream of the dam facilitating the safe release of additional water for recharge at downstream spreading grounds.
- The Large Landscape Water Conservation, Runoff Reduction and Educational Program is a component of a larger project and part of several integrated action plans (West Basin MWD's 2005 UWMP, Central Basin MWD's 2005 UWMP, Metropolitan Water District's Five-Year Conservation Strategy Plan). The implementation of this project and lessons learned will lead to the implementation of similar projects at the local and potentially Regional level. Finally, this project is closely linked to the Malibu Creek Watershed Urban Water Conservation and Runoff Reduction Project since they both rely on a similar technology of weather-based irrigation controllers, which will lead to shared lessons learned and potential partnerships in expanding or advertising the program.
- The JWPCP Marshland Enhancement Project and the Wilmington Drain Restoration Multiuse Project, located immediately downstream, both contribute to improving the water quality of the Wilmington Drain.
- The North Atwater Creek Restoration Project, Pacoima Wash Greenway Project, and other restoration projects relying on stormwater BMPs will benefit from a number of synergies such as public outreach elements, performance measurement tools, and lessons learned that could later be apply to similar projects throughout the Region.
- The Solstice Creek Southern Steelhead Habitat Restoration Project is the last key component of a larger project aiming at enhancing habitat for federally endangered southern steelhead trout.

5.4 Additional Project Concepts

Section 3 identified the quantifiable planning targets for water supply, water quality and open space. To determine the extent to which existing projects would contribute to these targets, the projects included in this Draft Plan and new projects identified through a call-for-projects are currently being reviewed to quantify the project benefits, including the:

- Volume of additional water supply that would be created;
- Volume of water conservation that would be achieved;
- Volume of additional recycled water that would be utilized;
- Volume of dry weather runoff that would be reused or captured and treated;
- Volume of stormwater runoff that would be reused or captured and treated;
- Linear miles of riparian habitat that would be restored; and
- Acres of new watershed-friendly parkland and open space.

Based on the review of existing projects, an assessment of the "gap" between the quantified benefits of existing projects and the quantified planning targets for water resources included in this Draft Plan will be developed, along with the extent to which water supply or water quality projects contribute to regional open

space and habitat needs. Although the review of projects benefits is ongoing, some preliminary assumptions have been identified, as described below.

Although water supply agencies in the Region have extensive experience in developing and delivering water to meet the Region's demands, and the Metropolitan Water District's IRP identifies strategies to meet future needs of it's member agencies, a substantial gap will exist between the water supply projects submitted for this IRWMP and the identified regional planning target of up to 850,000 acre-feet of additional water supply and/or demand reduction. Although the Metropolitan Water District will provide imported water to partially address Southern California's demand (from Metropolitan's Colorado River and State Water Project sources), much of the gap will have to be met through the development and implementation of local projects and programs to enhance water supplies and reduce water demand. This is likely to include enhanced recharge of existing local surface supplies, optimized use of groundwater basins, expanded use of recycled water, expanded groundwater and ocean water desalination, demand reductions via expanded water conservation, and the reuse or recharge of stormwater.

Although a gap currently exists between the production of recycled water and the utilization of that water, due to the relatively high cost of recycled water at some locations, as the cost of imported water is likely to increase, and as other "new" water sources (e.g., brackish groundwater and ocean desalination) may have relatively high costs, the utilization of recycled water will expand. Most sanitation agencies have identified future distribution networks to extend the use of recycled water as demand rises. Thus, it is assumed that the gap between recycled water production and the use of that water will disappear over time.

With the exception of runoff to portions of the North Santa Monica Bay (a designated Area of Special Biological Significance) the initial TMDLs established in the Region do not specifically require the capture of dry weather urban runoff or stormwater runoff. As most jurisdictions to-date are focused on meeting the initial target of the trash TMDL (a 20 percent reduction by 2006), as the removal of trash typically involves the filtration, not capture, or runoff, and as the volume of runoff (particularly stormwater) that may require treatment is substantial, few existing projects and programs are designed to capture urban or stormwater runoff. Thus, it is assumed that to meet the planning targets to reduce, capture, infiltrate, and/or treat urban and stormwater runoff, the Final Plan will need to identify projects or project concepts that reduce, capture, infiltrate and/or treat substantial portions of both urban and stormwater runoff.

The planning target to restore riparian habitat and associated habitat buffer in the Region will incorporate a goal in the Santa Monica Bay Restoration Plan, intended to restore habitat for Steelhead trout in the Santa Monica Mountains. Specific projects to remove barriers to fish migration in that area (e.g., removal of Rindge Dam in Malibu Creek Park) have been identified, but projects and programs to restore habitat and associated buffer along other streams in the Region remain to be identified. As noted above, the inclusion of this planning target in this IRWMP is intended to determine the extent to which implementation of this Plan will meet this identified regional conservation need.

Various park and open space proposals have been identified within the Region, but the cumulative total amount of open space created by those projects is relatively small. Thus, the gap between the existing projects and the identified target is substantial. The identified planning target in this Draft Plan is ambitious, yet could produce multiple benefits to water supply, water quality and improve access to open space for many communities, which would have multiple benefits to public health. As noted above, the inclusion of the parkland and open space planning target in this Plan provides an opportunity to determine to what extent integrated water resource management can assist in meeting that regional open space need.

For the purposes of this Draft Plan, it is assumed that identification of a list of potential projects and programs to meet the planning targets must include a list of local water supply options that would collectively provide approximately 850,000 acre-feet of additional water and/or equivalent demand reduction measures. The potential strategies to achieve that cumulative total of water supply and/or demand reduction are

described in Section 4. To fill the gap between existing projects and identified planning targets for urban runoff and stormwater runoff, project concepts will need to be identified to reduce, capture, infiltrate, and/or treat the substantial portion of urban and stormwater runoff.

5.4.1 Options to Fill Identified Gap

The Final Plan will identify projects and project concepts that can fill the identified gap which is described above. For the purposes of this Draft Plan, three conceptual options have been identified, as described below. It is not assumed that one single option will be implemented across the entire Region to meet the identified gap. Instead, this planning and feasibility analysis is intended for comparative purposes, to provide an estimate of the benefits, costs, and impacts of each option.

5.4.1.1 Continuation of Existing Projects and Programs

Public agencies throughout the Region have a variety of projects and programs to address water supply, improve surface water quality, and expand parkland and open space. However, as most public agencies have single-purpose missions and mandates, most of these projects and programs are single-purpose. Thus, one option to fill the identified gap would be to continue to implement projects and programs which are generally single-purpose.

For water supply, various projects and programs have been identified to improve local water supplies and improve water supply reliability, which include: expanded groundwater recharge (e.g., by expanding capacity at existing recharge facilities); groundwater basin optimization (including remediation of existing contamination); expansion of water conservation; expanded utilization of recycled water, ocean water desalination, and surface storage (e.g., using flood control facilities to retain additional runoff). For the purposes of this Draft Plan, it is assumed these projects and programs would cumulatively provide approximately 850,000 acre-feet of additional water and/or equivalent demand reduction.

For surface water quality, various projects and programs have been identified to treat stormwater contaminants (trash, bacteria, metals, and organic chemicals), and it is assumed that several treatment technologies will be required to treat specific contaminants (e.g., catch basin filters, continuous deflection separators, oil and grease separators, disinfection systems, or ultraviolet light systems). Given the volume of stormwater that must be treated, it is assumed that projects would need to be located within small catchments, or at the point where individual storm drains meet the river or major creek channels. The specific mix of treatment technologies that would be needed for individual storm drains would depend on an assessment of which contaminants are present in individual storm drains.

In addition, this option would also need to identify specific projects and programs to restore riparian habitat and associated buffer, which may include removal of barriers to fish migration in the Santa Monica Mountains, invasive species removal, land acquisition, and measures to improve water quality in contributing areas.

5.4.1.2 Distributed, Multi-Purpose Projects

Consistent with the theme of integrated water resource management, the second option consists of multi-purpose projects and programs, which would require individual agencies and jurisdictions to implement multi-purpose projects and programs, or to work collaboratively with other agencies, jurisdictions, and/or organizations to implement such projects and programs.

For this option, assuming that some of the various projects and programs have been identified to improve local water supplies would proceed, such as: expanded groundwater recharge (e.g., by expanding capacity at existing recharge facilities); groundwater basin optimization (including remediation of existing contamination); expansion of water conservation; expanded utilization of recycled water, ocean water

desalination, and surface storage (e.g., using flood control facilities to retain additional runoff). However, to the extent that stormwater improvement projects and programs make those supplies available for direct reuse or recharge, then the need for "traditional" water supply projects may be reduced.

As the implementation of traditional runoff treatment technologies generally only produce single-purpose benefits (e.g., improved water quality), for the purposes of this Draft Plan, it is assumed that natural treatment systems, consisting of detention basins (to allow sediments to precipitate and reduce the needed capacity of subsequent treatment systems) and constructed wetlands (which would utilize natural processes to cleanse runoff) would be located throughout the Region, within individual catchments and on smaller storm drains, which would create a patchwork of small open spaces in individual neighborhoods.

For this option, to the extent that these distributed runoff treatment projects result in quantifiable water supply benefits, either in terms of the direct reuse of treated stormwater (e.g., for landscape irrigation) or groundwater recharge, then the extent of single-purpose water supply projects identified above could be reduced by an equivalent amount.

5.4.1.3 Multi-Purpose Projects along Major Channels

The third option also consists of the development of multi-purpose projects, but the projects would be located along the rivers, creeks, and major tributary channels. For this option, a series of detention basins and constructed wetlands would be developed along major channels, to treat runoff from individual storm drains before they empty into the channel. This option is consistent with the concept of "river parkways" proposed in Common Ground (Resources Agency, 2001) to create green spaces along the Los Angeles and San Gabriel Rivers and major tributaries. The specific width of the parkways would vary, depending on volume of runoff that would need to be treated from specific storm drains or tributary channels.

For this option, some of the various projects and programs that have been identified to improve local water supplies would proceed, as described above. To the extent that stormwater improvement projects and programs provide quantifiable water supply benefits via direct reuse or recharge, then the need for "traditional" water supply projects would be reduced by an equivalent amount.

6. IMPACTS AND BENEFITS

6.1 Introduction

The assessment of impacts and benefits is central to the identification of projects included in both the Proposition 50 Step 2 Implementation Grant application and the IRWMP. For Step 2 projects submitted, Attachment 10 and Attachment 11 detail the quantity and variety of benefits. A benefit assessment framework is being developed to support benefit quantification as part of the IRWMP development process. The following sub-sections discuss the overall approach and specific assessment of impacts and benefits in each of the Step 2 application and overall IRWMP development.

6.2 Step 2 Projects Impact and Benefit Assessment

Step 2 projects represent the first phase of implementation for the IRWMP and have been selected to provide a range of benefits that work to meet the objectives of the Region. This section provides an analysis of the benefits and impacts of the Step 2 projects.

6.2.1 Project Benefits

Included in the Step 2 application submittal, Attachment 10 and Attachment 11 detail both the economic benefit and additional, non-quantifiable benefits of submitted projects. Table 6-1 provides a summary overview of benefits that will result from project implementation.

Five projects offer quantifiable water supply benefits, six projects offer quantifiable stormwater and urban runoff capture and treatment benefits (while all remaining projects offer other water quality benefits), and eight projects create wetlands, riparian, upland or steelhead habitat with significant open space and recreational opportunities. All of the priority projects are multi-objective in nature offering benefits in at least two of the benefits categories.

6.2.2 Regional Benefits

The priority projects selected for Step 2 Implementation provide benefits that impact the entire region. Collectively, they provide 26,000 acre-feet/year reduction in imported water demand (which includes 16,000 acre-feet/year of recycled water distribution), 9,000 acre-feet/year of urban and stormwater capture and treatment, 63 acres of natural habitat and open space restoration or creation, and 2 miles of steelhead habitat restoration. This results in regional benefits of decreased demand on imported water, cleaner rivers, creeks, and beaches and increased access to open space, recreation and natural habitat throughout the Region.

Table 6-1. Step 2 Application Project Benefit Summary

Project Name	Project Benefits		
	Water Supply	Water Quality	Open Space, Habitat, Recreation
Central Basin Southeast Water Recycling Project	16,000 acre-feet/year additional recycled water distribution	Decrease algal growth potential in the San Gabriel River	None
JWPCP Marshland Enhancement Project	None	Removal of 20% of TMDL constituents (ammonia, copper lead and coliform)	17 acres marshland restoration
Large Landscape Water Conservation, Runoff Reduction and Educational Program	1,250-2,000 acre-feet/year additional water conservation	300-500 acre-feet/year dry weather runoff reduction	None
Las Virgenes Creek Restoration Project	None	Reduction of algae blooms and improvements in creek water quality	0.5 acre streambed and riparian habitat restoration
Malibu Creek Watershed Water Conservation, Runoff Reduction, and Native Flow Restoration Project	3,500 acre-feet/year additional water conservation	3,500 acre-feet/year dry weather urban runoff reduction	None
Morris Dam Water Supply Enhancement Project	5,720 acre-feet additional groundwater recharge	Reduction in sediment loads	None
North Atwater Creek Restoration Project	None	44 acre-feet/year stormwater and urban runoff treated	2 acres of wetland habitat creation
Pacoima Wash Greenway Project: 8th Street Park	None	10 acre-feet/year stormwater and urban runoff treatment	2 acres upland habitat , 400 feet of ephemeral stream, 1 acre of live oak riparian woodland creation; 33 acres catchment drainage
San Gabriel Valley Riparian Habitat *Arundo* Removal Project	90 acre-feet/year additional groundwater recharged (from decreased evapotranspiration)	Reduction in algae growth and improvement in water quality	24 net acres Arundo removal, 3 miles San Gabriel River riparian habitat restoration
Solstice Creek Southern Steelhead Habitat Restoration Project	None	Decrease in sediment loads and turbidity	1.5 miles steelhead habitat restoration
South Los Angeles Wetlands Park Project	None	110 acre-feet/year dry weather urban runoff and 310 acre-feet/year stormwater capture and treatment	5 acres native habitat restoration
Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	Preservation of 7,000 acre-feet/year treated effluent for groundwater recharge	Reduction in NDMA and ammonia levels	None
Wilmington Drain Restoration Multiuse Project	None	4,800 acre-feet/year stormwater capture and treatment	5 acres wetland habitat and/or 8 acres riparian habitat restoration

The Step 2 projects will lead IRWMP implementation and an added regional benefit lies in providing a spark to future implementation. The Step 2 projects illustrate the wide variety of project types and concepts that will be necessary to creatively and effectively address the objectives of the Region. If successful, the projects will serve as models and inspire future projects that will work together to meet the IRWMP planning targets Table 6-2 shows the key regional benefits for the Step 2 projects.

Table 6-2. Regional Benefits of Step 2 Projects

Project Name	Regional Benefit
Central Basin Southeast Water Recycling Project	**Provides an additional source of recycled water within the Region** which will reduce dependence on imported water and reduce runoff to the ocean.
JWPCP Marshland Enhancement Project	**Serves as an example for the restoration and enhancement freshwater wetlands in industrialized areas of the Region**. Provides educational and viewing opportunities of wetland habitat and associated wildlife available to surrounding communities and other communities throughout the Region. Realization of positive water quality impacts through the treatment capability provided by the wetland.
Large Landscape Water Conservation, Runoff Reduction and Educational Program	**Provides an excellent example for the use of large landscape conservation methods in the Region.**
Las Virgenes Creek Restoration Project	**Provides an important model of a successful restoration of an urbanized creek segment to native conditions**.
Malibu Creek Watershed Water Conservation, Runoff Reduction, and Native Flow Restoration Project	Demonstrates that **existing water conservation programs can be tailored to target water uses** that result in the largest sources of dry weather urban runoff. **Shows the advantage of partnering between agencies in developing and implementing conservation programs** and showcases some recently developed irrigation conservation techniques.
Morris Dam Water Supply Enhancement Project	**Creates an additional source of local supply in the Region** through increasing water available for groundwater recharge operations.
North Atwater Creek Restoration Project	**Demonstrates the concept of a riverfront pocket park** that can provide water quality, flood control and wetland habitat opportunities while also **offering sorely needed open space for inhabitants of the Region**.
Pacoima Wash Greenway Project: 8th Street Park	**Encourages the development of greenways throughout the Region** by serving as the foundation project for a plan to create a 3-mile corridor of connected open space in conjunction with stormwater capture elements.
San Gabriel Valley Riparian Habitat *Arundo* Removal Project	**Continues a campaign to eradicate Arundo from urban areas** of a large swath of the Region.
Solstice Creek Southern Steelhead Habitat Restoration Project	**Addresses the loss of habitat in the Region for the federally endangered Southern Steelhead Trout** and also provides an **example of cooperation between federal and local stakeholders**.
South Los Angeles Wetlands Park Project	**Converts a former vehicle service facility in a densely urbanized area into a wetlands park**, which can be used as an example for the conversion of other similar sites in the Region.
Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	**Preserves and expands the use of recycled water for groundwater recharge in the Region**, which is an important component of water supply. It will demonstrate the use of chlorine/UV disinfection as an alternative method to avoid the problem of NDMA generation experienced by the current method of chloramination.
Wilmington Drain Restoration Multiuse Project	**Helps to reverse the trend of diminishing wetlands and open space in the Region** by converting a drain easement into a wetland habitats and park. **Provides an important regional habitat resting area for migating birds** and creates local wildlife viewing opportunities for nearby disadvantaged communities, as it is located in the migratory path of fowl that overfly the Region.

6.2.3 Advantages of Regional Implementation

There are a large number of potential projects developed for the Region. There are significant advantages of implementing these projects regionally through the IRWMP as opposed to implementing them as a series of local efforts. Regional implementation will:

- Allow for accounting of all benefits of projects in meeting regional objectives
- Provide opportunities for regional cooperation and coordination
- Encourage sharing of lessons learned
- Demonstrate many possible solutions to a region-wide audience
- Avoid duplicated efforts
- Increase efficiency in obtaining project funding

The benefits to regional implementation are that project prioritization and implementation will be consensus based. Given limited resources, not all projects can be implemented immediately. The IRWMP process brings stakeholders together to identify priorities at a regional level and work out conflicting interests. The regional implementation of projects allows for maximum utility as it will achieve a high level of consensus while providing the best chance for meeting the agreed upon objectives.

6.2.4 Benefits to Disadvantaged Communities

When implemented, Step 2 Application projects will provide benefit to disadvantaged communities within the Region. Table 6-3 identifies Disadvantaged Communities that will recognize the benefits of project implementation.

6.2.5 Impacts

Project impacts will be generally positive. Any potential negative impacts of project implementation are temporary and are usually associated with construction and no negative impacts are expected outside the Region. Table 6-4 summarizes the negative impacts and the mitigation that will be performed.

Table 6-3. Disadvantaged Communities Receiving Benefit from Step 2 Projects	
Project Name	Disadvantaged Community Receiving Benefit
Central Basin Southeast Water Recycling Project	16 disadvantaged communities with a total population of 786,202 spread throughout Central Basin MWD's service area will benefit from increased water supply reliability. These include the cities of Bell, Bell Gardens, Commerce, Compton, Cudahy, Huntington Park, Lynwood, Maywood, Paramount, and South Gate and the unincorporated communities of East Compton, East Los Angeles, and Walnut Park.
JWPCP Marshland Enhancement Project	The adjacent disadvantaged communities of Wilmington and Harbor City will benefit from improved water quality in the channel and lake downstream of the project. These communities will also benefit from public access to a wetlands habitat area and the creation of educational opportunities for students.
Large Landscape Water Conservation, Runoff Reduction and Educational Program	Residents of 22 disadvantaged communities spanning the North Santa Monica Bay, South Bay and Lower San Gabriel and Los Angeles sub-regions will benefit from lower water consumption and the attendant savings, as well as increased water supply reliability.
Morris Dam Water Supply Enhancement Project	The disadvantaged communities of El Monte, South El Monte and Rosemead will benefit by increased availability of local groundwater supplies.
North Atwater Creek Restoration Project	The disadvantaged community of Atwater Village will benefit from water quality improvements and open space and wetland habitat creation.
Pacoima Wash Greenway Project: 8th Street Park	The project will benefit the Northeast San Fernando Valley through the creation of open space and native habitat, as well as reduced flood risk. This area includes some of the most crowded and impoverished inner-city areas in the county. Cities in the area include San Fernando, which has a population of 23,000 with 4,600 below the poverty line; Pacoima, with a population of 57,000 with 12,414 below the poverty line; Arleta, with a population of 34,000 with 6,536 below the poverty line; and Sylmar, with a population of 64,000 and 8,176 below the poverty line.
San Gabriel Valley Riparian Habitat *Arundo* Removal Project	The disadvantaged communities of Rosemead and South El Monte will benefit through improved access to open space and native wildlife habitat viewing opportunities.
South Los Angeles Wetlands Park Project	The disadvantaged community of South Los Angeles will benefit from the creation of open space and wetland habitat, and water quality improvements as well as from the opportunity for educational opportunities
Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	17 disadvantaged communities in the Region with a total population of 1,600,000 will benefit from the protection of water quality and increased reliability of local groundwater supplies. These include the cities of Bell, Bell Gardens, Commerce, Compton, Cudahy, El Monte, Hawaiian Gardens, Huntington Park, Long Beach, Lynwood, Maywood, Paramount, Rosemead, South El Monte and South Gate and the unincorporated communities of East Compton, East Los Angeles, and Walnut Park.
Wilmington Drain Restoration Multiuse Project	The disadvantaged communities of Harbor City and Wilmington will benefit from public access to an improved wetland and native habitat area. The project will also create opportunities for wildlife viewing and educational programs for local schools from those communities.

Table 6-4. Potential Impacts from Step 2 Project Implementation	
Project Name Regional Benefits	Potential Project Impacts
Central Basin Southeast Water Recycling Project	Potential negative impacts during construction of the distribution pipeline include noise, traffic, dust and air quality. These will be minimized through a mitigation plan as well as an outreach program to impacted communities.
JWPCP Marshland Enhancement Project	There is a potential negative impact on nesting birds during construction, however a qualified biologist will be on site during critical periods to ensure that nests will not be impacted. Other potential negative impacts during construction will be mitigated through best management practices.
Large Landscape Water Conservation, Runoff Reduction and Educational Program	No construction is involved in this project and no mitigation is required. Impacts would be limited to retraining of personnel on use of water conservation devices.
Las Virgenes Creek Restoration Project	Negative impacts during construction involve increases in sediment load and disruption of a wildlife corridor. These will be mitigated through best management practices and monitoring by a qualified biologist.
Malibu Creek Watershed Water Conservation, Runoff Reduction, and Native Flow Restoration Project	No significant construction is involved in the project and any negative impacts possible during the installation of the weather based irrigation controllers will be minimized through proper training.
Morris Dam Water Supply Enhancement Project	The project will require dewatering of the reservoir behind Morris Dam and relocation of fish in the reservoir. This will be mitigated through the preparation of a dewatering plan. Construction work could also increase sediment flows downstream. This will be mitigated through the use of best management practices.
North Atwater Creek Restoration Project	Potential negative impacts during construction include increased noise, traffic, dust and wet weather runoff pollution. These will be mitigated through the preparation of a storm water pollution prevention plan (SWPPP) and by restricting construction to the hours of 7:00 am to 3:30 pm.
Pacoima Wash Greenway Project: 8th Street Park	Negative noise, air quality and cultural impacts during construction will be mitigated through defined measures.
San Gabriel Valley Riparian Habitat *Arundo* Removal Project	Negative impacts include the effect of tractor operation on bird nesting. This will be mitigated by surveying during nesting season. Impacts from the application of herbicides will be minimized through the utilization of experienced contractors and proven herbicide application methods.
Solstice Creek Southern Steelhead Habitat Restoration Project	No construction is involved. A qualified biologist will ensure that the project meets NEPA requirements for revegetation activities.
South Los Angeles Wetlands Park Project	Negative impacts of construction activities will be mitigated through best management practices and scheduling of activities to minimize impacts.
Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	Negative impacts of construction activities will be mitigate through dust and sediment mitigation control measures.
Wilmington Drain Restoration Multiuse Project	Negative impacts during construction will be mitigated through the use of mitigation measures for dust and sediment control and the preparation of a SWPPP. Construction will be restricted to the hours of 8:00 am to 3:00 pm to minimize noise, light and traffic impacts.

6.3 IRWMP Implementation Impacts and Benefits

This IRWMP integrates strategies and projects with a focus on synergy among approaches to improving water supply, water quality and other beneficial uses of water resources. The intended result is an integrated

plan that leverages the potential for increased benefits through coordination among individual projects. The IRWMP builds on projects already submitted for Proposition 50 funding and integrates new projects through a stakeholder driven process. The nature and extent of benefits derived from the IRWMP will also be used to attract additional funding sources, such as federal funds via the U.S. Army Corps of Engineers, U.S. Department of the Interior, and USEPA.

As outlined in Section 1, the Leadership Committee has committed to including quantifiable planning targets for water supply, reliability and other water resource objectives in this IRWMP to demonstrate their intent to be held accountable for implementation of projects that produce measurable results for this Region. The purpose of a benefit assessment framework is to quantify project benefits in relation to these quantifiable planning targets over time in order to assess and demonstrate progress.

This Draft Plan presents a benefit assessment framework for assessing the benefits of projects to be incorporated into the Final Plan. The Final Plan will identify the benefits, costs, and impacts of three conceptual options that have been identified in Section 5.4.1 to meet the identified gap between the planning targets and the existing level of service. The first option consists of single-purpose water supply and runoff treatment projects and specific projects to restore riparian habitat and associated buffer. The second option consists of the multi-purpose projects located throughout the region, within individual catchments and on smaller storm drains, which would create a patchwork of small open spaces in individual neighborhoods. The third option consists of the development of multi-purpose projects along the rivers, creeks, and major tributary channels, which would create river parkways along the major channels.

More specifically, the purpose of the benefits assessment framework is to quantify, in monetary terms, improvements to the "beneficial uses" of water as identified by the California SWRCB and any other improvements that may result from projects contained within the IRWMP. The benefits assessment framework provides decision-makers with a tool that supports the integration of separate and often single purpose water resources projects into an integrated county-wide water management plan. The benefit assessment framework can be used to compare the estimated benefits of differing multi-purpose projects or project combinations against the benefits of other project groupings or individual stand-alone component projects.

The benefits assessment framework provides input into the formulation of a regional integrated plan through the categorization and quantification of project benefits under a consistent metric. The intent of the benefit assessment framework is to identify opportunities to increase net benefits countywide, through the integration of individual projects or project purposes into a more cost-effective program. Benefit values used in this framework are largely based on value estimates established in the Environmental and Natural Resource Economics Literature, avoided costs, or value estimates provided by project sponsors. Economists regard environmental resources, including water resources, as natural assets that generate value in the same manner as all other assets. The value of a water resource asset can be generically defined as the discounted sum of the human well being provided by water resource services during the useful life of the resource.

In order to estimate the value of water resources improvements, environmental and natural resource economists have developed a variety of methods that either estimate the willingness-to-pay for the resource improvement or infer value from some observed phenomena, such as price differentials. Each valuation method has its appropriate application and comes with its own set of caveats. This benefit assessment framework relies on the following approaches to evaluate project benefits:

- Avoided costs;
- Revealed preferences;
- Stated preferences; and
- Hedonic pricing.

In addition, the benefit assessment framework uses a flood protection valuation model developed by LACFCD. Benefit estimates developed by others for projects submitted into the IRWMP are also presented in this benefits assessment framework.

6.3.1 Water Supply Benefits

In this benefit assessment framework, water supply benefits are generated by local projects that either increase local supply or reduce local demand, thereby decreasing the volume of imported water purchased from the Metropolitan Water District. Projects that generate water supply benefits will increase local water supply volume in at least one of the following ways:

- Increase groundwater recharge;
- Increase groundwater recovery;
- Increase conjunctive use;
- Increase water transfers;
- Increase use of recycled water;
- Increase surface water storage capacity;
- Increase surface water capture and treatment; and
- Provide desalination.

In addition, conservation, which decreases demand of imported water, provides benefits in a manner similar to local supply increases.

6.3.2 Water Quality Benefits

The components of water quality benefits are assessed through the same approaches as other environmental amenities, which include revealed preferences, stated preferences, and avoided cost approaches. The following is a list of use-based benefit types that may be generated by a water quality improvement project:

- Avoided purchase of imported water;
- Avoided water treatment costs;
- Avoided sediment removal costs:
- Avoided damages:
- Avoided health risks:
- Increased recreational use;
- Improved recreational experience;
- Increased aesthetic value of water and related habitat; and
- Increased property values.

6.3.3 Benefits of Other Beneficial Uses

Numerous types of benefits, other than those directly related to water supply and water quality, may be generated by a water resources project. These benefit types, often referred to as beneficial uses, may be ancillary to the primary purpose of a water resources project, such as bird habitat related benefits that might result from construction of a treatment wetland. Although ancillary, the benefits from beneficial uses other than primary project purposes may be instrumental in the formulation of a water resources plan that provides the greatest economic benefit, which includes both ancillary and primary purpose benefits.

The benefits of other beneficial uses may be categorized in various ways however, for the purpose of this benefits assessment framework other beneficial use benefits are categorized according to the services provided by the beneficial use. Categorization and calculation of benefits according to services provided is consistent with the valuation of ecological services (Boyd and Banzhalf, 2006) and allows for identification and calculation of separable components of total benefits, which may be added to water supply and water quality benefits calculated elsewhere.

The benefit assessment framework will allow the Leadership Committee to present in the Final Plan, an evaluation of the impacts and benefits of Plan implementation, identify the advantages of the regional plan, and the added benefits of the regional plan as opposed to individual local efforts, identify interregional benefits and impacts, evaluate the impacts and benefits to environmental justice or disadvantaged communities, and evaluate impacts/benefits to other resources such as air quality or energy.

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7. IMPLEMENTATION

7.1 Framework for Implementation

The Final IRWMP will establish a framework for integrated water resource management; however, as noted below, no single entity exists to implement the Plan. Thus, the long-term achievement of the objectives identified in the Plan will rely upon the continued oversight of the RWMG, the continued fiscal oversight of the LACFCD (as fiscal agent for current and future state funds), and the individual actions of various agencies and jurisdictions to implement the projects and programs identified in the Final Plan. As the objectives and planning targets identified in the IRWMP are derived from various existing local plans, including water supply, water quality, resource management, and watershed plans, the ongoing implementation of those plans by the relevant jurisdictions will assist in the long-term implementation of the IRWMP.

7.1.1 Relationship to Local Planning

The IRWMP has been developed from and is consistent with local planning efforts in the region, as discussed below.

- **General Plans.** The General Plans of the Counties and Cities that comprise the Region reflect local planning needs and issues. General Plans express the goals, actions and policies in a number of areas, including land use and water management. The General Plan of Los Angeles County (which covers the majority of the Region) specifically calls for a number of policies directly related to IRWMP goals and objectives such as water conservation; wastewater recovery and reuse; avoidance and mitigation of pollution threats to the ocean, drainage ways, lakes and groundwater reserves. General Plans of the cities echo similar themes of ensuring reliable water supply, maintaining open space and recreational opportunities in the dense urban areas. Representative language taken directly from a representative sampling of City General Plans and their relationship to IRWMP programs is shown in Table 7-1. Each of the goals, policies, programs or actions shown is addressed within the associated IRWMP program.
- **Regional Water Quality Control Board Basin Plan.** The IRWMP implements key strategies of the LARWQCB Basin Plan for achieving water quality goals for the Region. The control of NPS Pollution throughout the Region, and restoring water quality of the Santa Monica Bay, are particular aspects of the Basin Plan that are addressed by the IRWMP. A number of recommended actions were provided to achieve this such as coordinating NPS water pollution management on a watershed basis; implement control measures for pollutants associated with storm water/urban runoff; and controlling pathogens in the surfzone to ensure safety of swimmers. The Urban Runoff and Stormwater Water Quality Improvement Program directly addresses many of these issues.

Table 7-1. General Plans Relationship to IRWMP Programs	
IRWMP Programs	Goals, Policies, Programs and Actions expressed in General Plans
Imported Water Reduction and Supply Reliability	-Promote conservation of water resources -Promote the use of water conservation devices -Encourage the use of reclaimed water -Work with the West Basin Municipal Water District to ensure completion of the recycled water facility infrastructure
Urban Runoff and Stormwater Quality Improvements	-Reduce contaminant levels at beaches and oceans -Preserve existing naturally vegetated areas [for stormwater infiltration] -Incorporate stormwater runoff systems into site design -Utilize street wells, landscaped parkways, medians, islands and other elements of streetscape to minimize, capture and reuse stormwater runoff -Control surface runoff and associated pollutant loads into coastal waters, wetlands and riparian areas -Comply with laws prohibiting discharge of contaminants into the bays, and their tributaries -Protect Areas of Special Biological Significance (ASBS) against damage from excessive grading, stream pollution, and sewage outfalls
Flood Protection Maintenance & Improvement	-Minimize potential adverse effects from flooding -Maximize the amount of pervious surfaces to absorb stormwater and decrease runoff
Watershed-Friendly Recreation and Open Space Creation	-Uncovered open spaces should be encouraged to maximize opportunity for percolation of precipitation or imported water -Develop potential of existing open space resources represented by school playgrounds, flood control facilities, Edison right-of-ways, and City owned watersheds -Promote development of low-intensity, natural parks in City watershed areas with hiking, cycling, and equestrian trails -Provide target ratio of 3 acres of open space per thousand people -Provide a recreational resource within ½ mile of each resident
Natural Habitat Conservation and Restoration	-Restore Arroyo Seco streambanks -Connect habitat areas with larger expanses of open space -Protect stream bed gravel conditions in streams supporting steelhead trout -Establish setbacks from riparian corridors to protect wildlife habitats -Reclaim and preserve the natural state of Malibu Lagoon -Discourage plant species that are invasive where such species would degrade native plant communities

Source: General Plans of the Cities of Carson, Downey, El Monte (Being Updated), Glendale, Los Angeles, Malibu, Pasadena.

- **Involvement of Land Use Decision Makers.** Another important consideration is Land Use and its impact on the water management strategies utilized in the IRWMP. In the Region, land use decisions will impact projected population growth and the associated water demand. In addition, stormwater capture and flood mitigation projects will require decisions on land use. The Land Use decision makers in the Region are primarily the cities and Los Angeles County. In public areas, the National Park Service, California State Parks and the U.S. Army Corps of Engineers have decision making responsibilities. All of these decision makers are involved in the IRWMP through the stakeholder process as ex-oficio members of the Leadership Committee, members of sub-regional Steering Committees, or participants at stakeholder workshops.
- **Dynamics between IRWMP and Local Planning.** The stakeholder process allows for interactive feedback to occur between local planning and regional IRWMP planning. Local planning is conducted by cities and municipal agencies. Most of the cities in the Region are represented either directly, or through the participation of a Council of Governments (COG) representative. There are four COGs (Gateway Cities, Westside Cities, San Gabriel Valley Cities South Bay Cities) representing 78 cities, that have been active in the IRWMP process. Through the stakeholder workshops, the cities, COGs and municipal

agencies advocated for their respective local planning needs and issues, which have been incorporated into the IRWMP. Subsequently, the outcomes from the IRWM planning process have been disseminated by the representatives back to their local governments and planning agencies, allowing the IRWMP priorities and plans to be factored into local planning. For example, the Cities of Torrance and El Monte are updating their general plans in 2006, and the IRWMP will be used to inform and shape that process in areas related to water management.

7.1.2 Relationship of Other Planning Documents to IRWMP Objectives

There are a large number of other water management planning documents that have been developed in the Region. These documents are being used to help guide the IRWMP process. In addition, many planning documents are sources of specific projects and programs that can be incorporated into the IRWMP implementation plan. A general discussion of how planning documents are being used to develop each IRWMP objective is provided below.

- **Reduce dependence on imported water, optimize use of local resources, and enhance water supply reliability.** The quantity of supply necessary to meet future population growth and land use (forecasted in General Plans) is documented in the UWMPs of the Region. UWMPs describe future water supply projects as well as conservation measures. The IRWMP includes a number of projects described in the UWMPs, including large landscape water conservation projects. The implementation of projects to improve local water supplies and projects and programs to reduce water demand will depend on the actions of the wholesale and retail water agencies and districts that serve the Region. Some of these projects and programs are identified in the current UWMPs prepared by public water agencies, which describe planned water supply improvements and water reliability enhancements over a 20-year planning horizon. Specific projects and programs are typically identified in the capital improvement programs and operating budgets of the individual water agencies and districts. The use of recycled water is recognized in a number of local planning documents. As the production of recycled water is primarily the responsibility of wastewater treatment agencies, the expanded reuse or infiltration of recycled water will primarily occur via the implementation of individual projects and programs of those agencies. In addition, there are a number of recycled water master plans that have been developed by local agencies. The IRWMP implements a number of these projects. To the extent that the use of recycled water offsets the need for potable water supplies, then cooperative projects between water agencies and recycled water producers may result. Involvement of key regulators, including DHS and LARWQCB, is critical to ensuring these efforts are productive.
- **Improve the quality of urban runoff and stormwater.** There are a number of local planning documents that have informed IRWMP efforts in this area. TMDL implementation plans are developed to meet EPA Clean Water Act requirements. The Implementation Plans are developed at a local level and identify responsible agencies. Watershed master plans have been developed to resolve a number of issues in a holistic fashion. These plans contain many components related to stormwater management. The development of projects and programs to reduce, capture, infiltrate, and/or treat stormwater runoff is the responsibility of NPDES permit holders (and co-permittees), which include the counties, the cities, and point source dischargers. Projects and programs to reduce the presence of trash, bacteria, nutrients, metals, and toxic pollutants will be identified in TMDL implementation plans prepared by the relevant jurisdictions for the affected water bodies, and the plans and programs developed by individual permittees.
- **Maintain and enhance flood protection.** The Sun Valley Watershed has experienced the most significant local flooding issues. The Sun Valley Watershed Management plan has been developed to specifically address flooding as well as stormwater treatment benefits. LACFCD and Orange County Flood Control District, and the cities are responsible for the operation, repair, and replacement of the flood management infrastructure. Results of years of channel and underground inspections and safety concerns have prompted agencies to monitor and perform immediate repairs to several channels and drains with walls

that have been leaning progressively, inverts with extreme cracking, failed underground reinforced concrete pipe, failed subdrainage systems, and structural joints that have failed or are continuing to fail. This objective addresses the need for a systematic repair and replacement of this aging infrastructure.

- **Conserve and restore native habitat.** The goal to restore riparian habitat is contained in a number of local watershed management plans. Individual projects and programs to achieve this goal will be the responsibility of local jurisdictions in those areas in which restoration occurs, including those responsible for management of parks and open space (e.g., State land conservancies, including the Santa Monica Mountains Conservancy, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, and the Baldwin Hills Conservancy, California State Parks, the County of Los Angeles, and city parks departments in some locations), resource management agencies (e.g., the U.S. Fish and Wildlife Service, US Forest Service, and the California Department of Fish and Game), land use agencies (e.g., the County of Los Angeles and cities in some locations), the local wastewater treatment entity (to the extent that wastewater discharge effects streams subject to restoration), and NDPES permit holders (where stormwater discharge effects water quality in stream subject to restoration). Thus, the plans, work programs, and capital improvement programs of those agencies and entities will include the specific projects and programs that implement this goal.
- **Increase watershed-friendly recreation and accessible open space for all communities.** Creating open space and recreational opportunities has been identified as a priority by planning agencies throughout the Region. Responsibility for the expansion of parkland and open space rests with numerous jurisdictions, including the park and recreation departments of the cities and counties in the Region, the Open Space District of the County of Los Angeles, the California Department of Parks, State land conservancies (e.g., Santa Monica Mountains Conservancy, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, and the Baldwin Hills Conservancy), and the National Park Service. In addition, various private entities, such as land conservancies and trusts and park support groups have opportunities to promote and create additional parkland and open spaces. Many of these agencies and groups have existing plans to create new parks and preserve open space. In addition, most local watershed plans identify opportunities to expand parks and open space.
- **Promote the application of watershed approaches to resource management issues.** This objective encourages watershed approaches as a means to accomplish many of the other IRWMP objectives listed above in a holistic manner. Certain water supply, water quality, flood management, open space and natural habitat issues can often be can be addressed most effectively when considered within a watershed context. Watershed planning typically includes participation from a group of stakeholders so watershed planning documents have a great deal of support and consensus at the local level. Many projects within watershed plans are multi-objective in nature and can simultaneously work towards accomplishing many of the IRWMP objectives.

7.1.3 Implementation of Local Plans

Implementation of the IRWMP will address many of the expressly recommended actions, policies and goals found in the planning documents of the region. By doing so, it plays a crucial role of placing these plans into a regional context, while preserving the outcomes of the individual planning efforts. Most of the implementation projects come directly from local plan documents. Altogether, the projects included in this IRWMP directly implement elements of 34 local plans as shown in Table 7-2. These include 8 General Plans, 10 UWMPs, 5 Watershed Master Plans, 2 TMDLs, 2 TMDL Implementation Plans, 3 River/Creek Master Plans and 2 Water Recycling Master Plans, a Greenway Master Plan and a Master Facilities Plan. The IRWMP also has a significant number of projects that implement the LARWQCB Basin Plan.

Table 7-2. Local Plans Implementation	
Local Plan	# of Projects Included in IRWMP that Implement the Local Plan
Ballona Creek Watershed Master Plan	5
Central Basin MWD UWMP	3
Central Basin MWD Recycling Program Master Plan	1
City of Calabasas General Plan	3
City of El Monte General Plan	1
City of Lomita General Plan	2
City of Los Angeles General Plan	5
City of Long Beach UWMP	1
City of Malibu General Plan	3
City of Santa Monica Sustainable City Plan	2
City of Rancho Palos Verdes General Plan	1
City of Rolling Hills Estates General Plan	1
City of Torrance General Plan	2
City of Torrance UWMP	2
Compton Creek Watershed Management Plan	1
Dominguez Watershed Management Master Plan	3
Joint Outfall System 2010 Master Facilities Plan EIR	1
Las Virgenes, McCoy and Dry Canyon Creek Master Plan for Restoration	3
Las Virgenes MWD and Triunfo Sanitation District Joint Venture Recycled Water System Master Plan	1
Las Virgenes MWD UWMP	3
Los Angeles Harbor Bacteria TMDL	1
Los Angeles Regional Water Quality Control Board Basin Plan	30
Los Angeles River Master Plan	4
Los Angeles River Trash TMDL	1
MWD Regional UWMP	1
Pacoima Wash Greenway Master Plan	1
Rio Hondo Watershed Master Plan	1
San Gabriel River Corridor Master Plan	3
Santa Monica Bay Beaches JG 1-4 Wet Weather Bacteria TMDL Implementation Plan	4
Santa Monica Bay Beaches JG 2-3 Wet Weather Bacteria TMDL Implementation Plan	7
Sun Valley Watershed Master Plan	3
USGVWD UWMP	1
Three Valleys MWD UWMP	1
Triunfo Sanitation District/Oak Park Water Service UWMP	1
Waterworks District No. 29 UWMP	1
West Basin MWD UWMP	3

7.2 Institutional Structure

With a region that includes portions of four counties, 92 cities, dozens of water agencies and districts, and numerous special districts, resource management agencies and stakeholder organizations, no single entity will have responsibility for implementation of a plan with a planning horizon of 20 years. A successful implementation of the IRWMP will require maintaining some form of the current institutional structure once the IRWMP is finalized and adopted. As noted above, various local plans will implement projects and programs which assist in meeting the IRWMP objectives.

7.2.1 IRWMP Implementation

The RWMG as currently structured will continue to provide oversight of the process, review results of monitoring programs, prepare plan updates as appropriate, and convene stakeholder processes to revise Plan objectives or modify project priorities in response to the results of monitoring programs.

The LACFCD has assumed responsibility as fiscal agent for the planning grant funds for the Region. To the extent that future state funding is available to support project implementation, the LACFCD would continue to serve as fiscal agent for the administration of those funds, although it will not be responsible for the development, operation and maintenance of specific projects, except for those projects within their jurisdiction as a flood management agency.

TMDLs such as the bacteria TMDLs for Santa Monica Bay Beaches and the metals TMDL for the Los Angeles River require the formation of jurisdictional groups, generally based on watershed boundaries (or stream reaches) to develop monitoring and implementation plans for TMDL compliance. The development of these jurisdictional groups will likely result in collaborative projects and programs to implement the actions identified in the relevant TMDL implementation plans. Because of the cross-jurisdictional nature of these projects and programs, some form of governance structure may be useful to facilitate implementation of these projects and programs. As the IRWMP implements many projects related to TMDLs, the Final Plan will address the potential for such structures for implementation of multi-purpose projects and programs.

7.2.2 Potential Challenges to Implementation

Potential challenges to implementation and mechanisms to overcome these challenges include:

- **Lack of Sustained Effort.** Continued development and effective implementation of the IRWMP will require efforts by regional entities to continue participating to keep the RWMG structure intact. Although specific agencies and organizations have served as representatives to the RWMG during the initial development of the IRWMP, representatives are intended to rotate with time.
- **Conflicting interests between stakeholders.** While the IRWMP development process has brought dozens of parties together, conflicts and differences will remain. The RWMG has sought to provide leadership to create a respected body that, in turn will provide a forum for stakeholders to resolve differences.
- **Limited funding.** Funding to implement the necessary projects and programs to meet the IRWMP objectives will be an ongoing challenge. However, a primary purpose of the IRWMP is to identify funding needs and sources in a programmatic manner so as to reduce funding uncertainties.
- **Changing regional priorities.** As regional priorities potentially shift over time, the IRWMP will need to be adjusted accordingly such that it remains relevant as a planning and implementation tool. Procedures for regularly updating and revising the IRWMP are described in Section 7.9 to help ensure that regional priorities continue to effectively guide plan implementation.

7.2.3 Technical Feasibility

The priority projects identified for implementation in the IRWMP are all supported through technical studies and reports that document their ability to meet the intended objectives. The technical support for these projects and related project concepts is summarized by water management program category below.

- **Imported Water Reduction and Supply Reliability.** The projects selected to implement this program include water conservation projects, a desalter project and a recycled water ultraviolet (UV) disinfection project. Water conservation projects include the use of irrigation controllers, which utilize a computer that accounts for a series of factors such as evapotranspiration rates, temperature, wind direction and speed, plant species to deliver the right amount of water. The technical feasibility of desalting projects has been well established and efficiency is increasing due to improvements in membrane technology. The recycled water disinfection project utilizes a dual barrier free chlorine UV system which is a well documented practice for producing tertiary water for reuse while avoiding formation of nitrosodimethylamine (NDMA).
- **Urban Runoff and Stormwater Quality Improvement.** This program will be implemented by a series of runoff reduction, capture and infiltration projects, as well as non-structural programs. A key element for success of the program is optimal project site selection to ensure high levels of capture and pollutant reduction. TMDLs and TMDL Implementation Plans provided analysis of target pollutant sources and identified high impact areas that have been targeted by IRWMP projects. The effectiveness and optimal design of structural BMPs employed in these projects have been optimized through previous experience and are well documented through a number of documents.
- **Flood Protection Maintenance and Improvement.** Flood control improvement will not involve the construction of large scale facilities. Watershed plans based on hydrologic analysis and the rational method provide the support for determining placement of measures such as detention ponds and infiltration basins.
- **Watershed-Friendly Recreation and Open Space Creation.** Resource Conservation Districts, the National Park Service, California State Parks and local park agencies have developed a number of documents that identify potential opportunities for preserving existing open space and creating additional open space and recreation. These documents also contain information that assist in determining planning criteria such as appropriate density as well as how to allow access while minimizing the negative impacts of human activity on the natural environment.
- **Natural Habitat Conservation and Restoration.** This program includes stream restoration, steelhead habitat restoration, exotics removal and wetlands restoration. Stream restoration projects are supported through a number of studies that documents proven hydromodification techniques. Steelhead habitat restoration is supported by biological studies and established steelhead habitat criteria as documented by studies such as the Fish Migration Barrier Severity and Steelhead Habitat Quality in the Malibu Creek Watershed. Projects involving removal of exotic species use techniques developed from previous experience. These involve methods for removal on slopes, level ground as well as the best post removal strategies.

Table 7-3 provides a summary of some representative technical documents in the form of analyses, studies and plans that have been used to develop the IRWMP.

Table 7-3. Documents supporting technical feasibility		
Program	Document	Technical Support
Imported Water Reduction and Supply Reliability	Hydrological Analysis and Evaluation of the Pump Station and Outlet Weir for the JWPCP Marshland Enhancement Project (Noble, July 2004)	Assists in the design of the marsh and to develop an operational plan for the marsh.
	Montebello Loop Pipeline Alignment Study (Tetra Tech, Inc., April 2003)	Provides a comprehensive analysis of the alignment and construction for the segment of pipeline connecting Central Basin's existing easterly most and westerly most distribution system.
	The Residential Runoff Reduction Study (MWDOC & IRWD, July 2004)	Provides scientific and technical merit to the water savings and runoff reduction attributed to WBICs.
	Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse (NWRI and AWWARF Guidelines, May 2003)	Provides guidelines developed by UV experts that formulate minimum design requirements for UV disinfection and currently adopted by California DHS. Specifically discusses UV for water reuse and testing protocols.
	Westpark Study (IRWD, MWDOC, and MWD, 2001)	Presents a small-scale study of Weather-Based Irrigation Controllers.
Urban Runoff and Stormwater Quality Improvement	Assessment of Best Management Practice (BMP) Effectiveness (Brown et al, September 2005)	Provides an evaluation of BMP effectiveness
	Malibu Wetland Feasibility Study (Malibu Land Conservancy, 2000)	Assesses the feasibility of restoring a wetland in the Malibu Civic Center at the Chili Cook-off site to treat runoff before entering Malibu Lagoon.
	Total Maximum Daily Load for Nutrients, Malibu Creek watershed. (United States Environmental Protection Agency, 2002)	Identifies irrigation runoff from developed lands as the largest annual non-point source of nutrients in the watershed (Fig. A11) and that reducing this source is necessary to meet the TMDL bacteria and nutrient targets.
Flood Protection Maintenance and Improvement	Los Angeles and San Gabriel Rivers Watershed Feasibility Study: Preliminary Draft Feasibility Report (USACE, LADPW, 2001)	Characterizes watershed through GIS data mapping, narrative and tables. The report used GIS modeling to create project selection criteria
	Pacoima Wash: 8th Street Park Project, Conceptual Hydrologic Layout (Martin Kammerer, January 2006)	Provides a hydrologic study of 8th Street Site.
Watershed-Friendly Recreation and Open Space Creation	Common Ground: From the Mountains to the Sea: San Gabriel and Los Angeles Rivers Watershed and Open Space Plan (RMC and SMMC, 2001)	Sets forth a detailed list of guiding principles for land and water planning. The plan provides general characteristics of the watersheds and includes general project selection criteria. Trails, habitat linkages, open space and preservation opportunities are identified.
	South Los Angeles Wetlands Park Concept Feasibility Report (City of Los Angeles CH2M HILL, April 2003)	Analyzes the feasibility of the South Los Angeles Wetlands Park Concept.
	Watershed Management Plan for the San Gabriel River above Whittier Narrows (CDM, 2005)	Provides recommendations and policy measures to result in multiple beneficial uses for communities and wildlife by addressing the multiple areas.
Natural Habitat Conservation and Restoration	Fish Migration Barrier Severity and Steelhead Habitat Quality in the Malibu Creek Watershed (Heal the Bay, 2005)	Ranks the severity of steelhead trout migration barriers that block potential spawning and rearing habitat in the Malibu Creek Watershed
	Preliminary Design and Feasibility Analysis for Stream Restoration, Las Virgenes Creek , Calabasas, California (Questa Engineering Corporation, 2004)	This study investigated the existing stream conditions to develop and evaluate restoration alternatives for the project.

Table 7-3. Documents supporting technical feasibility		
Program	Document	Technical Support
	Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas (Mandy Tu, Callie Hurd, John M. Randall, 2001)	Describes an integrated pest management approach and reviews available control methods with pros and cons of each. We use this information to select control methods and design our overall site plan.

7.3 Agency Coordination

The involvement of federal agencies such as the National Park Service and the U.S. Army Corps of Engineers will be critical during the implementation phase. Examples are provided below:

- Federal agencies such as the National Park Service own a great deal of land which can impact the North Santa Monica Bay watersheds. The National Forest Service manages large portions of the Upper San Gabriel and Los Angeles Watersheds.
- The Angeles National Forest is located upstream of the San Gabriel River watershed and has experienced problems with sedimentation. To address this problem the Upper San Gabriel Valley MWD is partnering with the USDA Forest Service to replant forests that have been denuded by wildfires.
- The U.S. Army Corps of Engineers is a necessary partner in any dam related activities, such as the removal of Ridge Dam in the North Santa Monica Bay Watersheds. It also is important in conducting feasibility studies such as the Arroyo Seco Watershed, and could play a role in future funding opportunities related to ecosystem restoration along the rivers and major flood control channels.

Similar examples apply to state agencies involvement:

- The California Coastal Conservancy (CCC) plays an important role in projects near the coast. The Solstice Creek Southern Steelhead Habitat Restoration Project involves a cooperative agreement with the CCC.
- California State Parks is already an active stakeholder. Its participation is critical as many potential habitat projects may take place on state parks land. As an active project proponent, it can assist the IRWMP effort by communicating the importance of its projects to the public.
- RWQCB representatives are also engaged in the IRWMP process and are involved in parallel efforts to develop TMDLs and the associated TMDL Implementation Plans. By maintaining contact with both TMDL and IRWMP efforts, the RWQCB can identify projects that will meet TMDL requirements while simultaneously meeting other regional needs. By streamlining the process and avoiding duplication of efforts, the RWQCB can make available funds go further.
- Southern California-based staff from the California DWR attends most Leadership Committee and sub-regional Steering Committee meetings to observe the discussion and provide comments and suggestions about potential relationships between local and statewide water resource planning.

7.4 Schedule

The IRWMP will be implemented over the next 20 years through the following:

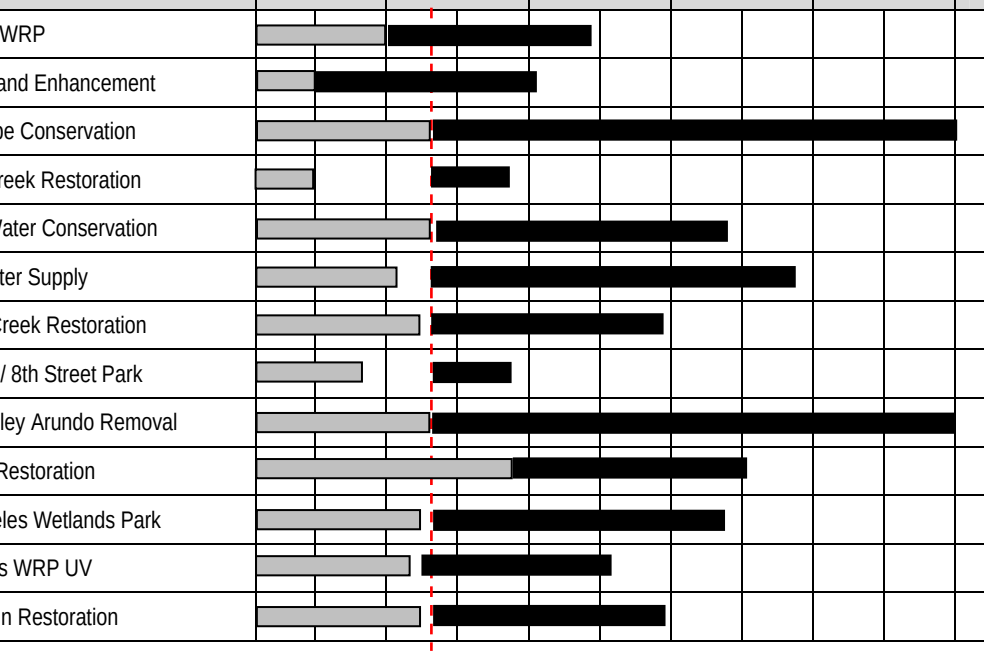
- Projects;
- Non-structural programs;
- Additional studies and planning; and
- Regular updates of the IRWMP.

7.4.1 Projects

The schedule for the priority projects identified in Section 5 is shown in Table 7-4.

Table 7-4. Implementation Grant Step 2 Project Schedules

Project Short Name	2006	2007	2008	2009	2010	Projected Construction Start Date
Central Basin SWRP						Jan 2007
JWPCP Marshland Enhancement						Jul 2006
Large Landscape Conservation						May 2007
Las Virgenes Creek Restoration						May 2007
Malibu Creek Water Conservation						May 2007
Morris Dam Water Supply						May 2007
North Atwater Creek Restoration						May 2007
Pacoima Wash / 8th Street Park						May 2007
San Gabriel Valley Arundo Removal						May 2007
Solstice Creek Restoration						Oct 2007
South Los Angeles Wetlands Park						May 2007
Whittier Narrows WRP UV						Apr 2007
Wilmington Drain Restoration						May 2007



Notes: **Planning/Design Phase**

Construction Phase (May 2007 is the projected effective date of the Grant Agreement)

The remaining projects will be prioritized and a master schedule for implementation will be created for IRMWP projects. The establishment of a priority list will allow projects to be implemented with minimal delay as funds become available for IRWMP projects.

As the IRWMP is further developed during the next six months, additional projects will be identified, prioritized and incorporated into the schedule.

7.4.2 Non-Structural Measures

The next Plan Element consists of non-structural measures and programs. Implementation of these measures will both support and complement constructed projects. These measures include:

- Education;
- Ordinance Changes; and
- Incentive Programs.

Currently these measures are being identified and the schedule for implementing them is being developed.

7.4.3 Ongoing and Future Studies and Plans

Ongoing studies and plans are another plan element that supports the IRWMP. Additional study and planning will be performed on both a regular basis and as-needed basis to inform updates to the plan.

Systematic, or already identified, planning activities that will be utilized include:

- UWMP updates (every 5 years);
- TMDL Implementation Plans (ongoing); and
- General Plan updates (ongoing).

Other studies and planning that will be utilized include:

- Groundwater management plan updates; and
- Master planning documents.

7.4.4 Updating the IRWMP

The IRWMP will be updated at a minimum every 5 years as further study and planning is conducted, projects continue to be developed and objectives and priorities are adjusted. An IRWMP status report will be prepared annually that will summarize new information relevant to the IRWMP. IRWMP updates serves as the final Plan Element. An adaptive management process will used for IRWMP updates and is described in Section 7.9.2.

7.5 Financing

Financial resources needed to implement the IRWMP will come from a variety of funding sources. Table 7-5 below outlines the expected sources of funds.

Obtaining funding for projects is one of the biggest challenges. Funding sources have been identified for the 13 projects being submitted for the Step 2 application. These sources are summarized in Table 7-6. Local funds include funding from agencies such as the SMBRC and the Metropolitan Water District. Other secured funds include non IRWMP state funds. Agencies have accounted for Operations and Maintenance (O&M) costs in their planning and have secured funds to ensure project continuity. O&M funds for the priority projects will be funded from the general O&M accounts of the individual agencies.

Table 7-5. Expected Sources of Funding to Implement IRWMP			
	Source	Expected Contribution	Targeted Beneficiaries
Local	• Customer/user fees • Municipal, countywide and special district assessments	High (>50%)	Region's residents, environment, and economy
State	• Competitive grants • Appropriations • State-wide Assessments	Moderate (10-50%)	Statewide environment and economy
Federal	• Appropriations • Competitive Grants	Moderate (10-50%)	Areas of national environmental or economic significance
Others	• Individual and corporate donors • Foundations and other non-profit organizations	Low (<10%)	Particular communities or targeted interests in the Region

Table 7-6. Expected Sources of Funding to Implement IRWMP						
Project Short Name	Total Budget	Local	Other Secured	Federal	Grant Requested	Annual O & M Costs
Central Basin SWRP	$54,676,000	$51,146,000	-	$0	$3,530,000	$1,750,000
JWPCP Marshland Enhancement	$2,637,065	$2,237,065	-	$0	$400,000	$150,000
Large Landscape Conservation	$5,291,360	$3,191,360	-	$0	$2,100,000	$702,000
Las Virgenes Creek Restoration	$1,063,090	$33,490	$514,600	$0	$515,000	$43,500
Malibu Creek Water Conservation	$883,600	$457,600	-	$0	$426,000	$117,000
Morris Dam Water Supply	$13,258,175	$8,122,541	-	$0	$5,135,634	$243,600
North Atwater Creek Restoration	$5,600,000	$3,350,000	$0	$0	$2,250,000	$200,000
Pacoima Wash / 8th Street Park	$1,328,650	$435,150	$306,500	$0	$587,000	$80,000
San Gabriel Valley Arundo Removal	$198,000	$20,000	-	$0	$178,000	$0
Solstice Creek Restoration	$235,733	$157,367	-	$0	$78,366	$210,000
South Los Angeles Wetlands Park	$11,820,000	$8,520,000	-	$0	$3,300,000	$210,000
Whittier Narrows WRP UV	$7,741,960	$5,741,960	-	$0	$2,000,000	$445,000
Wilmington Drain Restoration	$12,030,000	$7,530,000	-	$0	$4,500,000	$200,000

7.6 CEQA Compliance

This IRWMP is a feasibility or planning study which identifies possible future actions the members of the RWMG have approved, adopted, or funded. Potential environmental factors that might occur from implementation of the Plan are identified in Section 6.2 (Benefits, Costs and Impacts). Therefore, consistent

with Section 21083 of the Public Resources Code, this IRWMP is statutorily exempt from the California Environmental Quality Act.

Any agency decision to implement any project or program identified herein would be subject to CEQA compliance at such time as such agency commits to fund or implement the project.

7.7 Data Management

The collection, management, and dissemination of data (e.g., information gathered from studies, sampling events, or projects) are an essential element to creating a sustainable integrated plan. Information needs to be available to regional leaders, stakeholders, and the public to facilitate effective planning and decision-making. A comprehensive data management approach will help to quickly identify data gaps, detect and avoid duplicate data collection efforts, support statewide data needs, and integrate with other regional and statewide programs.

As part of this IRWMP, the data management strategies described below will be applied to coordinate data collection between implementation projects, leverage existing data available from ongoing statewide and regional programs, and provide timely data to stakeholders and the public, and consolidate information to be used in other state programs. These strategies are explained in more detail below.

7.7.1 Management and Dissemination of Data

Dissemination of data to stakeholders, agencies, and the general public is integrated into the IRWMP process to ensure overall success. This process is shown in Figure 7-1. Stakeholder workshops serve as the basis for the dissemination of information. Workshops are held within each of the five sub regions and one for the entire region to communicate progress and solicit information from stakeholders. A Leadership Committee and five sub-regional Steering Committees have been created to make important decisions. Data collected or produced as part of the IRWMP will be presented and disseminated during these workshops.

A public website has been created to store data and information about the IRWMP process so that the public can find information about public meeting dates, agendas, and notes. The website provides information on the IRWMP process and posts annual reports and relevant documents that can be downloaded. Data collected during the IRWMP process will be available on the website as well. The website will also provide links to other existing monitoring programs to promote data between these programs and the IRWMP. This will provide a means to identify data gaps (e.g., information needed to provide a more complete assessment of the status of a specific issue or program) and to ensure that monitoring efforts are not duplicated between programs.

During the call for projects, the project website will provide a mechanism for stakeholders to upload project information regarding water supply, water quality, and other benefits of the project, which will be collected in a database to manage, store, and disseminate information to the public. A data collection template will be available on the website so that data collected during the IRWMP can be stored and managed in a consistent format. This template will be compatible with those used in the statewide Groundwater Ambient Monitoring and Assessment (GAMA) and Surface Water Ambient Monitoring Program (SWAMP) programs to assist in the sharing and integration of data with these programs.

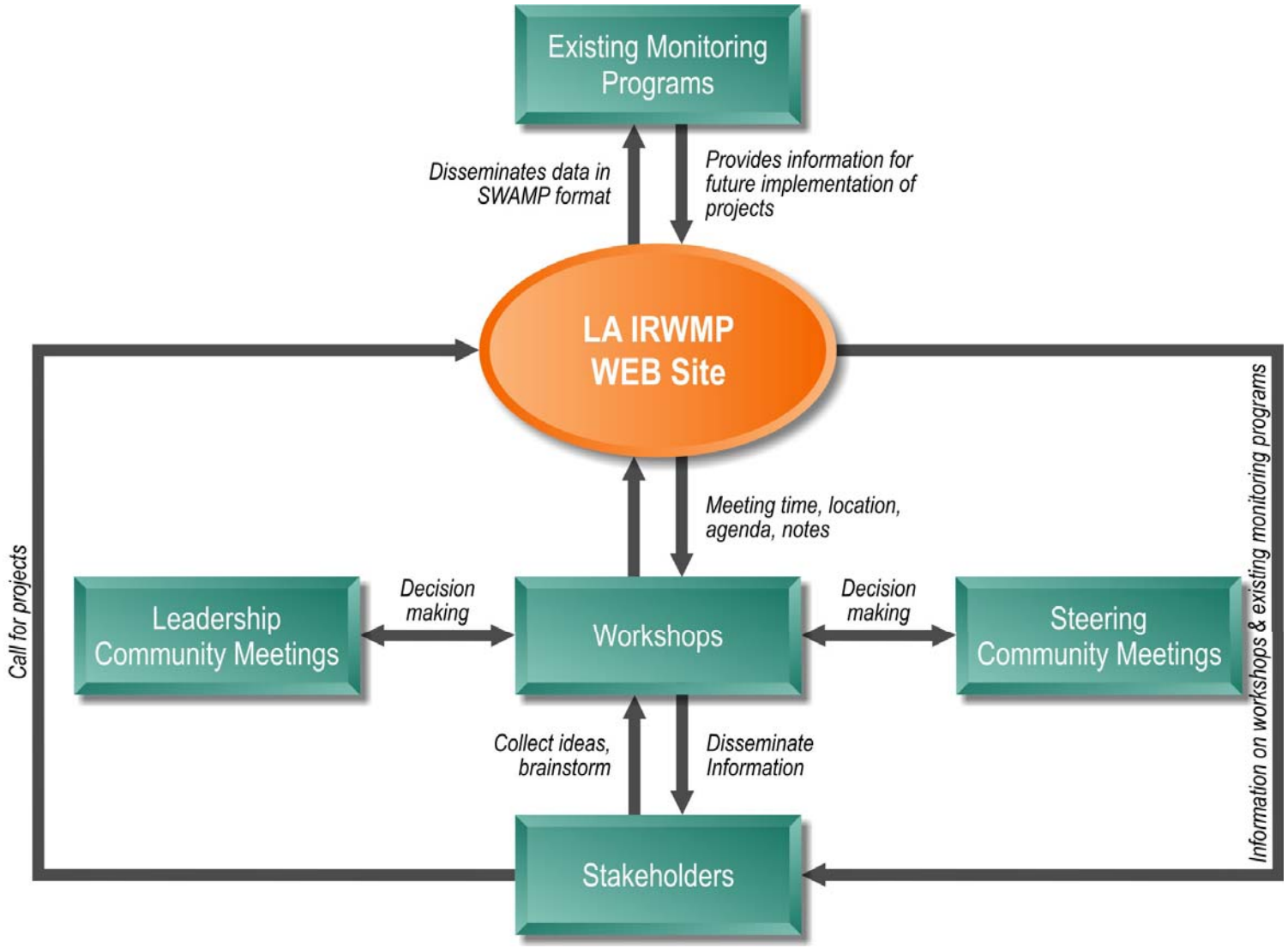


Figure 7-1. Data Management Process Flow Diagram

7.7.2 Statewide Data Needs and Gaps

Data sets and reports will be reviewed for their applicability to the Region and Statewide data needs. This knowledge will provide information necessary to identify data gaps. Data gaps will represent information crucial to a greater understanding of the Region and help develop context for future projects. The IRWMP can identify multi-objective projects that integrate appropriate management strategies to meet the statewide water supply, water quality, and beneficial use needs.

The IRWMP process will also collect non-traditional data (i.e., summarizing the effectiveness of water conservation programs throughout the Region) in a comprehensive way, and that can be a powerful contribution to statewide water management efforts. Comprehensive data collection and measurement of these efforts will provide leadership and guidance to growing metropolitan areas throughout California.

7.7.3 Existing Monitoring Efforts

Surface Water Quality. Numerous federal, state, municipal, local and community agencies and organizations have been conducting monitoring of surface water quality in the Region for years. The information gathered in Table 7-7 identifies a few of the numerous monitoring efforts and programs occurring. In general, these efforts and programs supply data to support the implementation of statewide programs such as TMDL development and implementation and Clean Water Act 303(d) listing of impaired water bodies. Data review will also include assessment of duplicate data collection efforts in the watershed to identify opportunities for partnership and reduced costs.

Table 7-7. Recent Surface Water Quality Monitoring Programs

Lead Agency/Program	General Overview
Friends of the LA River RiverWatch (319(h) grant program)	A (319(h) grant program monitoring the quality of water at 60 sites along the full length of the Los Angeles River on a monthly basis, surveying the river's biota in natural bottomed areas and tracking seasonal changes in the river and related habitat. FoLAR publishes a State of the River Report and intends to develop a successful and long-term volunteer river monitoring program.
RWQCB SWAMP	The RWQCB conducted SWAMP monitoring of the watershed in FY 03/04.
Regional Water Quality Control Board State of the Watershed Report	Issued a State of the Watershed Report/Water Quality Characterization Report draft on April 18, 1998 for coordinating permit renewals and regional monitoring program development including a further summary of existing monitoring programs in the Watershed.
San Gabriel River Regional Monitoring Program Work Group (including many county, regional, and local agencies, municipalities, and advisory organizations)	The Work Group has developed a regional monitoring program for the San Gabriel River watershed and is now working on implementation. The monitoring program integrates with existing monitoring efforts. The monitoring approach includes use of random sites in order to assess overall watershed health as well as directed sites at high habitat value areas and at the base of sub-watersheds. Extensive monitoring data are available as part of NPDES Monitoring and Reporting Programs.
Port of Los Angeles Consolidated Slip Restoration Project Draft Plan	A Consolidated Slip Restoration Project draft plan by the Port of Los Angeles described the extent of sediment contamination in Consolidated Slip and the site's history, identified data gaps, called for additional sediment sampling to characterize the area extent and vertical depth of Consolidated Slip contamination.
Santa Monica Bay Restoration Commission (SMBRC)	Developing new sources and loading monitoring design for point and NPS ocean discharges from the Santa Monica Bay Watershed.
Los Angeles Basin Contaminated Sediment Task Force	Conducting a study to identify sources of heavy metals loadings within the Ballona Creek Watershed. Study results could support the develop a TMDL for selected heavy metals.

Table 7-7. Recent Surface Water Quality Monitoring Programs

Lead Agency/Program	General Overview
U.S. Army Corps of Engineers	The U.S. Army Corps of Engineers has worked with UCLA to collect stormwater samples in Ballona Creek to calculate relative contributions of pollutant loadings from each tributary and major land use types.
Southern California Coastal Water Research Project (SCCWRP)	SCCWRP also has on-going efforts to investigate the loading and impacts of stormwater runoff throughout the Region, including creeks in the Santa Monica Mountains.
Caltrans	Caltrans conducts monitoring aimed at estimating loadings from highway runoff.
Los Angeles County Department of Public Works (LACDPW)	LACDPW monitors runoff from major watersheds, including some tributaries, during multiple storm events as well as during dry weather in order to comply with its NPDES permit. Samples are taken for physical, chemical and biological analysis; toxicity testing, bioassessment and trash monitoring are also performed. Details of the NPDES monitoring program and prior year's data are found in the annual monitoring reports at www.ladpw.org.
Santa Monica Bay Restoration Project (SMBRP)	Completed a marine resource inventory and habitat mapping (available on CD) for Santa Monica Bay. The objectives of these projects are to produce a detailed inventory of the Bay's habitats and provide necessary baseline for the valuation of the Bay's habitats.
Santa Monica BayKeeper	Volunteer monitoring of storm event sampling at over 30 Bay storm drains.
Resource Conservation District of the Santa Monica Mountains	Volunteer water quality and biological monitoring and surveys of Malibu Lagoon.
Malibu Chapter of the Surfrider Foundation	Volunteer monitoring of the upper Malibu Creek Watershed, and coliform monitoring of the surf zone off the Malibu coast.
Malibu Creek Watershed Advisory Council Malibu Creek Monitoring Program	Volunteer effort to provide baseline data for receiving waters throughout the watershed, coordinate with other monitoring efforts to avoid duplication, and provide data to submit to the Regional Water Quality Control Board to assist in the development of TMDLs. Where possible, this program will be used to satisfy TMDL compliance monitoring requirements.
Topanga Watershed Committee CWA 205(j) project	Volunteer baseline water quality monitoring for the past two years during both dry and wet weather.
Heal the Bay Beach Monitoring	Monitoring of total coliform, fecal coliform, enteroccus, total fecal ratio.
Los Angeles County Department of Public Works (LACDPW) Santa Monica Bay Beaches Bacteria (SMBBB) TMDL monitoring	The TMDL, which has been divided into dry weather and wet weather, each having their own compliance dates and limits, encompasses 27 subwatersheds that cover 44 303(d)-listed beaches from Malibu to Palos Verdes. The Coordinated Shoreline Monitoring Plan (CSMP) provided 67 sampling sites to be monitored on a weekly basis starting in November 2004.
City of Los Angeles Cleaner Rivers through Effective Stakeholder-led TMDLs (CREST)	CREST is a stakeholder effort initiated by the City of Los Angeles to develop TMDLs to restore and protect water quality in the Los Angeles River and Ballona Creek. TMDL strategies must include monitoring as the final step.
Southern California Marine Institute (SCMI)	This strategic alliance of 12 major universities in southern California operates several monitoring programs: CI-CORE Ocean Observatory Program, Citizen Water Quality Monitoring, Demonstration Cruise Monitoring, NOAA's Volunteer Observing Ship (VOS) Program, and Rocky Intertidal Monitoring, Seasonal Bacteria Study.

Drinking Water Quality. Drinking water quality is monitored through the following means:

- **SDWA compliance monitoring and reporting.** All public water systems are required to produce water that complies with the SDWA. To this end, specific monitoring is required and conducted routinely. Results of the monitoring are reported to the California DHS. In addition, monitoring information is required to be published in the annual Consumer Confidence Report (also required by the SDWA).

- **Unregulated Contaminant Monitoring Rule results.** The 1996 SDWA Amendments mandate that EPA publish a list of unregulated contaminants that may pose a potential public health risk in drinking water. This list is called the Contaminant Candidate List (CCL). The initial 1998 accounting listed 60 contaminants. USEPA uses this list to prioritize research and data collection efforts for future rulemaking purposes. The 1996 SDWA amendments incorporated a tiered monitoring approach. The rule required all large public water systems and a nationally representative sample of small public water systems serving less than 10,000 people to monitor the contaminants. The information from the monitoring program for the Region will be compiled and submitted to the State as well as be available on the website.
- **Groundwater contamination.** Metropolitan Water District produces periodic summaries of groundwater contamination in southern California. This report will be forwarded to the State.

Water Supply. Data for water supply quantities will be collected and compiled through various sources. These sources include individual agency UWMPs that are updated every five years, Metropolitan's IRP updates, Metropolitan's IRP Report Card, water supply planning documents and a survey sent to individual agencies. The data will include the amount of single dry-year and multiple dry-year supplies developed to date, projected single dry-year and multiple dry-year demands over a 20-year planning horizon and the gap between the existing supplies and demands. Data for the following supply categories will be compiled:

- Groundwater;
- Groundwater recovery;
- Groundwater production through conjunctive use;
- Local surface water;
- The Los Angeles Aqueduct;
- Recycled water for both direct and indirect use;
- Desalinated water;
- State Project water;
- Colorado River water;
- CVP/SWP storage and transfers;
- Other transfers; and
- Metropolitan surface storage.

All possible supply categories are included to assure that an appropriate figure is derived for future gap analysis. Additionally, the impacts of varying hydrology on demands, the SWP and Colorado River need to be taken into consideration. During dry years, demands are higher than normal and yield from some supply sources are less than average. Thus dry years are used to ensure that gaps in supplies and thus a possible "shortage allocation" does not occur.

7.7.4 Integration into State Programs

Data collected as part of the IRWMP will be integrated into the following major State surface water and groundwater programs.

Surface Water Ambient Monitoring Program (SWAMP). All the surface water data collected as part of the IRWMP will be consistent with SWAMP database comparability guidelines. Data will be collected in a database that is compatible with the SWAMP database and will be exported annually to the state database

using the required data submission formats. Where appropriate IRWMP sampling activities will be performed according to SWAMP quality assurance requirements.

Groundwater Ambient Monitoring and Assessment (GAMA). Groundwater data collection efforts as part of the IRWMP will be coordinated with the needs of the GAMA program so that the data can be shared and integrated into the GAMA database. Field sampling efforts will be coordinated with the GAMA program to eliminate duplicative data collection efforts and fill data gaps. Data will be consistent with GAMA database specifications so that it can be easily submitted, integrated and shared.

California Environmental Resources Evaluation System (CERES). All data and reports will be sent to CERES so that information will be available and useful to a wide variety of users.

7.8 Performance Measures

To measure the performance of the IRWMP and the identified projects and to allow for adjustments where necessary, a set of metrics has been established. Metrics at the IRWMP level were developed based on regional objectives to allow progress of the overall IRWMP to be measured. At the project level, metrics were developed to measure individual project performance based on the established goals of each project. Monitoring programs at both levels are planned to collect performance related data which will be analyzed and compared to the established metrics. Performance data will provide feedback into an adaptive management process that will be used to modify both project operations and the IRWMP implementation plan based on actual results. This section describes the monitoring methods and programs that will be used to collect data and the mechanisms by which this data will drive future improvements to projects and the IRWMP.

Detailed monitoring procedures are established for all projects that will be implemented as part of the IRWMP. These procedures are summarized in Table 7-8 below by program.

Table 7-8. Project Monitoring and Program Performance Measures

IRWMP Program	Project Monitoring	Program Performance
Imported Water Reduction and Supply Reliability	▪ # of water conservation devices provided ▪ Volume of recycled water distributed ▪ Volume of water created or stored	▪ Total volume of total water supply created or conserved
Watershed and Santa Monica Bay Water Quality Improvements	▪ Volume of stormwater captured ▪ Water quality parameter measurements	▪ Total volume of total runoff captured, infiltrated, and/or treated ▪ Observed water quality improvements
Recreational and Open Space Access	▪ Acreage created ▪ # of Trail/Park visitors	▪ Total acreage created
Natural Habitat Conservation and Restoration	▪ Acres restored ▪ Acres maintained ▪ Miles of river restored ▪ Water quality measurements	▪ Miles of habitat created

7.8.1 Imported Water Reduction and Supply Reliability Monitoring

Since the goals of this program involve quantities of supply created, conserved or reused, monitoring will typically involve measuring volumes of water.

Project Monitoring

Quantities of water conservation devices will be tracked as well as the number and attendance of public awareness events.

For recycled water projects, quantities of recycled water distributed will be measured and recorded. This will provide value of how much imported water is being replaced. Examination of user data may provide information that can guide the future expansion of water recycling systems based on areas of high usage. Monitoring of water quality parameters required by the RWQCB will also be performed by the recycled water producer as part of water recycling requirements. This water quality information can be used to determine appropriate further treatment and usage of the recycled water.

For other water supply projects such as desalting and storage capacity, the amount of water created or stored will be measured through flow metering devices and recording of water levels.

Program Performance Measures

To track the progress at a program level, the total actual contributions of all implemented projects will be determined. As an independent evaluation, water use figures from water agencies will be compiled annually to determine if imported water reductions are indeed being realized. These will be obtained from water agency records, California Urban Water Conservation Council (CUWCC) reports, and UWMPs (every 5 years).

7.8.2 Watershed and Santa Monica Bay Water Quality Improvements Monitoring

The metrics for this program have been designed to match the objectives which are described in terms of water quality improvements realized and volumes of urban runoff captured.

Project Monitoring

Flow measurement devices will be installed at key outflow locations for urban and stormwater runoff projects to record amounts of flow captured by the project.

Additionally, for stormwater capture and infiltration projects, water quality will be sampled and analyzed for a variety of constituents, including bacteria (E. Coli,), oil and grease, nutrients (nitrogen and phosphorus compounds), heavy metals, and other compounds that are specific to the areas of concern. This will enable the effectiveness of the BMP to be evaluated and modified. Even though some projects are being implemented as part of a specific TMDL (e.g., bacteria, trash), they often capture a range of pollutants, thus monitoring these pollutants will allow the BMP to be factored into future TMDLs that are developed.

Program Performance Measures

Total quantities of runoff captured by IRWMP projects will also be used as a program metric. Water quality improvements on a regional or sub-regional scale are the true measures of success for this program. The County of Los Angeles maintains a stormwater sampling program. There are many organizations that measure beach water quality and water quality in watersheds throughout the region. The number of beach closures and postings from bacterial contamination will be used as a metric for water quality impacts on the Santa Monica Bay. There are many stakeholder-based volunteer monitoring efforts that also measure water quality. Data from these efforts will be compiled annually and compared against the developed metrics to assess the regional effects of IRWMP water quality projects.

7.8.3 Recreational and Open Space Access

The basic metric for Recreational and Open Space Access will be acres of open space created, particularly in urban areas.

Project Monitoring

The primary metric for open space will be to monitor the acreage created.

Program Performance Measures

The sum of all open space and recreation acreage created will be used to measure program performance on a five year basis when the IRWMP is updated.

7.8.4 Natural Habitat Conservation and Restoration

The objectives of the Natural Habitat Conservation and Restoration program are in terms of acres or linear miles restored and metrics have been developed in these terms.

Project Monitoring

Habitat Restoration/Exotics Removal projects will be measured in acres restored. Exotics removal projects will be monitored for regrowth periodically (e.g., every 3-5 years depending on the sensitivity of the site). Native fish habitat restoration projects will be measured in miles of river restored or transformed to be amenable to native fish species. Water quality monitoring will be used to measure project success in terms of creating suitable habitat for fish migration and reproduction.

The performance of wetlands creation projects will be measured by acres of observed suitable vegetation that is created. Site surveys will be conducted by qualified biologists to document vegetation survival rates and the presence and extent of non-native plants. The site will also be evaluated for proper hydrologic function. Water quality at the entrance(s) and exit(s) to the site will be measured to determine the water treatment effectiveness of the project.

Program Performance Measures

On a program level, one measure of success will be the total acreage and mileage of habitat that is restored and most importantly maintained. Another measure of program success will be the return of native fish, birds or other indicator animals to the targeted rivers and the increased presence of wildlife to restored areas. Performance will be reported on a 5 year basis.

7.8.5 Overall IRWMP Progress Measurement

One method for documenting progress of the IRWMP as a whole will be the preparation of periodic progress report summarizing the projects that were implemented that year as part of the plan and the corresponding program level performance data in terms of regional benefits observed. This will be based on a 2006 reference year so that progressive gains can be measured. Based on the rate of progress towards a specific regional planning target, the project prioritization and types will be altered to produce faster progress in those areas that are desired.

A forward looking report will also be prepared annually that determines the next set of projects that can be implemented based on anticipated funding. By establishing this list of "preferred projects" annually in advance, this will provide a proactive procedure for targeting upcoming funding opportunities.

7.9 Next Steps

This Draft Plan has been prepared to provide a water resources roadmap for the region based on current information, procedures, and implementation strategies. The next steps involve completion and adoption of the IRWMP, and continued IRWMP implementation. This will be an ongoing process of project implementation, evaluation, modification and further implementation.

7.9.1 Completion and Adoption of IRWMP

The IRWMP is on schedule for completion and adoption by January 1, 2007. The results of a regionwide call for projects, ongoing project integration, benefit assessment and implementation refinements will be included in the IRWMP.

7.9.2 Adaptive Management

After the first phase of implementation projects has begun, a process of adaptive management will be used to analyze performance data and guide the modification of projects and future IRWMP implementation.

Project Level Response

The first level of response to performance will be at the project level. Agencies implementing projects have a vested interest in adjusting project operations for maximum benefit and also have familiarity with the technical aspects of the project. Documents that have been identified as the basis for scientific and technical merit for a project will be used to guide the response. Sponsors of similar projects will also be consulted. In addition, working groups will be formed to share information and experience regarding specific types of project issues. If certain projects do not perform as expected, then an alternate project may be designated to replace the underperforming project, if the costs are not prohibitive. This may cause a change in project sequence if the projects in question are addressing higher priority issues. Alternatively, if some projects exceed expectations or capacity, then investigation should be made to see if the project can be expanded. For instance, with stormwater capture projects it may be discovered that pollutant loading is higher than expected or the amount of water exceeds the design capture volume of a BMP. In this case, additional or expanded BMP could be employed to take maximum advantage of the higher volumes. Another response to performance data may be the realization that certain assumptions used to design and/or site the project were incorrect. As an example, TMDL implementation plans often use land use assumptions for initial BMP prioritization and placement. Once BMPs are in place, the data gained on the ground can be used to refine site selection. For instance, if a certain area is demonstrated to possess higher than assumed pollutant loads, then this information will also be fed back into the BMP prioritization database to allow updated models to be completed and new projects identified.

Programmatic Response

At the program level the regional targets are not being met, then the composition of a particular program will be analyzed to determine if a more optimal mix of project types and/or water management strategies would offer an improved chance for success.

Institutional Response

Finally, if both project level and programmatic responses do not lead to satisfactory results, then a change in institutional structure may be appropriate. This could involve identifying and bringing on board "missing" players whose participation would be critical for success. Changes to the stakeholder process could be explored to bring new ideas. Finally, a change in RWMG structure or decision making process could also be considered to bring a fresh approach.

7.9.3 IRWMP Responsiveness

The RWMG provides the forum for future decision making and will allow the IRWMP to be adjusted to account for regional changes. To facilitate response to changes, an annual integrated plan summit workshop will be held to discuss the past year's successes and challenges as well as future challenges. Following the workshop a leadership summit will be convened to make decisions for the upcoming year. Changes in regional priorities and/or project priorities can be addressed during these meetings and necessary updates voted upon and incorporated if necessary.

As part of the final IRWMP, a formal process for project nomination, submission and listing will be agreed upon, as well as the time and process for review. To provide the basis and information necessary for such decisions, the water management representatives and sub-regional representatives should have responsibilities for collecting and processing information for projects in their respective water management areas.

Future projects will be incorporated into the IRWMP and prioritized against other projects through a nomination voting procedure to be established. In order to be considered for inclusion into the IRWMP, a project must establish the measurable criteria. A project can enter at three levels:

1. Ready to proceed: The project is ready to proceed and is seeking funding. The project must be prioritized against other projects in the same program.
2. Design Phase: The project is in design phase.
3. Conceptual Phase: Includes projects which may or may not have completed conceptual planning. At a minimum, a potential location has been established for the project.

ATTACHMENT A

Greater Los Angeles Region IRWMP Projects

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
16th Street Watershed Runoff Treatment, Reuse & Infiltration Project	City of Santa Monica	Project is a 3-stage subterranean urban runoff (dry and wet weather) treatment, storage and infiltration system consisting of a primary screening-separation BMP device for gross pollutants, a secondary filtering medium BMP system for solubles, and a tertiary 'cistern' storage underground BMP consisting of stacks of plastic devices wrapped in an impermeable layer; the overflow infiltration system will consist of a similar or equivalent to the tertiary BMP but with a permeable wrapping. Runoff from the existing storm drain line will be diverted into the 3-stage BMP system and will be treated and storage for reuse in the tertiary system; flow of treated water that exceeds storage capacity will be infiltrated in a leach zone as backup.	South Bay	7/06 – 10/07	$1,665,000
Ballona West Bluff Acquisition and Restoration	West Bluffs Conservancy and Ballona Ecosystem Education Project	Aquire and restore the Ballona Bluff directly above and adjacent to the recently state acquired Ballona wetlands west of Lincoln Blvd. The project would prevent urban runoff from the luxury home development proposed for the Bluff.	South Bay	7/06 – 7/08	$5,235,000
Ballona Wetlands Restoration Project	State Coastal Conservancy	The project will restore wetland habitat and provide opportunities for compatible public access	South Bay	7/06 – 9/08	$10,300,000
City-wide Irrigation Controllers	City of Westlake Village	Upgrade citywide irrigation system to produce a reduction in runoff and in total reclaimed water usage through the use of a central control station utilizing ET data and wireless technology	North Santa Monica Bay		$310,000
Construction of the Las Virgenes Creek Restoration Project	City of Calabasas and Mountains Restoration Trust	The main objective of the project is to reestablish a native creek side habitat to enhance the water quality and biological environment of the area. The restoration would reestablish direct connectivity between the two existing riparian communities to the north and south of the concrete segment.	North Santa Monica Bay		$1,036,000
Culver City Best Management Practices	City of Culver City	This project will provide water quality protection and improvement through significant reductions in pollutants of concern (trash, metals, toxicity, oil & grease, bacteria) in storm water runoff originating from critical sector businesses or pollution hot spots; 2. water conservation by providing feasible alternatives (water brooms) to businesses, combined with sustained outreach and education; 3. contribution towards environmental and habit protection and improvement through pollution reduction; 4. contribution towards flood control management by providing additional storm runoff inlets along the project area (Washington Blvd), parts of which have potential flooding problems.	South Bay	7/06 – 11/07	$1,612,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Decker Canyon Recycled Water Line Extension	Las Virgenes Municipal Water District	Extends recycled water service to golf course, replacing 200+ AF of imported water. Reduces non-native flows and nutrient loading into Malibu Creek.	North Santa Monica Bay	7/06 – 9/08	$7,550,000
Dockweiler Watershed Runoff Treatment, Reuse, and Infiltration Project - Stage One	City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division	This project proposes to remove trash/sediment pretreatment and infiltration below grade by constructing Cisterns, Dry Wells, Infiltration Pits, Permeable Pavers, and vegetative swells. The project includes the treatment of onsite and offsite stormwater runoff a an existing 8.5 acre park and 22.3 acre golf/recreation center.	South Bay	7/06 – 3/11	$2,100,000
El Dorado Park Lakes Water Usage and Wetlands Restoration	City of Long Beach Department of Parks, Recreation and Marine	Treating and utilizing reclaimed water for lakes, creating wetland habitat in detention basin, daylighting storm drain, native planting etc.	San Gabriel and Lower Los Angeles River Watershed		$12,500,000
Expansion of Golsworthy Groundwater Desalter	City of Torrance	This project is an expansion to the Goldsworthy Groundwater Desalter Project. Phase 1 was completed in 2002 and has been operational for 2.5 years.	South Bay	5/05 – 9/08	$10,000,000
Full Capture Trash Removal Devices	Los Angeles County Flood Control District	Installing 2 full capture devices in Compton Creek Watershed to comply with the LAR Trash TMDL	San Gabriel and Lower Los Angeles River Watershed		$3,600,000
Fwy Runoff Infiltration	City of Santa Monica	Demonstrate the harvesting of wet weather runoff from a freeway for filtering and infiltration, removing all pollutants found in the runoff; improvement of Santa Monica Bay water quality and beneficial uses surrounding the Pico-Kenter storm drain; compliance with state and federal stormwater regulations, including TMDLs; show how this BMP strategy can be repeated and used throughout the State.	South Bay	7/06 – 11/07	$845,000
Grand Blvd Tree Wells	City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division	Installation of fifteen stormwater infiltration devices along the existing transportation corridors to significantly mitigate load reductions for several pollutants of concern.	South Bay	7/06 – 6/09	$420,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Headworks Los Angeles River Wetlands and Water Protection Project, Phase 1	Los Angeles County Flood Control District	The Headworks project features restoration of native vegetation at a 56-acre site with 0.63 miles of Los Angeles River frontage. The park facility is a joint project of the Los Angeles Department of Water and Power and the US Army Corps of Engineers. The site will feature an uplands meadow habitat area (atop an underground water storage tank) and a low-lying wetlands area. This proposal is for a portion of the project that daylights runoff from the adjacent Griffith Park to form an intermittent stream feeding the planned wetlands. Surface runoff and Los Angeles River water will be used to sustain the wetland and the habitat area.	Los Angeles River Watershed	5 year schedule	$7,292,000
Imperial Highway Sunken Median Project	City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division	This project will retrofit approximately a half mile stretch of Imperial Highway west of Sepulveda to Pershing drive by installing a sunken median with a vegetated swale that will act as an infiltration bioretention are.	South Bay	7/06 – 6/09	$300,000
Invasive Weed Control in Riparian Habitat	LA/SG Rivers Watershed Council	Arundo and exotic eradication at 4 locations in the San Gabriel Valley	San Gabriel and Lower Los Angeles River Watershed	7/07 – 12/10	$230,000
Joint Water Pollution Control Plant Marshland Enhancement	LA County San. District	This project will enhance and maintain the vegetation and wildlife habitat value of the the 17-acre freshwater JWPCP marshland.	South Bay	1/05 – 12/10	$1,565,000
Lafayette Daylighting	City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division	This project proposes to daylight approximately 500 linear feet of a culverted historical tributary stream of Ballona Creek, infiltrate overbank flows and local runoff, intercept trash, and expand park acreage.	South Bay	7/06 – 8/09	$1,500,000
Large Landscape Conservation/Runoff Reduction Management and Educational Program	Central Basin Municipal Water District	Installing weather-based irrigation controllers at 500 locations in the watershed, establishing a rebate program, developing 5 demonstration programs	San Gabriel and Lower Los Angeles River Watershed		$1,600,000
Large Landscape Conservation/Runoff Reduction Management and Outreach Program	West Basin Municipal Water District	Through the installation and management of landscape weather-based irrigation controllers, an estimated 20%-50% of irrigated water will be conserved, thus reducing imported water needs. A major component of this program is the development of "Ocean Friendly Garden" workshops designed to educate the public on water conservation and water quality	North Santa Monica Bay		$1,952,500

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Large Landscape Conservation/Runoff Reduction Management Program	West Basin Municipal Water District	This project will evaluate and implement a large landscape water management program utilizing centralized weather-based irrigation controllers and systems that link back to the local water and regional agencies regarding end-use water management. The program is designed to allow the local users (parks, schools, cities, etc.) to work with a water management company that utilizes the HydroEarth management system. HydroEarth is an environmentally minded company that provides multi-faceted solutions to conserve water and protect the environment.	South Bay	11/05 – 12/10	$3,755,250
Las Virgenes Creek Evaluation and Protection Study	City of Calabasas and Mountains Restoration Trust	The purpose of this study is to evaluate the health of Las Virgenes Creek and to develop opportunities for restoration.	North Santa Monica Bay	7/06 – 9/07	$180,000
Las Virgenes Creek Naturalization: Removal of Artificial Structures and Fish Barriers	City of Calabasas and Mountains Restoration Trust	One part of a larger creek restoration and rehabilitation vision. Improvement of canopy over stream, bio-engineering of stream banks to reduce erosion.	North Santa Monica Bay	7/06 – 6/08	$990,000
Limelkin Canyon Stream Restoration and Habitat Improvement	Mountains Recreation and Conservation Authority	This project will preserve and restore the Limekiln Canyon stream corridor and riparian habitat and upland wetlands, directly creating habitat and species diversity, and its interrelationship with other upland biological resources will aid in regional recovery.	Los Angeles River Watershed	3/06 – 9/07	$770,000
Lomita Integrated Storm to Vadose to Water Supply - Cypress Hill Reservoir	City of Lomita with WRD, WBMWD, Egmond Associates Ltd.	Turn NPDES, TMDL, stormwater and flood water liabilities into a vadose zone, aquifer, watershed, biological habitat preservation tool and benefit using SAGES technology and approach.	South Bay	7/06 – 5/07	$1,016,500
Lomita Integrated Storm to Vadose to Water Supply - Oceanview Depression	City of Lomita with WRD, WBMWD, Egmond Associates Ltd.	Turn NPDES, TMDL, stormwater and flood water liabilities into a vadose zone, aquifer, watershed, biological habitat preservation tool and benefit using SAGES technology and approach.	South Bay	7/06 – 4/07	$951,000
Los Angeles Harbor Low-Flow Diversion	LACFCD	The program is to construct 3 storm drain low flow diversions to the sewer system and other Structural BMPs to eliminate dry weather low flows from entering the Los Angeles Harbor and eventually affecting water quality in the area.	South Bay	1/06 – 12/08	$2,130,000
Machado Lake Artificial Aeration and Circulation Project	City of Los Angeles, Department of Recreation and Parks	In-lake water quality and habitat improvement project within Lake Machado. Replacement of aeration system with two floating, solar-powered aeration and circulation systems.	South Bay	7/06 – 1/07	$95,300

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Madrona/PV Lateral Water Recycling Project	WBMWD	The Madrona/ Palos Verdes Lateral is a local recycled water distribution system that will further offset imported potable water supplies from northern California, the eastern Sierra, and the Colorado River. The project includes approximately 64,000 linear feet of pipeline that will ultimately serve up to 17 sites with over 800 acre-feet per year of recycled water to public and private entities.	South Bay	1/03 – 2/08	$27,402,787
Malibu Civic Center - Chili Cook-Off Land Acquisition	City of Malibu	Proposed acquisition of 20 acres to improve water quality at Malibu Creek, Lagoon and Surfrider Beach by constructing vegetated retention basin/treatment wetland system and riparian habitat to tie in with City Stormwater Treatment Facility to increase disinfection of urban runoff nearly 10 times. Land also to be used for dispersal of Title 22 tertiary treated wastewater from a separate, offsite proposed centralized wastewater reclamation facility, which will replace aging onsite systems near the water bodies.	North Santa Monica Bay	1/06 – 12/08	$25,350,000
Malibu Creek Watershed Urban Water Conservation and Runoff Reduction Project	Las Virgenes Municipal Water District	Promotes indoor and outdoor water conservation by replacing low-efficiency irrigation systems, clothes washers and toilets with more efficient systems.	North Santa Monica Bay	7/06 – 9/08	$542,000
Marie Canyon Storm Water Treatment Project	Los Angeles County Flood Control District	The completion of this project will improve the water quality of the Santa Monica Bay by ensuring that bacteria levels in dry and wet weather flows from Marie Canyon do not exceed the standards set within the Santa Monica Bay Beaches Wet-Weather Bacteria Total Maximum Daily Load. This goal will be achieved by constructing a multi-stage treatment system with ultra-violet (UV) disinfection.	North Santa Monica Bay	1/06 - 7/09	$3,000,000
Marsh Street Park	Mountains Recreation and Conservation Authority	The project objectives are to capture and infiltrate first flush from Marsh Street, Rosanna Street and Glenelden Street; and three industrial buildings on site, where runoff currently flows directly into Los Angeles River; and to create riparian and wetland wildlife habitat, a natural public park and recreational amenities	Los Angeles River Watershed	10/05 – 6/07	$823,000
Montebello Forebay Attenuation and Dilution Studies	Sanitation Districts of Los Angeles County	Hydrogeologic studies examining the fate and transport of a disinfection byproduct, NDMA, as it mixes with surface and groundwater	San Gabriel and Lower Los Angeles River Watershed		$2,400,000
Morris Dam Water Supply Enhancement	Los Angeles County Flood Control District	Lower the operational pool behind Morris Dam by upgrading the dam's control structures to allow more water to be released for recharge at downstream spreading grounds	San Gabriel and Lower Los Angeles River Watershed	3/06 – 11/09	$12,800,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Multiuse Wetlands Project at Children's Museum of Los Angeles, Hansen Dam Recreation Park	Los Angeles County Flood Control District	This project will provide a wetlands development opportunity in the Los Angeles River Watershed. Located immediately adjacent to the new Children's Museum, the project will provide an outdoor learning environment.	Los Angeles River Watershed		$1,390,000
North Atwater Creek Restoration and Water Quality Enhancement	City of LA Bureau of Sanitation	Project will expand the existing park by adding over 5 acres of water quality improvement landscaping; project will restore an exiting degraded remnant seasonal riparian stream tributary to the LA River, creating an intermittent streambed fed by urban runoff and an intermittent wetlands for improving water quality and increasing infiltration; project includes a native upland wooded area, walk paths, picnic area, informational kiosk, benches, riverfront walk, and a small parking lot featuring storm water BMPs	Los Angeles River Watershed	9/06 - 11/09	$5,600,000
North Santa Monica Bay Watersheds Onsite Wastewater Treatment System Improvement Grant Program	Santa Monica Bay Restoration Authority	This program will provide grants to property owners to improve failing onsite wastewater treatment systems (septic systems) to comply with regulatory requirements.	North Santa Monica Bay		$3,650,000
North Santa Monica Watershed Runoff Treatment, Reuse, and Infiltration Project Stage One	City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division	This project proposes to remove trash/sediment pretreatment and infiltration below grade by constructing Cisterns, Dry Wells, Infiltration Pits, Permeable Pavers, and vegetative swells. Runoff from these projects' locations have high trash volume, oil and grease, and bacteria levels. There are 5 project sites, consisting of a total area over 50 acres.	South Bay	7/06 – 3/12	$5,250,000
Oakpark Recycled Water Extension	Triunfo Sanitation District	Will replace 60 AFY of potable water with recycled water	North Santa Monica Bay		$1,080,000
Ozone Park Retrofit Runoff Treatment, Reuse & Infiltration Project	City of Santa Monica	Project is a 3-stage subterranean urban runoff (dry and wet weather) treatment, storage and infiltration system consisting of a primary screening-separation BMP device for gross pollutants, a secondary filtering medium BMP system for solubles, and a tertiary 'cistern' storage underground BMP consisting of stacks of plastic devices wrapped in an impermeable layer; the overflow infiltration system will consist of a similar or equivalent to the tertiary BMP but with a permeable wrapping. Runoff from the street will be diverted into a storm drain/catch basin (with an insert for primary screening) and then into the 3-stage BMP system to be treated and stored in the tertiary system for reuse; flow of treated water that exceeds storage capacity will be infiltrated in a leach zone as backup.	South Bay	7/06 – 10/07	$1,145,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Pacoima Wash Greenway Project: 8th Street Park	Mountains Recreation and Conservation Authority	Part of the planned Pacoima Wash Greenway Project - a three mile long corridor of open space which also offers stormwater capture benefits. This project would convert 3 acres of undeveloped land into a natural park that collects, treats and infiltrates residential runoff onsite.	Los Angeles River Watershed	2/06 – 6/08	$997,000
Peck Park Canyon Project	LA Neighborhoods Initiative	The Peck Park Canyon project's objectives include: storm water management, including water quality improvements, slope restoration, trail restoration, safety, improved maintenance, nature education (through development of native plant enhancement zones), and dumping prevention.	South Bay	3/04 – 3/08	$2,554,653
Peck Water Conservation Park	City of El Monte/ Amigos de Los Rios	Enhancing Peck Park thorugh an improved trails network, demonstration garden, native planting, improved access points, educational resources, etc.	San Gabriel and Lower Los Angeles River Watershed		$8,900,000
Restoration of Southern Steelhead Habitat in Solstice Creek	National Park Service, Santa Monica Mountains National Recreation Area	Removal of built-up sediment and debris trapped behind small dams and impoundments. Removal of fish impediments and riparian habitat restoration.	North Santa Monica Bay	2/06 – 3/09	$238,366
Sepulveda Feeder Interconnections	County of Los Angeles Department of Public Works, Waterworks District No. 29, Malibu	The primary objective of this project is to introduce two new sources of supply, to increase system reliability and provide redundancy to the District in case of emergency outages.	North Santa Monica Bay	7/06 – 9/08	$2,984,800
Sewer and Road Project at Malibou Lake	Malibou Lake Mountain Club	Replacement of septic systems and connection of houses to sewer lines. Fossil Filters installed on stormwater outfalls to reduce runoff pollution	North Santa Monica Bay	7/06 – 9/08	$4,150,000
South Los Angeles Wetlands Park	City of LA Bureau of Sanitation	Project will convert a former MTA maintenance facility into a multi-benefit community resource with a water quality treatment element, a constructed wetland, and a community and education center	Los Angeles River Watershed	2/06 – 12/08	$8,000,000
Southeast Water Reliability Project, Phase 1 Water Recycling	Central Basin Municipal Water District	Constructing a recycled water line from San Jose Creek WRP to distribute recycled water to users in Pico Rivera and Montebello	San Gabriel and Lower Los Angeles River Watershed	7/06 – 12/07	$15,200,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Stone Canyon Creek at UCLA	UCLA Institute of the Environment	Restoration of Stone Creek through this funding request will provide for native riparian habitat restoration along the last natural remaining section of Stone Creek on UCLA's campus. UCLA's Institute of the Environment will partner with Heal the Bay and the Ballona Creek Watershed Task Force's Coordinator to mobilize professors, students, and community members in documenting, analyzing, and restoring ecoystem functionality and habitat value to the creek. This project will serve as a demonstration for the region of the benefits of restored natural urban creeks in Los Angeles. The role of streambank bioengineering as an alternative to traditional methods of flood management, and the considerable cost-savings, will also be demonstrated. Future phases of the project are anticipated to include tributary-wide improvements to address watershed issues and upstream contributions to the system, as well as implementing ecoystem restoration strategies at the neighboring University Elementary School to restore functionality to the currently channelized condition of Stone Creek through that site.	South Bay	7/06 – 6/07	$56,825
Strathern Pit Multiuse Project	Los Angeles County Flood Control District	Conversion of a 30-acre pit/landfill to a mulitpurpose park that includes a retention basin and a constructed wetland. Involves land acquisition. Will capture storm runoff and treat via BMPs and a treatment wetland and convey it to nearby spreading grounds for recharge or a nearby facility for reuse.	Los Angeles River Watershed	1/06 – 12/11	$20,730,000
Sun Valley Middle School Multiuse Project	Los Angeles County Flood Control District	Retrofitting a middle school facility in the heavily flooded Sun Valley area with vegetative swales, underground storage tanks, underground infiltration basins and strategically located trees. This would reduce flooding and allow for capture, storage and eventual reuse of stormwater for irrigation on the school grounds.	Los Angeles River Watershed	1/06 – 5/08	$8,320,000
Trancas Canyon Urban Runoff Biofiltration Project	Los Angeles County Flood Control District	The completion of this project will improve the water quality of the Santa Monica Bay and help protect an Area of Significant Biological Species from urban runoff. This goal will be achieved by constructing a series of approximately 30 catch basin biofiltration systems throughout an urbanized area to improve the quality of runoff being discharged to Trancas Canyon before it flows into the Bay.	North Santa Monica Bay	1/06 – 7/09	$1,680,000
Triunfo Creek Trash Capture Screens	City of Westlake Village	This project proposes to install a state-of-the-art trash capture device in this flood control channel at the "Foxfield Drain," a double box culvert that transmits the flows from the flood channel into the Lake. Trash, debris, oil/grease entering the Lake will be significantly reduced once the system is installed.	North Santa Monica Bay	7/06 – 6/08	$62,000

Attachment A
Greater Los Angeles County Region IRWMP Projects

Project	Sponsor	Description	Step 1 Sub-Region	Schedule	Budget
Valley Steam Plant Multiuse Project	Los Angeles County Flood Control District	This project will dramatically reduce downstream flooding by collecting, treating and infiltrating the stormwater runoff generated at the 155 acre-site. Stormwater will be captured, conveyed through a treatment system, and then pumped to the nearby Hansed Spreading Grounds for groundwater recharge	San Gabriel and Lower Los Angeles River Watershed		$9,550,000
Whittier Narrows Conservation Pool	Water Replenishment District	Increasing the water conservation pool behind Whittier Narrows Dam to conserve an additional 2,900 AF annually	San Gabriel and Lower Los Angeles River Watershed		$4,000,000
Whittier Narrows Water Reclamation Plant UV Disinfection Studies	Sanitation Districts of Los Angeles County	Modifying the process of tertiary treatment at the WNWRP from chloramination to UV disinfection	San Gabriel and Lower Los Angeles River Watershed		$6,600,000
Wilmington Drain Restoration Multiuse Project	City of LA, Dept of Public Works, Bureau of Sanitation, Watershed Protection Division	This project proposes wetlands restoration in the Dominguez Channel Watershed. The project will: • Preserve and restore coastal wetlands ecosystems. • Preserve and restore stream corridors and wetlands in coastal watersheds. • Recover native habitat and species diversity. • Prevent future degradation and/or loss of wetlands resources	South Bay		$11,120,000

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