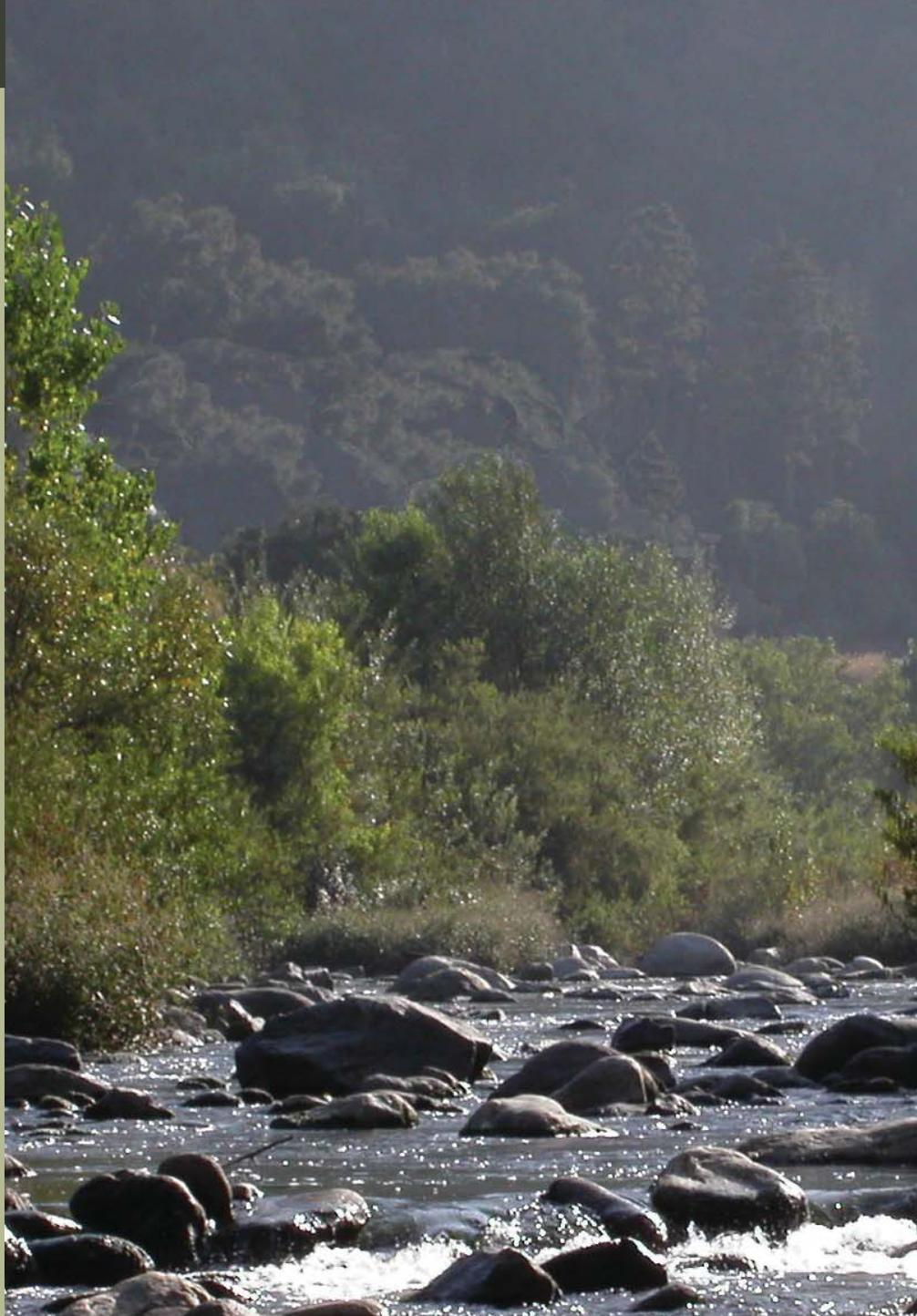


Open Space Management Strategy



Technical Memorandum

May 15, 2006

Integrated Regional Water Management Plan For the
Greater Los Angeles County Region



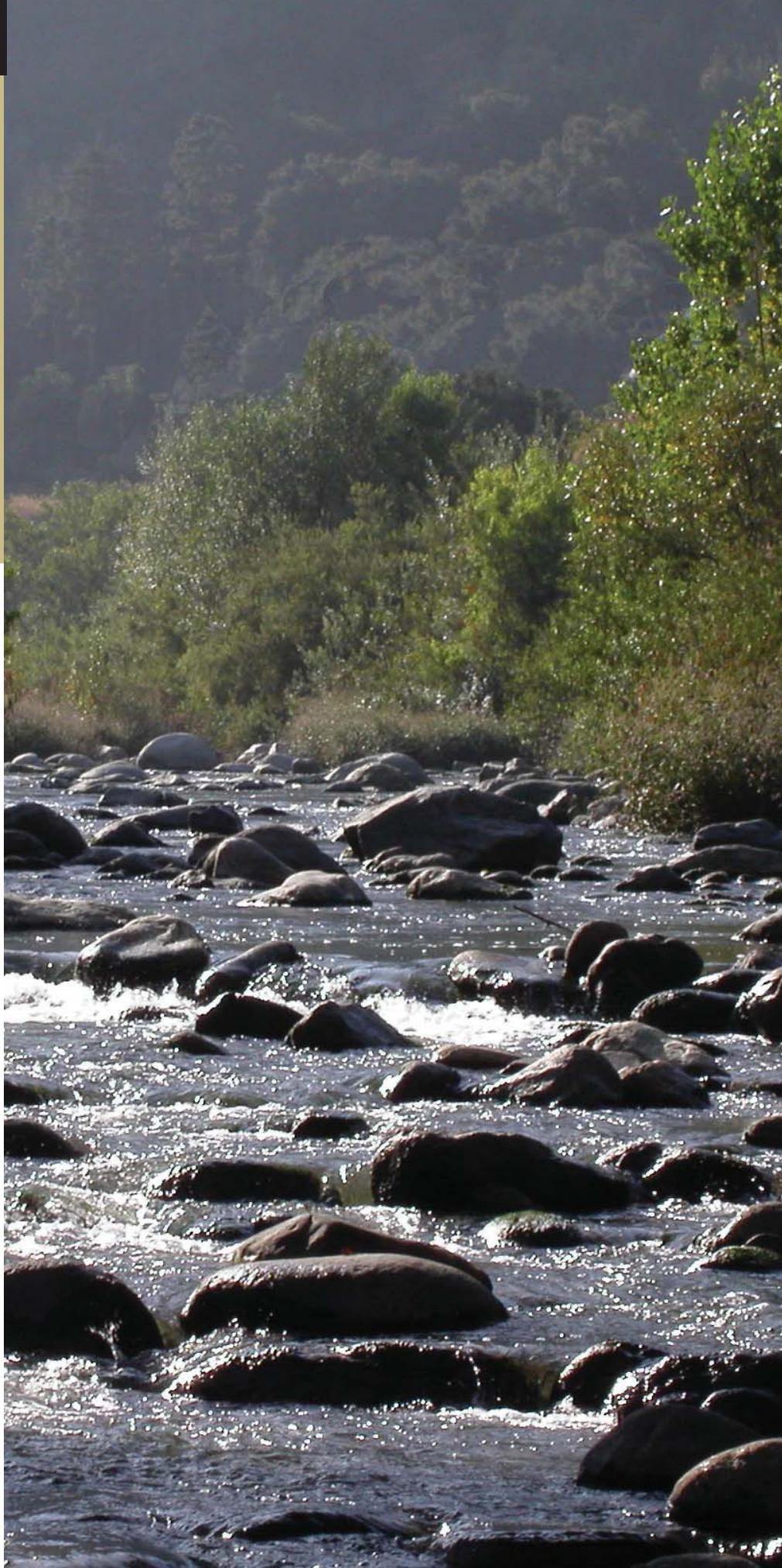


Technical Memorandum for the
Integrated Regional Water Management
Plan for the Greater Los Angeles County
Region prepared in partnership with:

BROWN AND
CALDWELL



DUVIVIER architects
Architecture, Planning and Sustainable Design



OPEN SPACE
TECHNICAL MEMORANDUM

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

May 15, 2006

BROWN AND CALDWELL

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LIST OF ACRONYMS

ASCE	American Society of Civil Engineers
BMP	Best Management Practice
CIP	Capital Improvement Project
COG	Council of Governments
CRHCP	California Riparian Habitat Conservation Program
DPR	Department of Pesticide Regulation
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
IRRI	International Rice Research Institute
IRWMP	Integrated Regional Water Management Plan
LABOS	Los Angeles Bureau of Sanitation
LACDA	Los Angeles County Drainage Area
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation District
LANI	Los Angeles Neighborhood Initiative
LA/SG Rivers	Los Angeles and San Gabriel Rivers
LA&SGRWC	Los Angeles and San Gabriel Rivers Watershed Council
LVMCOG	Las Virgenes Malibu Conejo Council of Governments
MRCA	Mountains Recreation and Conservation Authority
NSMB	North Santa Monica Bay
RCD	Resource Conservation District
RMC	Rivers and Mountains Conservancy
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAP	Science Advisory Project
SCAG	Southern California Association of Governments
SCWRP	Southern California Wetlands Recovery Project
SEA	Significant Ecological Area
SMMC	Santa Monica Mountains Conservancy
TM	Technical Memorandum
TMDL	Total Maximum Daily Load

WBMWD	West Basin Municipal Water District
WCA	Watershed Conservation Authority
WRD	Water Replenishment District

LOS ANGELES INTEGRATED REGIONAL WATER MANAGEMENT PLAN OPEN SPACE TECHNICAL MEMORANDUM

1. INTRODUCTION

Information contained within this Technical Memorandum (TM) is supported by the Integrated Water Management Technical Memorandum (Integrated TM). Please refer to the Integrated TM for further information about background, context, and stakeholders.

1.1 Purpose

The purpose of this TM is to:

- Describe the existing Greater Los Angeles County Region (Region) conditions as they pertain to the potential for habitat, recreation, and open space to affect or enhance water resources.
- Develop quantifiable planning objectives that will be used as a tool to measure progress towards overall Region goals and needs.
- Identify issues, constraints, opportunities and water management strategies relevant to habitat, recreation and open space.

The intent of this TM is to help create integrated regional solutions with the potential for habitat, recreation, and open space to affect or enhance water resources. With respect to habitat, this TM specifically addresses wetlands and riparian habitat, as those habitat types are directly associated with rivers, streams, and other bodies of water. The potential for other habitat types to affect or enhance water resources is also addressed in this TM, as relates to open space.

1.2 Background

The Region, an area of approximately 2,058 square miles, is comprised of 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 Los Angeles and San Gabriel Rivers Watersheds. The watersheds and sub-regions are shown on Figure 1-1.

1.3 Existing Conditions

1.3.1 Overview

As related to habitat, recreation, and open space, the geography of the Region can generally be divided into several distinct types: the coastal plain, inland valleys (e.g., San Fernando, San Gabriel, Pomona, and Walnut), foothills, and mountains (e.g., the Santa Monica and San Gabriel Mountains). Almost all of the coastal plain and the inland valleys have been urbanized, much of the foothills surrounding the coastal plain and the inland valleys have been subject to residential development, while the mountains have been subject to limited development. As a result, most remaining native habitat is located in the Santa Monica and San Gabriel mountains and the adjacent foothills. Pockets of habitat are found in several locations, such as the Palos Verdes Peninsula, the Baldwin Hills, and the Verdugo Mountains, and in remaining coastal wetlands and estuaries, such as the Ballona Wetlands and Malibu Lagoon.



Figure 1-1. Map Showing Watersheds and Sub-Regions

The Los Angeles and San Gabriel rivers drain approximately 1,513 square miles of the Region and discharge into the San Pedro Bay. Other major watersheds in the region include Malibu Creek, Ballona Creek, and the Dominguez Channel. Various smaller watersheds drain directly into Santa Monica and San Pedro bays. 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 and Santa Monica mountains remain mostly in a natural state. Thus, most of the riparian habitat within the coastal plain and the inland valleys has been lost. Intact riparian habitat is mostly limited to unimproved streams in the Santa Monica and San Gabriel mountains.

The largest open spaces within the Region are found within the San Gabriel Mountains (e.g., the Angeles National Forest) and the Santa Monica Mountains. Additional open spaces are located in the foothills around coastal plain and the interior valleys (e.g., the Santa Susanna Mountains and the Puente and Chino Hills). These major open spaces provide various recreational opportunities and facilities. Urban parks and the extensive public beaches provide recreational opportunities for most of the Region's residents, although substantial numbers utilize the Angeles National Forest and the state and local parks within the Santa Monica Mountains.

1.3.2 Wetlands

1.3.2.1 Wetland Ecosystems

As defined by U.S. Fish and Wildlife Service, wetlands are “lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.” For the purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes (plants that can grow in saturated soils); (2) the substrate is predominantly undrained hydric soil (soils which show prolonged saturation); and (3) the

substrate is non-soil and saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al., 1979). For the purposes of this document, “wetland ecosystem” includes both wetlands and the transitional and adjacent upland habitats that meet the above definition. Southern California wetland ecosystems occur in a multitude of geomorphic setting, including floodplains, estuarine and lacustrine fringes, topographic depressions, slopes and mineral or organic soil flats (Improving Regional Planning, 2002).

1.3.2.2 Wetland Function and Values

After a long history of ignominy, wetlands have belatedly been recognized as performing many valuable, even critical roles in the environment. Wetlands 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. Some of these species are commercially valuable, while others enhance our quality of life.

1.3.2.3 Wetland Degradation

In the highly urbanized lower reaches of the Region, wetlands have been largely paved over. River and stream channels have been channelized, and in large part concrete-lined. Some channels have been routed through underground pipes and the remaining wetlands, of all types, are threatened for a variety of reasons, such as:

- Changes in hydrology due to urbanization and/or changes in groundwater depth. Wetlands may get too much or too little water.
- Wetlands in many locations are privately owned and are under threat of development.
- Invasive species have severely compromised the functions and habitat values of many wetlands and pose an ongoing threat.
- While wetlands are known for their ability to cleanse water, natural wetland systems are often overwhelmed by increased loads of sediments, nutrients, metals, organic compounds, and increased water temperature.

1.3.2.4 Historical and Current Distribution

A lack of information on the characteristics of the various wetland zones and the original flora prior to European settlement makes it difficult to identify the actual extent of the changes that have taken place in many developed areas. However, historical texts note that the rivers within the Region meandered freely over the coastal plains and valleys that were shaded by sycamore, cottonwood, and alder woodlands interspersed with marshes, ponds, lakes and riparian thickets of willow, mulefat and other shrub-like vegetation such as wild grape (Josselyn, 1993).

Los Angeles County has lost more than 90 percent of its coastal wetlands, a greater percentage than any other county in the Region (Figures 1-2 and 1-3). Most of this loss occurred within the Los Angeles Basin. 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 (Common Ground). Within the basin, only two significant coastal wetland areas remain: the Los Cerritos wetlands complex, and the wetland and lagoons near the mouth of Ballona Creek. Other substantial remaining historic wetland areas include the El Dorado wetlands near the confluence of Coyote Creek and the San Gabriel River, Lower Compton Creek where the channel bottom is unlined; and saltwater marsh along the banks at the lowest reach of the Los Angeles River.

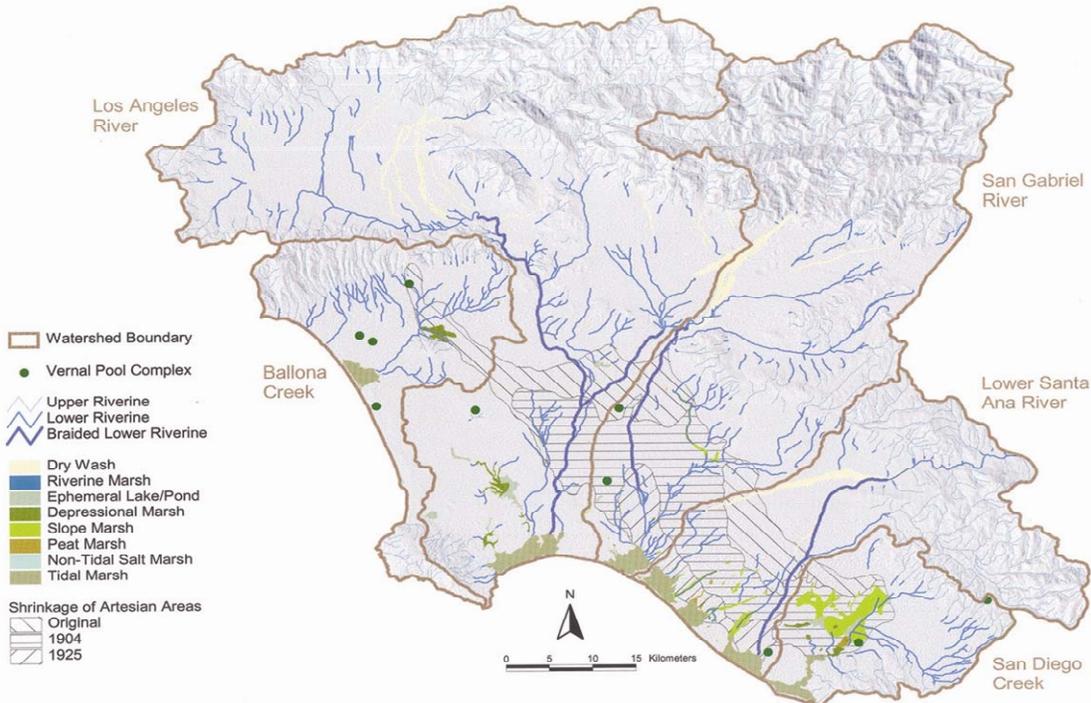


Figure 1-2. Historic Wetlands within the Los Angeles, San Gabriel, and Lower Santa Ana River Watersheds. Adapted from Rairdan, 1998

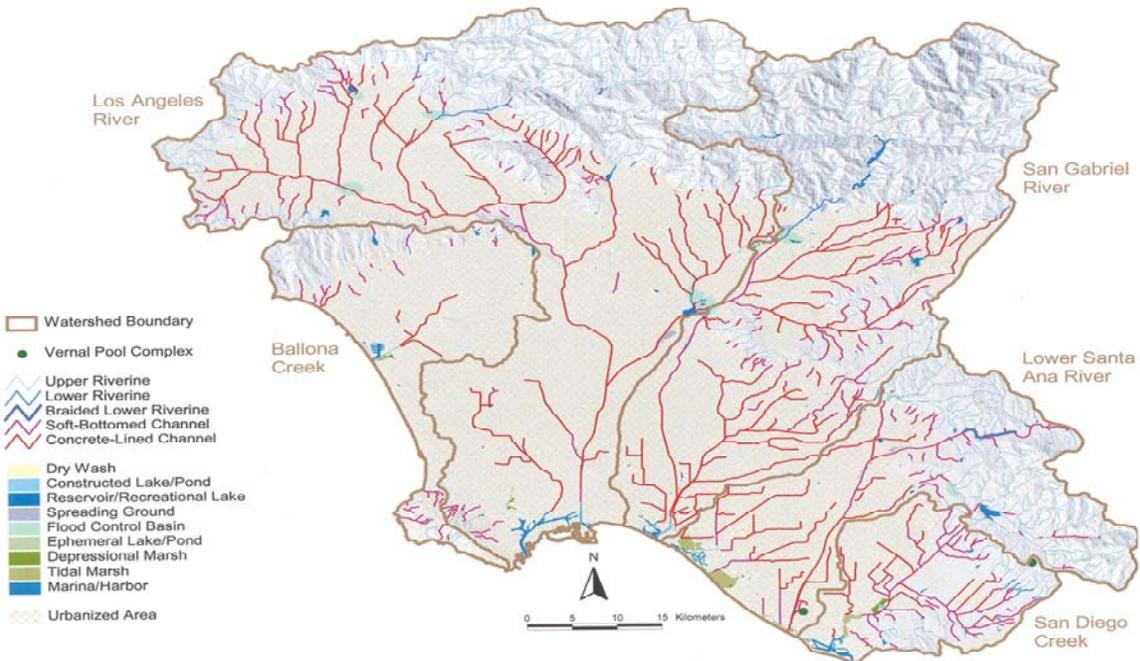


Figure 1-3. Current Wetlands within the Los Angeles, San Gabriel, and Lower Santa Ana River Watersheds. Adapted from Rairdan, 1998

1.3.3 Riparian

1.3.3.1 Background and Definition

Riparian ecosystems are linear corridors of variable width that occur along perennial, intermittent, and ephemeral streams (Williams, 1978). Two distinguishing features of riparian ecosystems are the hydrologic interaction that occurs between the stream channel and adjacent areas through the periodic exchange of surface water and groundwater, and the distinctive geomorphic features and vegetation communities that develop in response to this hydrologic interaction (Richards, 1982; Harris, 1987; Gregory et al., 1991; and Goodwin et al., 1997). The hydrologic interaction between streams and adjacent areas typically results in two distinct riparian zones, although either zone may be narrow and seemingly absent under certain geologic or geomorphic conditions. The first zone, named the active floodplain, includes areas that are inundated by overbank flooding at least once every 5 years. This zone exhibits the features associated with recurring flooding such as point bars, areas of scour, sediment accumulation, natural levees, debris lines, and riparian vegetation communities that are either short-lived or able to survive the effects of frequent flooding (Figure 1-4).

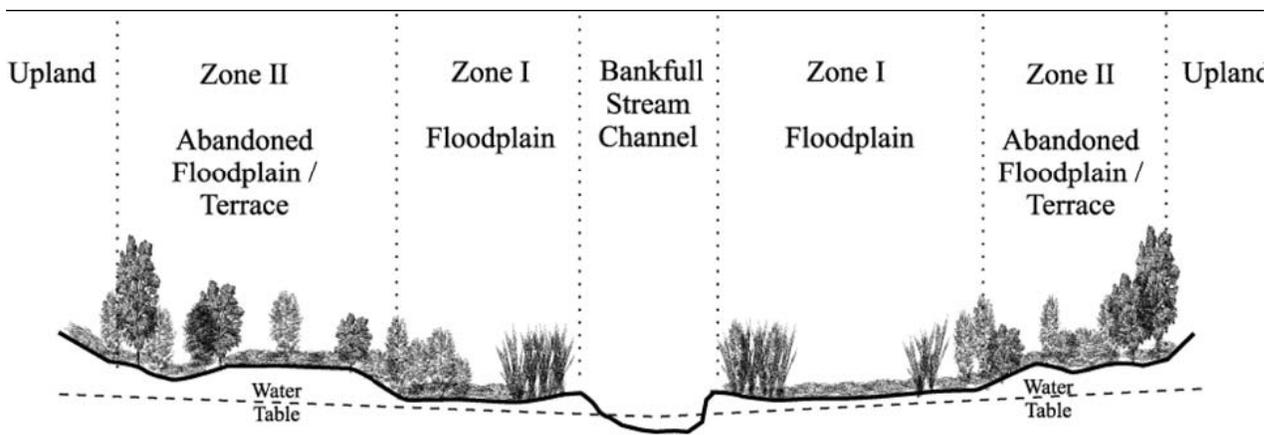


Figure 1-4. General Cross-Section of Riparian Ecosystem (Dunn and Leopold, 1978)

The second zone consists of abandoned floodplains and historical terraces formed by fluvial processes operating under different climatic conditions or hydrologic regimes (Knox et al., 1975; Graf et al., 1991; Rumsby and Macklin, 1994). These areas are only flooded during infrequent, larger magnitude events. Vegetation communities in this zone are generally composed of woody perennials that rely on the higher water tables present in the riparian zone and are capable of reestablishment after floods.

As riparian ecosystems characteristically have a high water table and are subject to periodic flooding and influence from adjacent water bodies, for the purposes of this TM, riparian ecosystems are defined from a functional perspective as the areas along perennial, intermittent, and ephemeral streams where the interaction with surface water and groundwater results in distinctive geomorphic features and vegetation communities. Under natural circumstances, the riparian ecosystem includes the bankfull stream channel, active floodplain, and less frequently flooded abandoned floodplains and terraces.

Riparian habitats within the region include wetlands, uplands, or some combination of these two, including riparian forest, woodland, and scrub habitats. In some instances (e.g., within waterways and drainages) these habitat types may also have wetland characteristics, where an adequate supply of water (surface or ground) is present and appropriate soil conditions have developed.

The size and type of riparian vegetation varies depending on the type of stream channel. Along small stream channels, the extent of the riparian community may only be a thin band of shrub-like vegetation within or directly adjacent to the channel, whereas along larger streams or rivers the riparian habitat can be in the form of dense woodlands that can be quite extensive (Figures 1-5 through 1-9). Height of these communities can vary in size from 3 to 10 feet in scrub habitats, to greater than 100 feet in riparian forest habitats.



Figure 1-5. Native Streamside Riparian Vegetation



Figure 1-6. Riparian Vegetation along Upper Los Angeles River



Figure 1-7. Riparian Vegetation along a Seasonal (Ephemeral) Stream in the Santa Monica Mountains



Figure 1-8. Riparian Vegetation within and adjacent to a Soft Bottle Channel



Figure 1-9. Riparian Vegetation Transition to Upland Vegetation

Riparian areas serve many ecological functions, some of which act to protect water quality or maintain an ecological balance in a water body. Specifically, healthy riparian areas perform several basic functions which help maintain good water quality, such as those outlined below.

- Natural riparian vegetation usually has deep roots and it stabilizes river beds and banks, binds soil, and protects against erosion and slumping. The stabilization is a result of the riparian root mass that helps maintain the bank or shoreline structure by holding the soil together. This vegetation provides a barrier to the erosive power of the water. By reducing erosion, less sediment is transported to the water body. Reducing sediment helps keep fish spawning areas clear, reduces nutrients, and makes water treatment easier.
- Riparian vegetation can also help reduce the amount of sediment and nutrients that are transported in runoff. The vegetation physically traps sediment in surface flow and uses the nutrients (i.e., phosphorus and nitrogen) in the shallow sub-surface flow, improving the quality of water entering watercourses. This is especially important along smaller streams that feed into main channels. Studies show that species diversity and abundance of fish are greater in areas with good riparian vegetation.
- Some riparian vegetation is a source of large woody debris. When floating or beached in a water body, debris provides shelter for fish and habitat for aquatic insects. In flowing water, the debris also traps sediment and helps create structure (pools, riffles and runs) in the stream. Pools, riffles, and runs are important components of a streams ability to maintain aquatic life.
- Riparian vegetation provides shade. Shade helps regulate stream temperatures by controlling the amount of sunlight that reaches the stream. Most fish species prefer the cooler temperature of shaded streams. Shady areas also provide refuge areas for fish. Less algae grows in shaded streams because reduced sunlight limits photosynthesis.
- Riparian vegetation is a source of small organic debris, which may include levees, twigs and terrestrial insects. This debris is an important food source for many aquatic organisms.
- Riparian vegetation helps reduce stream velocity during high flow events. This helps to slow down the natural erosion of the streambed. Rapid erosion of the streambed results in a lowering of the local groundwater table. Once the groundwater table is lowered, it is very difficult for water-loving plants to re-establish.
- It contributes to the overall ecological health and sustainability of an area and offers recreation opportunities to local residents and tourists.
- It provides important foraging and breeding habitat for many wildlife species including sensitive, rare, and endangered species.

Riparian vegetation can be degraded through the removal or modification of native plants that comprise this habitat. At a local scale riparian vegetation is frequently degraded by clearing or by activities such as construction, channelization, agriculture, debris dams, silviculture, and trampling. On a catchment scale, changes in flow regimes often affect riparian vegetation either directly by prolonged inundation that results in the plant's death, or indirectly through erosion and bank slumping, floodplain alienation, and altered flooding regimes. In addition, a major cause of degradation is the introduction of, or invasion by, non-native species. In some areas the only vegetation present along streams may be exotic species such as the giant reed, *Arundo donax* (Figure 1-10).



Figure 1-10. Removal of Invasive Arundo Donax in Riparian Habitat

The results of degradation of riparian vegetation can lead to increased erosion of banks and channels, diminished water quality for wildlife and domestic use, sedimentation (accretion), loss of habitat for wildlife, alteration in flood protection, loss of aquatic productivity and health, and loss of recreational, educational, and aesthetic values.

1.3.3.2 Historical and Current Distribution

A lack of information on the characteristics of the various riparian zones and the original flora prior to European settlement make it difficult to identify the extent of the changes that have taken place in many developed areas. However, historical texts note that the rivers within the Region meandered freely over the coastal plains and valleys that were shaded by sycamore, cottonwood, and alder woodlands interspersed with marches, ponds, lakes and riparian thickets of willow, mulefat and other shrub-like vegetation such as wild grape (Josselyn, 1993).

The current riparian systems within the Region bear little resemblance to the streams and lakes encountered by the first European explorers and settlers (Moyle, 2002). The confinement and hardscaping of southern California's creeks and rivers have led to substantial losses of the Region's floodplain, riparian, and aquatic habitats. An estimated 90 to 95 percent of the riparian community has been lost (Faber et al., 1989). Some systems, such as the Los Angeles River, have been almost completely disconnected from their floodplain and denuded of nearly all riparian habitats. Urban and agricultural development in southern California coastal watersheds has also significantly altered other natural stream functions including water quality, hydrology, and sediment transport functions. Water quality impairments include increases in both non-toxic elements such as sediment, nutrients and water temperature, as well as toxic contaminants such as pesticides and heavy metals. The loss of riparian and wetland habitat throughout the coastal watersheds has aggravated water quality problems, since riparian vegetation and wetlands can improve water quality by removing or sequestering many contaminants. The degraded water quality affects fish and wildlife habitat quality and limits recreational use of southern California beaches, bays, and lagoons.

In recognition of the consequences of the loss of California's riparian habitat, and in an effort to reverse this trend to the extent possible, many conservation organizations, state and federal agencies, and local governments are actively developing programs to protect these valuable ecosystems. The State legislation enabled the Department of Fish and Game to regulate riparian habitat through Section 1600 of the Fish and Game Code of California, and the California Riparian Habitat Conservation Program (CRHCP) to protect and restore riparian habitat throughout the State. The CRHCP is a cooperative effort involving state and federal agencies, local government, nonprofit conservation groups, private landowners, and concerned citizens.

As a result of the large-scale loss of riparian habitat within southern California, high quality native riparian habitat within the Region are restricted to the North Santa Monica Bay, upper Los Angeles River watershed, and upper San Gabriel River. Riparian corridors occur along streams in the San Gabriel Mountains and the upper and middle reaches of the San Gabriel River, including portions of Walnut, San Jose, and Coyote Creeks, and upper Los Angeles River watershed, including the Santa Monica Mountains, Simi Hills, Verdugo Mountains and Santa Susana Mountains. Freshwater stream riparian habitat also occurs in the upper San Gabriel River and streams in the San Gabriel foothills, Puente and Chino Hills, the Whittier Narrows, and the Glendale Narrows on the Los Angeles River. Although these areas do contain some large areas of quality riparian habitat, they are increasingly stressed by heavy 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, but there are also significant natural areas not yet protected.

1.3.4 Recreation and Open Space

1.3.4.1 Historical and Current Distribution

In the Region there are public open space areas designated as Significant Ecological Areas (SEA) by the Los Angeles County. These include Alamos Bay, Altadena, Ballona Creek, East San Gabriel Valley, El Segundo Dunes, Griffith Park, Harbor Lake Regional Park, Madrona Marsh, Malibu Coastline, Palos Verdes Peninsula Coastline, Point Dume, Portuguese Bend Landslide, Puente Hills, Rio Hondo Wildlife Sanctuary, Rolling Hills Canyons, San Gabriel Canyon, Santa Monica Mountains, Terminal Island, Tujunga Valley/Hansen Dam, Valley Oaks Savannah, and Verdugo Mountains. In addition, there are significant remaining undeveloped open space and natural areas which are located on private land. For example, the undeveloped areas of the Baldwin Hills is in private ownership, primarily supporting oil and gas production. Other undeveloped land, located in the Santa Monica Mountains, the foothills of the National Forest and small isolated hilltops such as El Sereno Hill and Monterey Hills, have, until recently, been considered too steep to build on.

There are more than 1,000 parks in the entire Region ranging in size from 0.2 acres to 449,175 acres. Parks more than 100 acres are listed in Table 1-1 by sub-region. Parks in bold are parks located in disadvantaged communities (i.e., households that earn less than \$37,999 per year).

Table 1-1. Parks Over 100 Acres		
Park Name	City	Acres
<i>Lower Los Angeles and San Gabriel Rivers Watersheds</i>		
Whittier Narrows Recreational Area**		1,303
El Dorado Park	Long Beach	197
El Dorado Park West	Long Beach	162
El Dorado Park East	Long Beach	161
Heartwell Park	Long Beach	138
Country Park	Diamond Bar	132
El Dorado Nature Center Park	Long Beach	118
La Mirada Park	La Mirada	105
Willowbrook Park**		98
<i>Upper San Gabriel River and Rio Hondo Watersheds</i>		
State Owned Lands	Los Angeles	4,180
Griffith Park	Los Angeles	1,333
Kenneth Hahn State Recreational Area	Los Angeles	335
Will Rogers State Historic Park	Los Angeles	242
Alondra Park**		206
South Coast Park	Rolling Hills Estates	181
Runyon Canyon Park	Los Angeles	171
Friendship Park	Rancho Palos Verdes	128
Exposition Park**	Los Angeles	124
Palisades Park	Los Angeles	122
Ken Malloy Harbor Regional Park	Los Angeles	122
White Point Park	Los Angeles	100
<i>Upper Los Angeles River Watershed</i>		
Angeles National Forest		126,319
Griffith Park	Los Angeles	2,618
Hansen Dam Park	Los Angeles	1,170
State Owned Lands	Los Angeles	874
Deukmejian Wilderness Park	Glendale	735
Brand Park	Glendale	680
Omelveny Park	Los Angeles	666
Elysian Park	Los Angeles	594
Wildwood Canyon Park	Burbank	534
Sepulveda Dam Recreational Area	Los Angeles	467
Ernest E Debs Regional Park	Los Angeles	332

Table 1-1. Parks Over 100 Acres		
Park Name	City	Acres
Brookside Park		303
Verdugo Mountain Park	Los Angeles	250
Lake Balboa Park	Los Angeles	230
Bell Canyon Park	Los Angeles	225
Moonshine Canyon Park	Los Angeles	197
Stough Park	Burbank	183
Hjelte Sports Center	Los Angeles	173
Coldwater Canyon Park	Los Angeles	160
Aliso Canyon Park	Los Angeles	157
Descanso Gardens	La Canada Flintridge	149
Valley Plaza Park**	Los Angeles	110
Wildlife Area	Los Angeles	109
Browns Creek Park	Los Angeles	104
El Cariso Regional Park	Los Angeles	103
Limekiln Canyon Park	Los Angeles	99
Palisades Park	Los Angeles	98
<i>South Bay Watersheds</i>		
State Owned Lands	Los Angeles	4,180
Griffith Park	Los Angeles	1,333
Kenneth Hahn State Recreational Area	Los Angeles	335
Will Rogers State Historic Park	Los Angeles	242
Alondra Park**		206
South Coast Park	Rolling Hills Estates	181
Runyon Canyon Park	Los Angeles	171
Friendship Park	Rancho Palos Verdes	128
Exposition Park	Los Angeles	124
Palisades Park	Los Angeles	122
Ken Malloy Harbor Park**	Los Angeles	122
White Point Park	Los Angeles	100
<i>North Santa Monica Bay Watersheds</i>		
Santa Monica Mountains National Recreational Area	Agoura Hills, Malibu	11,044
Malibu Creek State Park		5,190
State Park Lands		4,444
Leo Carrillo State Beach		2,184
Topanga State Park		888
Charmlee County Park		483

1.3.4.2 Park Standard

In spite of the large number of parks and the massive size of some of the parks, our Region is still considerably park poor. Access to open space is limited for many communities. A comprehensive system of parks, bike trails, and hiking paths does not exist. Public appreciation of the value of natural areas and preservation of cultural resources is low. Planning by individual jurisdictions often does not adequately consider downstream or watershed-wide implications. Many public projects are planned to achieve single rather than multiple benefits.

The National Recreation and Park Association, in their 1990 publication entitled, “Recreation, Park and Open Space Standards and Guidelines,” suggests that a park system, 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 population. Table 1-2 identifies parks and population numbers for the sub-region.

Sub-Region	Population 2006	Acres of Parks *	Acres/1,000 people
Lower Los Angeles and San Gabriel Rivers Watersheds	3,219,316	11,690	3.6
Upper San Gabriel River and Rio Hondo Watersheds	1,640,528	11,632	7.1
Upper Los Angeles River Watershed	2,338,290	16,174	6.9
South Bay Watersheds	2,903,382	8,138	2.8
North Santa Monica Bay Watersheds	106,480	5,155	48.4

*Excludes Angeles National Forest, Santa Monica National Recreational Area and Other State Lands

Only two of the sub-regions are below the minimum park standard. But the access to open space by disadvantaged communities is also taken into consideration (Table 1-3). A different scenario emerges when comparing access by disadvantaged communities to open space and parkland. The definition of disadvantaged community is a community with an annual median household income of less than 80 percent of the statewide annual median household income. Based on Census 2000 data, 80 percent of the statewide annual median household income is \$37,994. All the sub-regions, except the North Santa Monica Bay Watersheds, are park poor. Figures 1-11(A) through 1-11(D) show Disadvantaged Communities within the Region.

Sub-Region	Population Disadvantaged Communities	Acres of Parks Disadvantage Communities*	Acres/1,000 people
Lower Los Angeles and San Gabriel Rivers Watersheds	1,570,713	2,413	1.5
Upper San Gabriel River and Rio Hondo Watersheds	395,115	335	0.8
Upper Los Angeles River Watershed	1,024,416	2,706	2.6
South Bay Watersheds	1,443,938	1,423	1.0
North Santa Monica Bay Watersheds	no disadvantaged communities		

*Excludes Angeles National Forest, Santa Monica National Recreational Area and Other State Lands

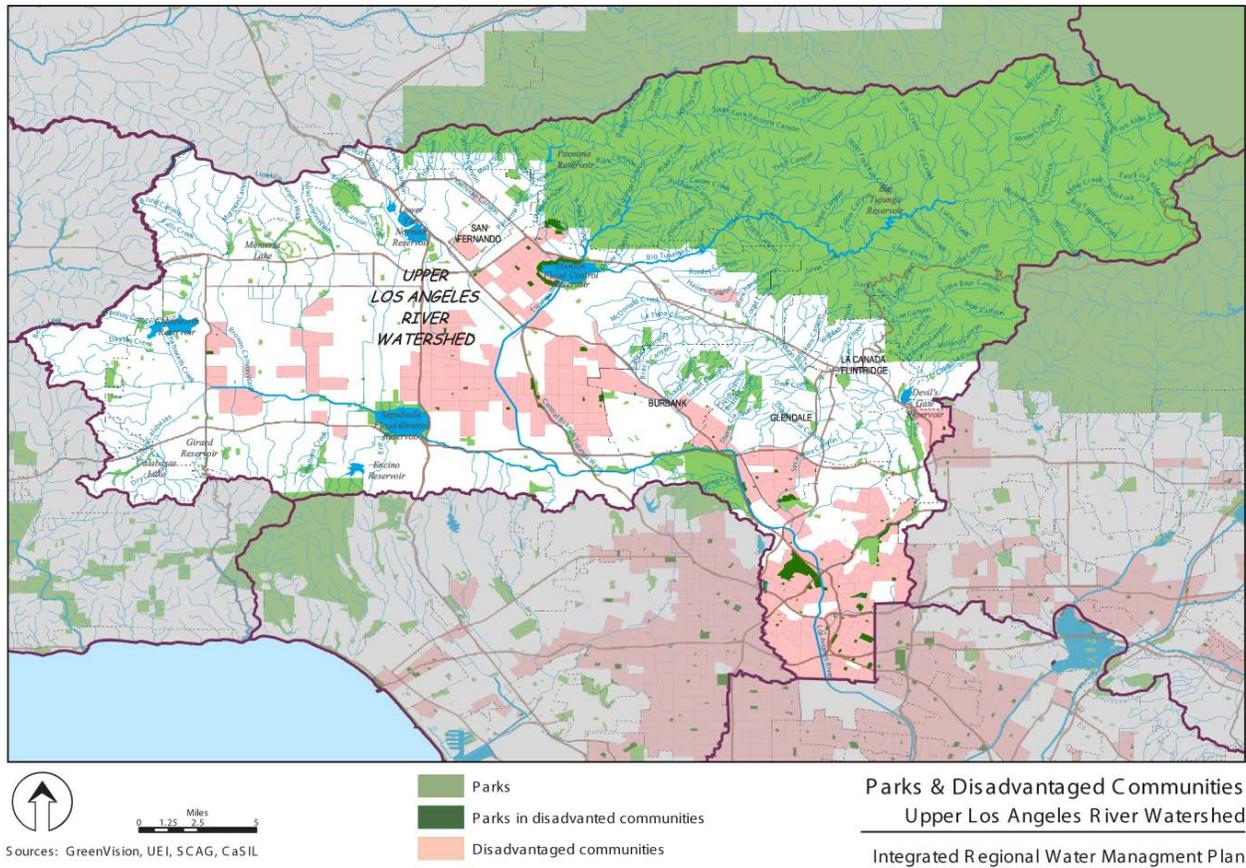


Figure 1-11(A). Disadvantaged Communities, Upper Los Angeles River Watershed

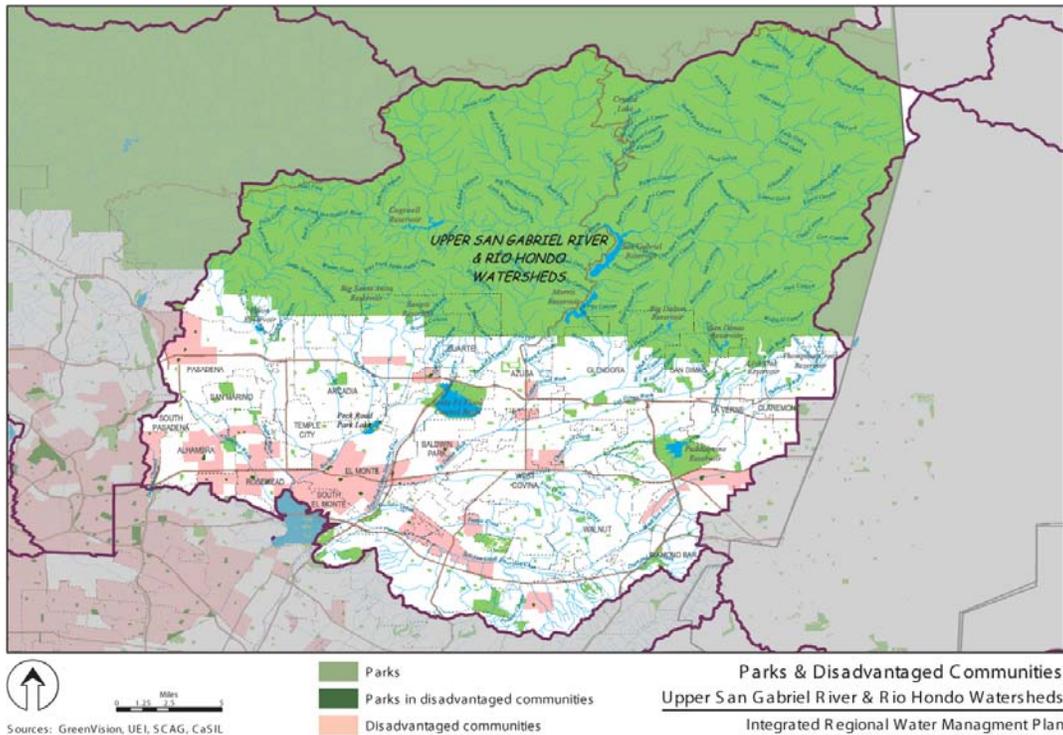


Figure 1-11(B). Disadvantaged Communities, Upper San Gabriel and Rio Hondo Watersheds

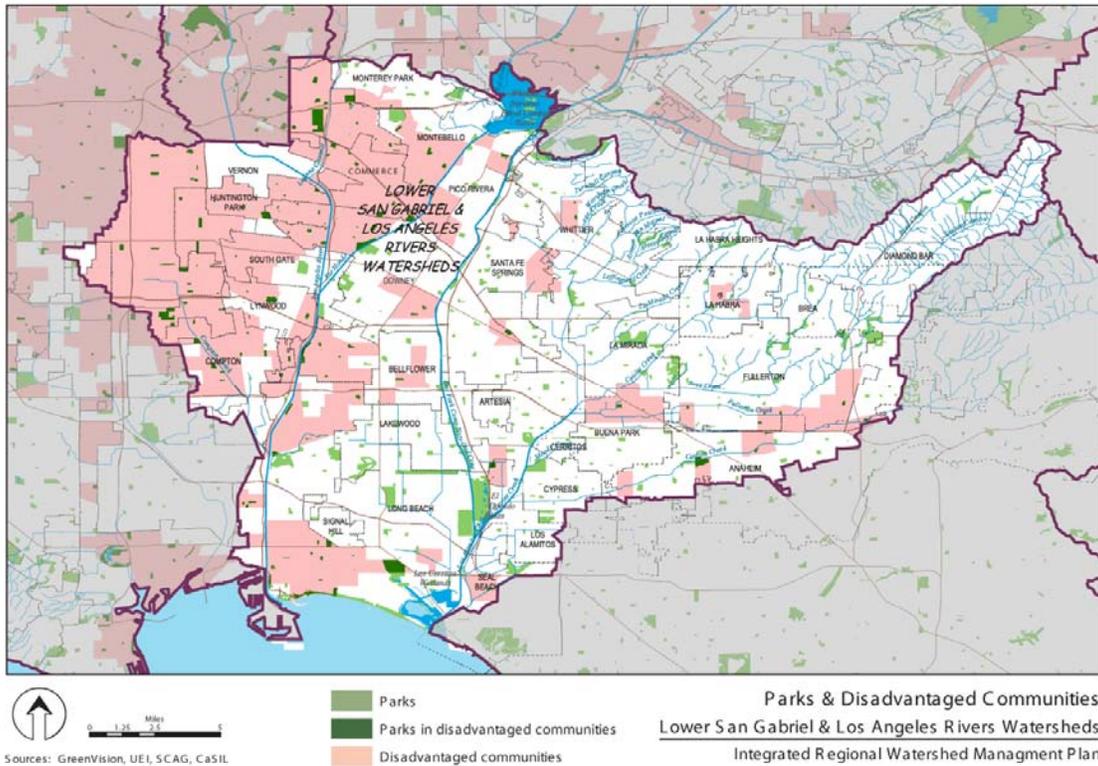


Figure 1-11(C). Disadvantaged Communities, Lower San Gabriel and Los Angeles Rivers Watersheds

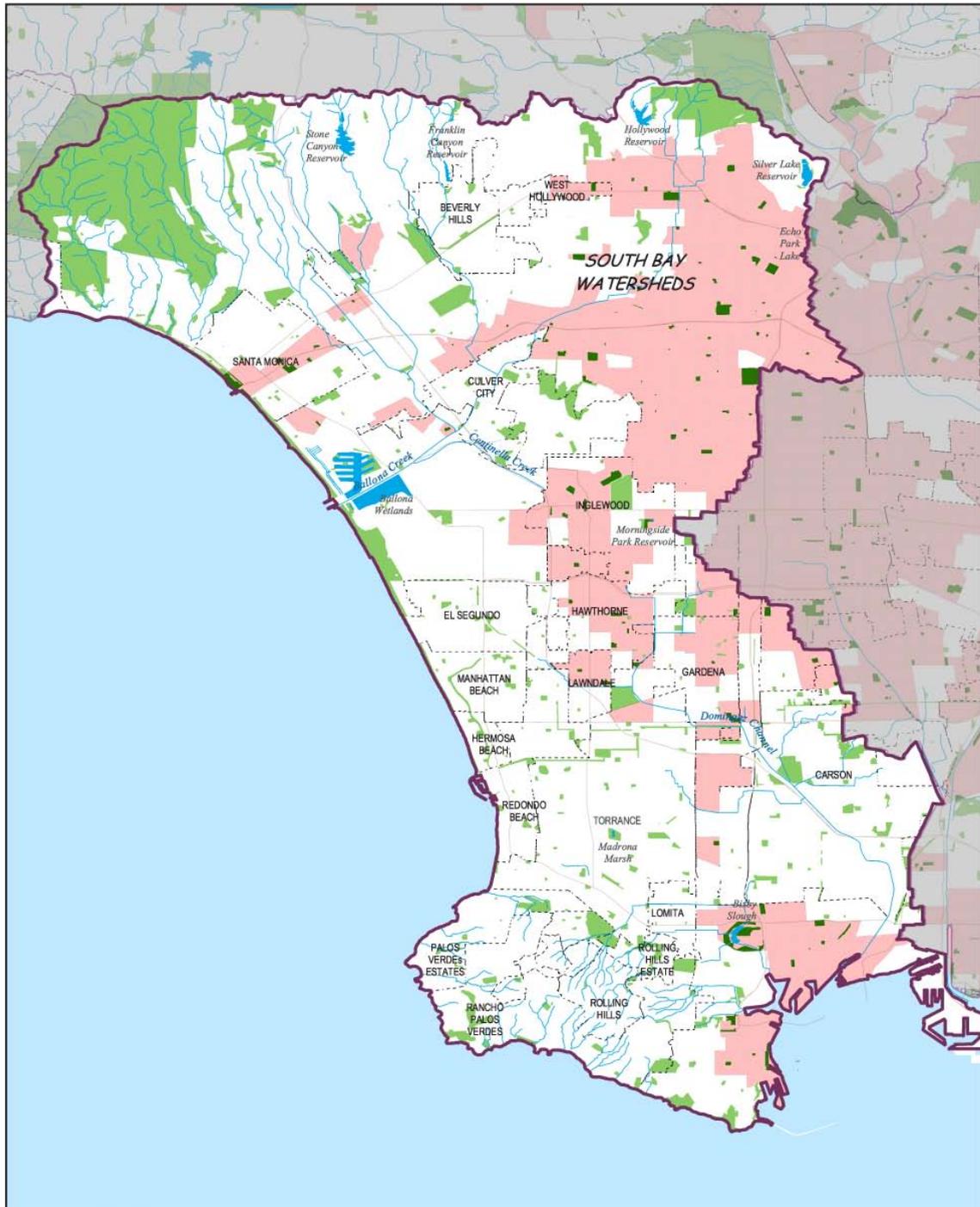


Figure 1-11(D). Disadvantaged Communities, South Bay Watersheds

The majority of the cities in the watershed have goals to increase park land and open space and to meet their set minimum requirements of the ratio of park acreage per each 1,000 population. Goals also include continued maintenance and improvement of existing parks and recreational areas and consideration of accessibility to persons with physical disabilities.

2. ISSUES, CONSTRAINTS AND OPPORTUNITIES

Throughout the Integrated Regional Water Management Plan (IRWMP) process, workshops were held in each sub-region to provide a mechanism by which local concerned parties, municipalities, and stakeholders could provide input on the habitat, open space, and recreation needs of each particular sub-region. The goal was to identify and discuss issues, opportunities, and constraints that are specific to, or of greatest concern, within each sub-region. These comments have been documented and consolidated to those that were contained in the existing plan, studies, and reports that were reviewed during the IRWMP process. Those issues, opportunities, and constraints that are common to all sub-regions are identified as "Regional" points and are discussed below. Those that are sub-region specific are identified in Appendix A. It is important to note that the identification of a particular issue as an opportunity or constraint is based on individual perception as one stakeholder's opportunity may be another stakeholder's constraint.

2.1 Issues

2.1.1 Loss of Natural Function and Habitat in Channels

Alteration of the landscape within the Region has fundamentally changed the relationship between aquatic and terrestrial habitats. The loss of the natural function of habitats within southern California, along with degradation of those remaining, has greatly reduced their natural functions. These functions include habitat to support native species biodiversity; food chain support; hydrological processes, including storm flow management and surface water storage and groundwater recharge; sediment yield, transport and storage processes; and biogeochemical functions important for preserving water quality, including the cycling of organic matter and nutrients, and the trapping and transformation of pollutants (Mitsch and Gosselink, 1986).

In addition, the biological structure and functions found within each habitat are the direct result of a complex set of interactions between the physical processes that provide the foundation for habitat and the community of biota that utilize and modify the habitat. The potential to restore habitat within the Region decreases as the magnitude of natural function loss increases.

2.1.2 Increasing Urbanization and Urban Runoff

The urbanization of the Region has resulted in a significant percentage of the surface area being impervious to rain and infiltration. This creates substantial runoff during storm events. Runoff from urban sources alters the natural hydrology and water quality within the Regions waterways. The alteration of hydrology and deterioration of water quality severely impacts the quality of the Regions' habitat function and biodiversity.

2.1.3 Lack of Usable Undeveloped Land

Restoration and creation of new habitat, recreational areas, and open space is dependent upon having suitable locations on which to site them. The urbanization of the Region has resulted in very limited undeveloped areas and high land values that severely limit potential project locations.

2.1.4 Insufficient Parkland and Poor Access to Open Space

Using the National Standard of 6.25 acres of parkland per 1,000 people, two of the sub-regions (the South Bay Watersheds and Lower Los Angeles and San Gabriel Rivers Watersheds) are below the minimum park

standard. If access to open space by disadvantaged communities is taken into consideration, all of the sub-regions, except North Santa Monica Bay Watersheds, are park poor.

2.1.5 "Active" Versus "Passive" Recreation Conflicts

Different types of recreational activities may conflict with another. For example, active-sports park type recreation could conflict with more passive types of recreation such as nature walks, equestrian uses, and bird watching. Given the limited parkland within certain sub-regions and the limited potential to develop new parkland, conflicts between recreation types and which of these takes priority will tend to occur.

2.1.6 Impacts on Flood Control

One of the primary functions of modern-day waterway channelization is to increase flood protection for the adjacent areas. Restoration of natural stream channels, wetland hydrology, and riparian habitats within the Region can only occur if existing levels of flood protection are guaranteed.

2.2 Constraints

2.2.1 Lack of Funding

The restoration, preservation, and creation of habitat, open space, and/or recreational areas are expensive. Significant funding constraints exist at virtually every planning level including acquisition, clean up, maintenance, staffing, and monitoring of a particular project area. In addition many funding sources, such as Proposition 50, do not fund operations and maintenance of the otherwise fundable projects. This leaves the local governments or other private organizations with a significant monetary barrier to overcome.

2.2.2 Habitat Fragmentation and Protection of Sensitive Species and Wildlife Corridors

Conversion of natural habitat for human use reduces the amount of intact natural habitat and fragments what remains. Urbanization and habitat fragmentation are major threats to wildlife populations, and may result in the loss of species that require large contiguous expanses of unbroken habitat. It may also contribute to the loss of large animals that require extensive home ranges and that already exist in low densities. Wildlife corridors are areas of contiguous habitat that function to prevent or counter habitat fragmentation. Preservation of existing corridors and creation of new ones would allow movement between populations that would otherwise be geographically isolated (islands) within an urban environment.

2.2.3 Exotic, Invasive Plant Species, and Non-Native Animals

Invasive plant and animal species (also referred to as exotics, non-natives, or introduced species) are organisms which have expanded beyond their native range or may have been introduced from other parts of the world. Negative impacts of these species becoming established within an area include reduction in biodiversity, food, habitat and aesthetic quality, and soil productivity. The rapid expansion of exotic weed populations has been a deterrent to restoring native plant communities and re-establishing historic ecological conditions. Species such as *Arundo donax* and *Tamarix ramosissima*, the giant reed and saltceder respectively, use up to three times the amount of water as compared to native species and are responsible for the loss of numerous plant and animal species within southern California riparian and wetland systems.

2.2.4 Piecemeal Planning

Historically unorganized project planning throughout the Region has resulted in a piecemeal approach to planning new projects. Individual project planning does not facilitate the integration of regional solutions to prevent habitat loss, increase open space, and provide for better recreational opportunities. Many times planning by individual jurisdictions does not adequately consider downstream or watershed-wide implications. Nor does there exist a common land use policy that focuses on aquatic habitat within the Region (e.g., a Stream Ordinance). Thus, inconsistencies in local approaches to stream and riparian habitat preservation and mitigation result in a patchwork of regulations that in some cases oppose one another. An integrated approach to planning that promotes multi-jurisdictional and multi-use projects would help to minimize these issues.

2.2.5 Liability and Safety

Liability and security measures could significantly limit public access to water supply facilities (i.e., dams/reservoirs) and any open spaces that may result from these facilities. Homeless encampments are common within open space and can be a source of liability and safety issues. The potential increases in pathogens and bacteria resulting from wildlife in a restored habitat can also pose potential water quality and public health concern.

2.2.6 Private Property Rights Issues

Use of private property for impromptu (i.e., non-authorized) recreation also becomes an issue. Large open areas such as spreading basins and gravel pits for water supply tend to attract unauthorized uses and vandalism in these areas considered to be private property and active commercial enterprises. Conflicts also arise when projects are identified on these private properties and there is a public perception that these projects will result in a loss of open spaces.

2.2.7 Pollutants

Street litter, fertilizers, pesticides, herbicides, pet and yard waste, motor oil, anti-freeze, household hazardous wastes, paint and trace contaminants (i.e., pharmaceuticals) are just a few of the pollutants that find their way into storm drains, streams, rivers, and coastal watersheds of southern California. These pollutants continue to impact open space, recreational areas, habitat, and public health and safety within the Region.

2.2.8 Surrounding Land Use

Land uses that surround potential open space, recreational, or habitat project sites may be incompatible with the purpose of the project. This could lead to conflicts between users of the open space and the adjacent land uses or degradation of, or impacts to, the restored habitat.

2.2.9 Altered Hydrology

All wetlands and riparian habitat depend on certain water conditions (hydrology) to maintain healthy habitats for plants, fish, and other forms of life. When these conditions are altered by land use changes, flood protection measures, or other human actions, these habitats become degraded or are lost completely. Restoration of the correct hydrology is required before restoration of the habitat is successful.

2.3 Opportunities

2.3.1 Regional

2.3.1.1 Habitat Creation, Restoration, and Preservation

Creation, restoration, preservation of the Region's habitat, including riparian, wetland, and aquatic, has increased since the early 1970s but has been limited by extensive urbanization development, as well as by geologic and topographic constraints. Continued efforts to conserve and create habitat throughout the Region could augment current water resources for the Region in addition to enhancing water quality management, habitat, recreation, and open space value. Examples of actions that would create habitat creation, restoration, preservation opportunities include:

- Preserve, restore, and create large areas of riparian habitat and wetlands in appropriate areas of the watersheds.
- Restore creeks and rivers.
- Prevent future degradation and/or loss of riparian habitat and wetlands and related resources through buffers and land use policy.
- Preserve and restore stream corridors and riparian habitat and wetlands in appropriate areas of the watersheds.
- Increase and implement multi-objective planning and projects that integrate natural resources, water quality, recreation, and water supply components into one integrated project.
- Create new land use policy (e.g., stream ordinances) that provide for protection of existing habitat.
- Remove exotic species.
- Implement natural treatment systems.
- Conserve existing open space.

2.3.1.2 Restore Ecosystem Function

Ecosystem restoration's goal is to return a specific ecosystem to a condition that resembles its natural pre-disturbance state as closely as possible. Opportunities to restore ecosystems within the Region center on the reestablishment of natural riverine functions that are dependent upon the interrelationships between the river, its adjacent wetland and riparian habitat, the surrounding uplands, and native flora and fauna. Actions that can be implemented are both large and small scale that can cumulatively result in a shift over time from a non- or poorly functioning disturbed system to a more naturally functioning system. Examples of actions that would provide ecosystem restoration opportunities include:

- Recover and restore native habitat and species diversity.
- Integrate riparian habitat and wetlands recovery efforts with other public objectives.
- Increase and promote creek restoration/daylighting.
- Remove exotic species.
- Recover/restore landscape hydrologic connections where possible.
- Create wetland and riparian habitat.
- Increase channel naturalization.
- Remove concrete/armoring of streambanks where flood protection can be assured.
- Create new land use policy (e.g., stream ordinances).

- Create habitat corridors and trails along right of ways.

2.3.1.3 Improve and Increase the Amount and Access to Open Space and Recreation for All Communities

Given that the Region is considered to be park poor, increases in the amount and accessibility to open space and recreation would not only provide greater recreational opportunities but also play a role in heightening public awareness with respect to the value of natural areas and the importance of preservation of cultural resources. Continued efforts to increase open space and create recreational opportunities could also result in multi-purpose projects that provide water quality management and habitat creation benefits. Examples of actions that would create open space and recreational opportunities include:

- Promote education and compatible access related to riparian habitat and wetlands and watersheds.
- Create regional greenway connections between communities and parks.
- Produce a comprehensive trail and bikeway plan.
- Create additional neighborhood parks, open space, community gathering areas and public recreational water access.
- Restore existing open/space parks.
- Increase and implement multi-objective planning and projects.
- Consider the potential for open space on unbuildable land.
- Encourage native planting of parkland areas to improve habitat for wildlife.
- Clean up and develop Brownfields.

3. PLANNING OBJECTIVES

3.1 Assumptions

In identifying quantifiable objectives under this TM the following assumptions were used to help define and formulate those objectives.

3.1.1 Wetlands and Riparian Habitat

- This document covers a 20-year plan horizon.
- Existing technical reports and studies by regional experts will be used to identify and set quantifiable objectives.
- Preservation, restoration and enhancement of all existing natural wetlands and riparian vegetation will continue within the Region per State and federal regulations (i.e., "No Net Loss" policy).
- Projects and future actions will be consistent with existing regional programs (e.g., Wetlands Recovery Project).

3.1.2 Recreation and Open Space

- Constructed wetland and riparian habitat would assist in meeting the regional parkland objective.
- Open space and parks include beaches, cemeteries and golf courses.
- Open space and parks not include undeveloped private lands.
- Population projections, per Southern California Association of Governments (SCAG) 2004 RTP Growth Forecast, between 2006 and 2026 is 15.4 percent. Population growth is the same throughout the region.
- Sub-regional population numbers are based on U.S. Census data taken in 2000.
- Open space and park numbers for the region are based on SCAG data.
- Open space and park numbers do not include undeveloped private lands, Angeles National Forest, Santa Monica National Recreation Area, Topanga State Park and other State Lands.
- National Recreation and Park Association standard of 6.25 -10.5 acres per 1,000 people.
- Disadvantage communities household income is less than 80 percent of the statewide annual median household income, which is \$37,994 based on U.S. Census data taken in 2000.
- Preservation of all existing open space (designated) and parks.

3.2 Quantifiable Objectives

To provide a benchmark to measure the IRWMPs success in meeting the water management strategies listed within Chapter 8 of Proposition 50, the following quantifiable objectives are proposed. These quantifiable objectives are based on and incorporate the assumptions listed above.

3.2.1 Wetlands

As wetland areas are ecologically and socially significant in their effects on water quality and quantity, as well as aesthetics, habitat, bank stability, and their contribution to overall biodiversity, numerous studies have identified non-quantifiable goals for wetlands within the Region (Southern California Wetland Recovery

Project Regional Plan, 2001; Coastal Conservancy, 2000, California Resources Agency, 2001; Santa Monica Mountains Conservancy, 2001; Dominguez Watershed Advisory Council, 2004; The River Project in prep).

Having clear goals is an important part of the planning process as they provide purpose and focus; as such the following non-quantifiable goals for wetlands habitat are proposed within the Region during the IRWMP implementation period:

- Wetland Goal #1: Preserve and restore wetland ecosystems.
- Wetland Goal #2: Preserve and restore stream corridors and wetland ecosystems in coastal watersheds.
- Wetland Goal #3: Recover native habitat and species diversity.
- Wetland Goal #4: Integrate wetlands recovery with other public objectives.
- Wetland Goal #5: Promote education and compatible access related to coastal wetlands and watersheds.
- Wetland Goal #6: Advance the science of wetlands restoration and management in southern California.
- Wetland Goal # 7: Recover landscape elements of ecosystem structure.

With respect to quantifiable objectives, the Southern California Wetlands Recovery Project (SCWRP) Science Panel's Improving Regional Planning of Wetland Ecosystem Restoration and Management in Southern California (2002) identified five recovery objectives, identified below, that specified the elements of ecosystem structure and function that must be maintained or restored to achieve "recovery".

1. Maintain existing and increase wetland acreage.
2. Recover habitat diversity to reflect historic distribution to the extent possible.
3. Restore physical processes.
4. Recover biological structure and function.
5. Recover landscape elements of ecosystem structure.

The goals are programmatic goals that define the primary actions (preservation and restoration) and targets of these actions (wetland ecosystems), define the geographic scope (southern California coastal watersheds), and emphasize habitat and species diversity. They also establish ancillary goals that provide additional benefits to the public including improved water quality, storm flow management, education and public access, and a better understanding of wetland restoration and management in southern California. The SCWRP stopped short of establishing a numerical quantifiable wetland goal as, "Implementation of a habitat goals project depends on the development of data sources for this assessment. The Science Advisory Panel (SAP) recommends updating the historical and present day inventories by habitat type, and cataloging monitoring data used to develop habitat requirements for wetland species. The SAP will provide specific recommendations on establishing [numeric] targets once the availability and quality of these data are documented."

No other documents, studies, or technical reports have been identified that specifically identify a quantifiable (numeric) objective for wetlands within the region.

The IRWMP proposed the identification of quantifiable objectives to measure the program's success in meeting the water management strategies listed within Chapter 8 of Proposition 50. For this IRWMP, a fundamental assumption of establishing the quantifiable objectives is that existing technical reports and studies created and reviewed by regional experts will be used to identify and set any quantifiable objectives. As such, a quantifiable (e.g., numeric) regional or sub-regional objective for the water management strategy of Wetlands Creation cannot currently be established, as regional experts have recognized that there is a need to better articulate the major elements of wetland ecosystem structure and function prior to establishing numeric targets.

3.2.2 Riparian Habitat

As riparian ecosystems can be ecologically significant in their effects on water quality and quantity, aesthetics, habitat, bank stability, and overall biodiversity, several studies have identified non-quantifiable goals for riparian vegetation within the Region (Southern California Wetland Recovery Project Science Panel, 2002; Coastal Conservancy, 2000, California Resources Agency, 2001; Santa Monica Mountains Conservancy, 2001; Dominguez Watershed Advisory Council, 2004; The River Project in prep). Having clear goals is an important part of the planning process as they provide purpose and focus; as such the following non-quantifiable goals for riparian habitat are proposed within the Region during the IRWMP implementation period.

- Riparian Goal #1: Ensure that riparian-related identified beneficial uses (per the Basin Plan) for a water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses to ensure riparian viability.
- Riparian Goal #2: Maintain or restore the geomorphic and biological characteristics of riparian vegetation and special aquatic features, including lakes, meadows, wetlands, vernal pools, springs; streams and rivers, including flow volume and seasonality; reconnect creek and river corridors to their floodplains; and hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.
- Riparian Goal #3: Preserve, restore, or enhance riparian vegetation and special aquatic features, such as meadows, lakes, ponds, vernal pools, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.
- Riparian Goal #4: Restore sediment transport functions and characteristic patterns. As described above, sediment transport functions have been altered in several ways. Restoration activities could include removing dams and other barriers to sediment transport, managing storm flows to increase scouring and flushing of downstream sediments, trapping sediment, and removing excess sediment in downstream estuaries.
- Riparian Goal #5: Reduce erosion, both along stream channels and from upland areas. Stream bank and channel erosion should be controlled through environmentally-sensitive stabilization measures that minimize channel hardscaping. Efforts to reduce erosion from upland areas will focus on working with landowners to implement erosion control management measures.
- Riparian Goal #6: Identify and implement maintenance and restoration actions to maintain, restore or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.
- Riparian Goal #7: Implement stream protection ordinances and increase riparian buffers to preserve and protect riparian vegetation and ensure the long-term survival of the riparian habitat; enhance the opportunities for wildlife use of riparian areas; promote and increase pollutant and sediment removal; and provide a funding mechanism for maintenance of riparian areas.
- Riparian Goal #8: Improve the non-native/native plant ratio within riparian habitat and increase public awareness of the sensitive nature of the habitat.

The SCWRP Science Panel's Improving Regional Planning of Wetland Ecosystem Restoration and Management in Southern California (2002) also addressed riparian vegetation within the Region. For the purposes of their report they chose to use the term "wetland ecosystem" which includes "the wetlands, adjacent transitional deepwater and upland habitats" that serve a role critical to the ecological function of the wetland. In many locations such as rivers, streams, creeks, and seeps the adjacent habitats would include riparian areas. The habitat type approach was used to help the SCWRP develop a general set of recovery objectives (as detailed in the wetland quantifiable objective discussion above). The intent is that these

objectives be applicable to all classes of southern California wetland and their adjacent and transitional habitats (e.g., riparian).

As with the wetlands component, the proposed riparian goals are programmatic and the SCWRP stopped short of establishing a numerical quantifiable riparian goal as the establishment and implementation of habitat goals depends on the development of data sources. The SAP will provide specific recommendations on establishing (numeric) objectives for riparian habitat once the availability and quality of historical and present day inventories by habitat type and monitoring data used to develop habitat requirements are documented.

For this TM, a fundamental assumption of establishing the quantifiable objectives is that existing technical reports and studies created and reviewed by regional experts will be used to identify and set any quantifiable objectives. As such, a quantifiable (e.g., numeric) regional objective for the water management strategy of Riparian Habitat Creation cannot currently be established, as regional experts have recognized that there is a need to better articulate the major elements of riparian ecosystem structure and function prior to establishing numeric targets. However, as discussed below there are sufficient data to allow for sub-regional quantifiable objective.

Within the North Santa Monica Bay Watersheds sub-region, specifically within the Malibu Creek Watershed, Heal the Bay's Stream Team, on behalf of the California State Coastal Conservancy, the California Department of Parks and Recreation, and the Santa Monica Bay Restoration Commission, completed a fish migration barrier severity and steelhead habitat quality study (2005) that identified 10 barriers that if removed would meet a minimum of 93 percent of the Santa Monica Bay Restoration Commission's overall goal of increasing steelhead trout habitat in the Santa Monica Mountains by 20 miles. As steelhead habitat is inexorably linked to adjacent riparian habitat, the Santa Monica Bay Restoration Commission's 20 mile goal can be directly related to riparian vegetation and thus, provide the required existing technical reports and studies created and reviewed by regional experts to allow the establishment of a sub-regional quantifiable objective.

Riparian Objective 1. Develop 20 linear miles of riparian habitat and habitat buffer within the North Santa Monica Bay Watersheds sub-region.

No other documents, studies, or technical reports have been identified that specifically identify a quantifiable (numeric) objective for riparian habitat within the region.

3.2.3 Open Space and Recreation

Open Space and Recreation Objective 1. Provide 30,000 acres of new water resources related parkland and open space, focused in under-served communities.

In order to keep up with population growth, 15.4 percent more parks and open space need to be added (the equivalent of 7,300 acres), except in the North Santa Monica Bay Watersheds sub-region.

In order to meet the National Standard of a minimum of 6.25 acres of open space per 1,000 people, we need an additional 23,000 acres of open space in the South Bay Watersheds and in the Lower Los Angeles and San Gabriel Rivers Watersheds for a total of 30,000 acres. Table 3-1 shows additional park requirements over the next 20 Years.

Table 3-1. Additional Park Requirements Over 20 Years

Sub-region	Population 2006	Population 2026	Existing Acreage Open Space and Recreation	Additional acreage needed to keep pace with population growth of 15.4% from 2006-2026	Acres per 1,000 people	Additional acreage needed to bring acreage to national standard of 6.25	Total new acreage needed per sub-region
Lower Los Angeles and San Gabriel Rivers Watersheds	3,219,316	3,715,091	11,690	1,800	3.6	10,658	12,458
Upper San Gabriel River and Rio Hondo Watersheds	1,640,528	1,893,169	11,632	1,791	7.1		1,791
Upper Los Angeles River Watershed	2,338,290	2,698,387	16,174	2,491	6.9		2,491
South Bay Watersheds	2,903,382	3,350,503	8,138	1,253	2.8	12,387	13,640
North Santa Monica Bay Watersheds	106,480	122,878	5,155		42.0		0
TOTAL	10,207,996	11,780,027	52,789	7,336		23,045	30,380

4. WATER MANAGEMENT STRATEGIES

The Integrated Regional Water Management Grant Program Guidelines identify 20 water management strategies that may be included in an IRWMP. With respect to habitat, recreation and open space, the following water management strategies are discussed in this TM: ecosystem restoration, environmental and habitat protection and improvement, recreation and public access, and wetlands enhancement and creation.

4.1 Ecosystem Restoration

4.1.1 Background

Despite their exceptional importance and value, many of the Region's inland, riverine, and coastal ecosystems have suffered from more than 100 years of human impacts including 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 processes 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 Region's native ecosystems. The fundamental goal of ecosystem restoration is to return the selected ecosystem to a condition that resembles its natural pre-disturbance 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 treatment.

4.1.2 Opportunities for Improvements and Integration

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. Dams constructed to detain runoff created sediment traps that deprive coastal beaches of new material. 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.

Numerous 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, 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 is their goal of preserving and restoring large areas of habitat to increase and restore the natural functions of both the project and surrounding areas. The coordinated planning and implementation of these and other restoration projects will, by virtue of their inherent hydrologic effects, advance the objectives of improving management of water quality and water supply. Some of these plans and multi-benefit projects that would provide various levels of ecosystem restoration are identified in Appendices B and C.

4.2 Environmental and Habitat Protection and Improvement

4.2.1 Background

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. Water quality impairments include increases of 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 that 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.

4.2.2 Opportunities for Improvements and Integration

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.

Numerous opportunities for restoration, improvement, and protection of the Region's riparian and aquatic habitat and environment 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 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. The coordinated planning and implementation of these and other habitat protection and improvement projects will, by virtue of their inherent hydrologic effects, advance the objectives of improving management of water quality and water supply. Some of the numerous multi-benefit environmental and habitat protection and improvement plans and projects that also provide water quality and water supply opportunities are listed in Appendices B and C.

4.3 Recreation and Public Access

4.3.1 Background

One of the overarching goals of this Region is to maintain a sufficient open space and park systems so that it is diverse in uses and opportunities and includes natural function and wildlife habitat, as well as passive and active recreation with an equitable distribution of parks, trees and pathways throughout the community. Our region as a whole is currently below the National Standard of parks per 1,000 people. This is especially true in disadvantaged communities mostly located in the coastal plains, which not only have fewer local parks within their community but are also far away from the large tracts of open space in the Santa Monica and San Gabriel Mountains. With the expected population growth of 15.4 percent over the next 20 years, we will be woefully short of park land.

4.3.2 Opportunities for Improvements and Integration

Due to urbanization and the lack of available land for the creation of new parks, it is necessary to be very creative in the ways that we achieve our open space goals.

To increase open space, 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 are 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, Los Angeles Department of Water and Power easements are being used for treatment wetlands to assist local cities in meeting water quality regulatory requirements.

Floodplain restoration is another opportunity to increase open space while also providing water supply and quality benefits. Restoration efforts may include setting back the banks of the rivers and daylighting 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.

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 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 goals of improved water supply and quality. Some of the numerous multi-benefit open space and recreation plans and projects that also provide water quality and water supply opportunities are listed in Appendix C.

4.4 Wetlands Enhancement and Creation

4.4.1 Background

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 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 that affect fish and wildlife 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.

4.4.2 Opportunities for Improvements and Integration

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 to helping the public understand its 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 money. However, there are many opportunities. Meeting water quality and flood management needs, water supply needs and habitat and recreation goals over the next 20 years will strain the Region's 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. There is an alternative, however; with planning, cooperation, and vision, one can integrate many projects so that projects achieve multiple goals. 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 treat them more favorably and there are more funding sources to tap for a given project.

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 LA 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. The coordinated planning and implementation of these many wetland enhancement and creation projects will, by virtue of their inherent hydrologic effects, advance the objectives of improving management of water quality and water supply. Some of the numerous multi-benefit environmental wetland plans and projects that also provide water quality and water supply opportunities are listed in Appendix C.

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 IRWMP will lead to 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.

5. CONCLUSIONS: OPPORTUNITIES FOR INTEGRATION OF HABITAT, OPEN SPACE AND RECREATION ELEMENTS INTO PROJECTS

Opportunities for regional strategies for increasing habitat, open space, and recreation opportunities exist within almost every water quality and water supply project. Natural treatment systems and/or stormwater capture projects that increase water quality, recharge groundwater, or increase reliability, can include areas of riparian vegetation, parks and open space, and wetland habitat. Although constructed wetlands offer reduced opportunities for habitat and species diversity due to their treatment nature, the realities of acquiring land within a highly urbanized environment, limited funding opportunities and project funds, sub-regional conflicts in stakeholder needs and desires, and watershed-wide hydrological disruption require multi-jurisdictional cooperation to promote and implement the integrated projects that maximize space, funds, and implementation times. For example, a Region-wide stream ordinance and integrated “Safe Harbor” agreement for endangered and threatened species could facilitate streamlined planning and permitting on a Regional scale, based on the model of the successful Multi-Species Habitat Conservation Plans. These provide for the protection and potential re-introduction of multiple special-status species and sensitive habitats while providing the property owners or managers with the security of an up-front agreement as to how to handle any colonizing special-status species. This and other cross-jurisdictional approaches to addressing Regional issues would minimize potential conflicts between habitat and ecosystem restoration and water quality, and water supply projects while providing the necessary stakeholder incentives such as a secure mechanism for dealing with sensitive species issues that may result from the creation of new wetlands, riparian habitat, open space and recreation areas.

In summary, an integrated regional approach to the protection, enhancement and creation of riparian habitat, wetlands, parklands and other open space constitutes a powerful strategic tool for improving water quality, reducing demand for imported water and improving water reliability through multi-purpose land use aimed at advancing beneficial uses.

6. LIMITATIONS

Report Limitations

This document was prepared solely for the Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Plan in accordance with professional standards at the time the services were performed and in accordance with the contract between the Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Plan and Brown and Caldwell dated May 15, 2006. This document is governed by the specific scope of work authorized by the Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Plan; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Plan and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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APPENDIX A

Sub-Regional Issues, Constraints, and Opportunities

IRWMP STAKEHOLDERS

South Bay Sub-Region

- Lack of Transitions in Land Use
- Minimal Buffer Areas
- Channelization of Drainages
- Habitat Fragmentation
- Narrow Buffers to Urban Development

North Santa Monica Bay

- Restoration of Steelhead Habitat and Access
- Restoration of Malibu Lagoon Habitat
- Restore Habitat and Natural Hydrologic Function of Creeks
- Reliance on US Army Corps of Engineers for Dam Removal
- Conflicting Needs of Wildlife
- Equestrian Uses
- Impact of Upstream Urbanization

Upper Los Angeles River

- How to Preserve Upland Habitat

Lower San Gabriel and Lower Los Angeles Rivers

- Stream Modification
- Equestrian Uses
- Lack of Data
- Wildlife Corridor in Puente-Chino Hills Under Development Threat
- Cost of Removal of Green Waste From Upstream Restoration

Upper San Gabriel and Rio Hondo Rivers

- Stream Modification
- Equestrian Uses
- Lack of Data
- Protection of Uplands

South Bay Sub-Region

- Wetlands Restoration/Creation (I.E. Ballona, JWPCP Marshland, Dominguez Channel)
- Trail Creation
- Natural Treatment Systems

- Conserve Existing Natural Resources
- Conserve Natural Canyons and Hillsides for Drainage Control and Wildlife Habitat.
- Promote Landscaping Along Dominguez Channel
- Protect and Link Open Space Areas

North Santa Monica Bay

- Removal of Man-Made Barriers to Steelhead Migration
- Steelhead Restoration
- Create Six Viable Watersheds
- Create 40 Miles of Steelhead Habitat
- Create 100 Foot Riparian Buffer Starting At Edge of Canopy

Upper Los Angeles River

- Promote/Increase Ecosystem Restoration in Hansen Dam, Sepulveda Basin, Chatsworth Reservoir, Glendale Narrows, Foothills and Arroyo Seco
- Increase Channel Naturalization
- Widening River Channel
- Recover/Restore Landscape Hydrologic Connections
- Create Greenway and Bikeway Along Creeks and Rivers and Transportation and Utility Corridors
- Multi-Purpose Parks
- Integrate Recreation Into Wetlands and Watershed Projects.
- Provide For Maintenance of Parks, Open Space, and Trails
- Create Habitat Corridors Along Washes (I.E., Tujunga and Pacoima)
- Restore Riparian Habitat Along Historic Tributaries Where Feasible
- Watershed Protection

Lower San Gabriel and Lower Los Angeles Rivers

- Promote/Increase Ecosystem Restoration In:
- Long Beach/Marina (Bullet)
- Coyote Creek (Bullet)
- Compton Creek (Bullet)
- Rio Hondo (Bullet)
- LA/SG Rivers (Bullet)
- Los Cerritos Wetland Complex (Bullet)
- Increase Channel Naturalization
- Widening the River Channel
- Recover/Restore Landscape Hydrologic Connections
- Create Greenway and Bikeway Along Creeks and Rivers and Transportation and Utility Corridors

- Dual Use Flood Channel (Buried) and Naturalized Stream (On Surface)

Upper San Gabriel and Rio Hondo Rivers

- Promote/Increase Ecosystem Restoration in Santa Fe Dam
- Preserve Pristine Waters of Upper San Gabriel
- Equestrian Use
- Integrate Recreation Into Wetlands and Watershed Projects.
- Provide for Maintenance of Parks, Open Space, and Trails
- Creation of Habitat Linkages and Corridors

Table A-1. North Santa Monica Bay Sub-Region Stakeholders	
Stakeholder	Stakeholder
Agoura Hills, City of and Westlake Village, City of	National Park Services-Santa Monica Mountains NRA
Agoura, City of	Port Community Advisory Committee
ASCE, Brown and Caldwell	Port of Long Beach
Assembly District No 56	Resource Conservatory of Santa Monica
Calabasas, City of	Resource Conservation District of Santa Monica Mountains
California Department of Parks and Recreation	RWQCB, Los Angeles
California Coastal Conservancy	San Gabriel
California Department of Public Works	Santa Monica Bay Restoration Commission
California Department of Transportation	Santa Monica Baykeeper
California Department of Water Resources	Santa Monica Mountains Conservancy
CDM Inc.	South Pasadena
Duvivier Architects	State of California Department of Water Resources
Heal The Bay	Stormwater 360
Las Virgenes Municipal Water District	Triunfo Sanitation District
Los Angeles City Department of Beaches and Harbors	University of Southern California
Los Angeles County Beaches & Harbors	Water District # 29 Los Angeles County Waterworks Division
Los Angeles County Board of Supervisors	West Basin Municipal Water District
Los Angeles County Department of Public Works	Westlake Village, City of
Malibu, City of	Whitehouse Properties
Mountains Restoration Trust	World Team

Table A-2. South Bay Sub-Region Stakeholders

Stakeholder	Stakeholder
ABA	Los Angeles City Department of Recreation & Parks
Architectural Division, Bureau of Engineering, Department of Public Works	Los Angeles County Department of Parks and Recreation
Arroyo Seco Foundation	Los Angeles County Department of Public Works
ASCE, Brown and Caldwell	Los Angeles County Sanitation District
Baldwin Hills Conservancy	Los Angeles Department of Transportation
Ballona Creek Renaissance	Los Angeles Department of Water and Power
Ballona Ecosystem Education Project	Los Angeles Neighborhood Initiative
Ballona Wetlands Land Trust	Los Angeles Port Commission
Beverly Hills, City of	Los Angeles Regional Water Quality Control Board
Brown & Caldwell	Los Angeles, City of
Calabasas, City of	Madrona Marsh
CalFed B/D Authority	Manhattan Beach, City of
California Department of Public Works	Moffat & Nichol
California Department of Water Resources	Mono Lake Committee
California Water Services Company	Mountains Recreation and Conservation Authority
Carson, City of	Mountains Restoration Trust
Central/West Basin MWD	MWH
Citizens Committee To Save Elysian Park	North East Trees
Congresswoman Maxine Waters Office	OSG, Ltd.
Conservation Strategy Group	Palos Verdes & South Bay Audobon
Council Member Wendy Greuel	Palos Verdes Estates
Crescenta Valley Water District	Palos Verdes Peninsula Land Trust
CSSLAR	Playa Vista, City of
Culver City	Playa Vista, City of
Department of Water and Power, City of Los Angeles	Port Community Advisory Committee
Downey, City of	Port of Los Angeles
Duvivier Architects	PSOMAS
East Valley Coalition	Rancho Palos Verdes, City of
Econ Alliance San Fernando Valley	Redondo Beach, City of
EE+K Architects	Resource Conservatory of Santa Monica

Table A-2. South Bay Sub-Region Stakeholders

Stakeholder	Stakeholder
Egmond Associates	RMC Water and Environment
EIP Associates	Rolling Hills Estates, City of
El Segundo, City of	RWQCB, Los Angeles
Expert, Inc.	San Fernando, City of
Gardena, City of	San Gabriel, City of
GDLA	Santa Monica Bay Restoration Commission
GeoSyntec	Santa Monica Baykeeper
Glendale, City of	Santa Monica City Stormwater Management
Greater CL Parks Coalition	Santa Monica Mountains Conservancy
Hawthorne, City of	SMBRE
Heal the Bay	So Cal Marine Institute
Hermosa Beach, City of	So Cal Wetland Recovery Project
Inglewood City Department of Parks, Recreation, and Community Service	South Bay Cities COG
Inglewood, City of	State Coastal Conservancy
IRRI	State of California, Dept of Water Resources
Judy Wilson & Associates	TECS Environmental
Kleinfelder, Inc.	Torrance, City of
KMHRP Advisory	TreePeople
Lawndale	Trust for Public Land
Lomita, City of	Tujunga Watershed Council
Long Beach City Department of Public Works	United Anglers of Southern California
Long Beach, City of	University of Southern California
Los Angeles & San Gabriel Rivers Watershed Council	US Army Corps of Engineers, Los Angeles District
Los Angeles City Bureau of Engineering	USC Sea Grant
Los Angeles City Bureau of Sanitation	Water Replenishment District
Los Angeles City CD #2 (Wendy Greuel)	West Basin Municipal Water District
Los Angeles City CD #4	West Basin Water Association
Los Angeles City CD#9	West Hollywood, City of
Los Angeles City Council District 1	Wild Bird Unlimited
Los Angeles City Department of Parks and Recreation-Cabrillo	

Table A-3. Upper Los Angeles River Watershed Sub Region Stakeholders

Stakeholder	Stakeholder
Alladena Town Council	Los Angeles County Department of Health Services
Angeles National Forest	Los Angeles County Department of Parks and Recreation
Arroyo Seco Foundation	Los Angeles County Department of Public Works
ASCE, Brown and Caldwell	Los Angeles County Sanitation District
Baldwin Park, City of	Los Angeles Department of Water and Power
Beverly Hills, City of	Los Angeles Neighborhood Initiative
Brown & Caldwell	Los Angeles Regional Water Quality Control Board
Burbank Water and Power	Los Angeles, City of
Burbank, City of	Lynwood, City of
Bureau of Reclamation	Manhattan Beach, City of
Calabasas, City of	Metropolitan Water District of Southern California
California Coastal Conservancy	Monrovia, City of
California Conservation Corps	Monterey Park, City of
California Department of Health Services	Mountains Recreation and Conservation Authority
California Department of Parks and Recreation	Mountains Restoration Trust
California Department of Public Works	MWH
California Department of Water Resources	North East Trees
California State Parks	Norwalk, City of
Calpirg	Pasadena, City of
Carson, City of	Port Community Advisory Committee
Cerritos, City of	Port of Long Beach
Charles Abbott Associates, Inc.	Port of Los Angeles
Coastal Conservancy	Praxair
Conservation Strategy Group	Purkiss Rose RSI
Crescenta Valley Water District	PV/South Bay Audubon
Department of Fish and Game	Rancho Palos Verdes, City of
La County Department of Public Works Bureau of Sanitation	Redbird
Department of Public Works, Bureau of Sanitation	Regional Water Quality Control Board
Diamond Bar, City of	Resources Agency
Duarte, City of	RMC Water & Environment
Duvivier Architects	RWQCB, Los Angeles

Table A-3. Upper Los Angeles River Watershed Sub Region Stakeholders

Stakeholder	Stakeholder
EIP Associates	SA Associates
El Monte, City of	San Diego County Department of Public Works
Expert, Inc.	San Dimas, City of
Flow Science	San Fernando, City of
Friends of The Los Angeles River	San Gabriel Basin Water Quality Authority
Friends of The San Gabriel River	San Gabriel Mountains Regional Conservancy
GDLA	San Gabriel Valley News
Glendale Water and Power	San Gabriel Valley Water Association
Glendale, City of	Sanitation Districts of Los Angeles County
Glendora, City of	Santa Clarita, City of
Heal the Bay	Santa Fe Springs, City of
Huntington Park, City of	Santa Monica, City of
Industry, City of	Signal Hill, City of
La Canada Flintridge, City of	So Cal Transport & Land Use Coalition
La Habra Heights, City of	So Cal Wetland Recovery Project
Lakewood, City of	South Pasadena, City of
Lanterman Regional Center	State Coastal Conservancy
Lawndale, City of	State of California, Dept of Water Resources
Long Beach City Department of Public Works	TECS Environmental
Long Beach, City of	The River Project
Los Angeles & San Gabriel Rivers Watershed Council	TreePeople
Los Angeles City Bureau of Sanitation	Tujunga Watershed Council
Los Angeles City CD #4	UC Davis
Los Angeles City Council Jack Weiss	Ultra Systems
Los Angeles City Department of Parks and Recreation-Cabrillo	University of Southern California
Los Angeles City Department of Public Works	Upper Los Angeles River Area Watermaster
Los Angeles City Department of Recreation & Park	US Army Corps of Engineers
Los Angeles City Department of Water and Power	US Army Corps of Engineers, Los Angeles District
Los Angeles City Mayor's Office	Watts Renaissance Planning Committee
Los Angeles City Rec & Parks	WBWA
Los Angeles Council District 2	West Basin Municipal Water District

Table A-3. Upper Los Angeles River Watershed Sub Region Stakeholders

Stakeholder	Stakeholder
Los Angeles Council District 4	West Basin Water Association
Los Angeles Council District 7	West Hollywood, City of
Los Angeles County	

Table A-4. San Gabriel and Lower Los Angeles River Sub-Region Stakeholders

Stakeholder	Stakeholder
Arcadia, City of	Los Angeles Regional Water Quality Control Board
ASCE, Brown and Caldwell	Los Angeles Unified School District
Assembly District No 56	Los Angeles, City of
Audubon Society	Lynwood, City of
Azusa, City of	Main San Gabriel Basin Watermaster
Baldwin Park, City of	Metropolitan Water District of Southern California
Bellflower, City of	Mia Lehrer & Assoc.
Brown and Caldwell	MLAB-ASCE
California American Water Company	Montebello, City of
California Coastal Conservancy	North East Trees
California Department of Health and Services	Norwalk, City of
California Department of Public Works	Orange County
California Department of Water Resources	OSG, Ltd.
California State Assembly	Paramount, City of
California State Division Boating and Waterways	Pico Rivera, City of
Caltrans	Purkiss-Rose/ RSI Landscape Architect
Central/West Basin MWD	Rivers and Mountains Conservancy
Cerritos, City of	RMC Water and Environment
Coastal Conservancy	RWQCB, Los Angeles
Commerce, City of	San Gabriel Hydroelectric Association
Compton, City of	San Gabriel Mountains Regional Conservancy
Congresswoman Napolitano 38th District	San Gabriel River Water Committee
County Sanitation Districts of Los Angeles County	San Gabriel River Watermaster
Downey, City of	San Gabriel Valley Council of Governments
Duarte, City of	San Gabriel Valley Municipal Water District
Duvivier Architects	San Gabriel Valley Water Association
EEC	Santa Fe Springs, City of
EIP Associates	SEA Lab Los Angeles Conservation Corps.
El Monte, City of	Senatorial District No 24
Expert, Inc.	Sierra Club

Table A-4. San Gabriel and Lower Los Angeles River Sub-Region Stakeholders

Stakeholder	Stakeholder
Friends of The San Gabriel River	Signal Hill, City of
Gateway Cities COG	South El Monte, City of
Gateway CPG- City of Paramount	South Gate, City of
Heal the Bay	Southeast Water Coalition
Huntington Park, City of	Southern California Association of Governments
Industry, City of	State of California Department of Fish And Game
Irwindale, City of	State of California Department of Water Resources
John L. Hunter and Associates	Surf Rider Foundation / City of Seal Beach
La Mirada, City of	The Ferguson Group
Lakewood, City of	Three Valleys Metropolitan Water District
Lakewood/Los Banos Wildlife Area	TreePeople
Long Beach City Department of Parks, Recreation & Marine	Trust for Public Land
Long Beach City Department of Public Works	University of California, Irvine
Long Beach Water Department	University of Southern California
Long Beach, City of	Upper San Gabriel Valley Municipal Water District
Los Alamitos, City of	US Army Corps of Engineers, Los Angeles District
Los Angeles & San Gabriel Rivers Watershed Council	Vernon, City of
Los Angeles City Bureau of Sanitation	Water Replenishment District
Los Angeles City Department of Public Works	Watts Renaissance Planning Committee
Los Angeles County	West Basin Municipal Water District
Los Angeles County Department of Parks and Recreation	Whittier, City of
Los Angeles County Department of Public Works	Withers and Sandgren
Los Angeles County Department of Regional Planning	Los Angeles County Sanitation District

Table A-5. Upper San Gabriel River Sub-Region Stakeholders	
Stakeholder	Stakeholder
43RD Assembly District (Dario J. Frommer)	Los Angeles Council District 4
Alhambra, City of	Los Angeles Council District 7
Altadena Town Council	Los Angeles County Department of Parks and Recreation
Angeles National Forest	Los Angeles County Department of Public Works
Arcadia, City of	Los Angeles County, CAO
Arroyo Seco Foundation	Los Angeles Puente
Azusa, City of	Los Angeles Unified School District
Baldwin Park, City of	Los Angeles, City of
Beverly Hills, City of	Los Virgenes MWD
BP environmental	Main San Gabriel Basin Watermaster
Brown and Caldwell	McGuire Malcolm Pirnie
Burbank Water and Power	Monrovia, City of
Bureau of Reclamation	Monterey Park, City of
CAA	National Parks Service
Cabrillo Marine Aquarium	North East Trees
California Department of Health Services	Norwalk, City of
California Department of Public Works	Office of Assembly member Alan Lowenthal
California Department of Transportation	Palos Verdes Land Conservancy
California Department of Water Resources	Pasadena, City of
California Environmental Protection Agency	Redbird
California State Division Boating and Waterways	Regional Board
California State Parks	Rivers and Mountains Conservancy
California Water Service Company	Rosemead, City of
California, State of	RWQCB, Los Angeles
Cerritos, City of	San Diego County Department of Public Works
Claremont, City of	San Dimas, City of
Compton, City of	San Fernando, City of
Covina, City of	San Gabriel Basin Water Quality Authority
Cresenta Valley Water District	San Gabriel Mountains Regional Conservancy
Department of Public Works Bureau of Sanitation	San Gabriel Valley Municipal Water District
Diamond Bar, City of	San Gabriel Valley Water Association

Table A-5. Upper San Gabriel River Sub-Region Stakeholders	
Stakeholder	Stakeholder
Downey, City of	San Gabriel, City of
Egmond Associates	San Marino, City of
Foothill Municipal Water District	Sierra Madre, City of
Gateway Cities Council of Governments	Signal Hill, City of
Glendale Water and Power	South El Monte, City of
Glendale, City of	South Pasadena, City of
Glendora, City of	Stetson Engineers
Greater Los Angeles County Vector Control	Three Valleys Municipal Water District
Integrated Resource Management	Ultramar Diamond Bar-Shamrock
John L. Hunter and Associates	University of Southern California
La Puente, City of	Upper San Gabriel Valley Municipal Water District
La Verne, City of	US Army Corps of Engineers, Los Angeles District
Los Angeles & San Gabriel Rivers Watershed Council	USDA Forest Service
Los Angeles City CD #4	Vernon, City of
Los Angeles City Department of Power & Water	Walnut Valley Water District
Los Angeles City Department of Public Works	Walnut, City of
Los Angeles City Department of Recreation & Park	West Covina, City of
Los Angeles Council District 2	Westlake Village, City of

APPENDIX B

Existing Studies, Plans, and Reports Consulted

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
Amigos de los Rios, Sierra Club	Rio Hondo Vision Plan (Emerald Necklace Concept)	The Emerald Necklace Concept, a portion of the Rio Hondo Vision Plan prepared by Amigos de los Rios and the Sierra Club in association with other local organizations, articulates a vision for a 1,500 acre, 17-mile riverfront urban park network connecting 10 cities and benefiting nearly one-half million residents along the Rio Hondo and San Gabriel River. The purpose of the Emerald Necklace portion of the Plan is to describe the proposed park network that would include multi-use trails, parks, open spaces and habitat corridors and would re-connect the historically linked Rio Hondo and San Gabriel River.
Ballona Creek Watershed Task Force (BCWTF)	Ballona Creek Watershed Management Plan, 2004	<p>With a \$200,000 grant from the State Water Resources Control Board, the project proposes to:</p> <ul style="list-style-type: none"> • Establish a local watershed stakeholder organization • Identify target areas for source control of pollutants • Identify habitat/open space restoration potentials in the watershed, demonstrate their feasibility, evaluate their potential water quality benefits • Develop measurable water quality improvement and habitat restoration goals, • Select and prioritize cost-effective Best Management Practices, • Develop a community-based watershed monitoring plan to track environmental conditions and evaluate plan implementation • Identify and obtain commitment from responsible parties to plan implementation. <p>Coordinates water quality, habitat and open space improvement efforts in the watershed across jurisdictions; identifies actions to be implemented by individuals, neighborhoods, organizations, cities and local, state and federal agencies.</p>
California Coastal Conservancy	Arroyo Seco Watershed Restoration Feasibility Study, 2002	<ul style="list-style-type: none"> • Characterizes ecosystem health, physical and cultural characteristics of the watershed and makes recommendations for future studies and technical analyses • Proposed projects sorted by stream reach across a large range of costs. • Identifies watershed goals and years to fulfill. • Briefly discusses economics, governance structures.
California Coastal Conservancy	Southern California Wetlands Recovery Regional Strategy	<p>The Southern California Wetlands Recovery Regional Strategy articulates long-term goals and specific implementation strategies to guide efforts of the Wetlands Recovery Project:</p> <ul style="list-style-type: none"> • to increase pace and effectiveness of wetland recovery in the region; • to re-establish a mosaic of functioning wetland riparian systems that support a diversity of species, while also providing refuge for humans in the landscape. <p>The Wetlands Recovery Project employs three primary strategies to recover wetlands:</p> <ul style="list-style-type: none"> • (1) acquisition of property from willing sellers, • (2) restoration and enhancement of wetlands where allowed by landowners and land managers, and • (3) outreach and education about best practices to protect wetlands. <p>The Plan outlines regional goals and strategies, and also identifies more specific objectives at the County level, including countywide, site-specific, and organizational objectives as well as data and research needs pertaining to each County.</p>

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
California Coastal Conservancy	Wetlands of the Los Angeles River Watershed: Profiles and Restoration Opportunities, 2000	<p>The intent of the Plan is to:</p> <ul style="list-style-type: none"> • inventory wetland resources of the Los Angeles River Watershed; • provide profiles of nine current wetlands • illustrate existing biological and physical resources; • compare historic and current wetland resource conditions and extents; • outline restoration goals; examine possible restoration opportunities and identify ten specific priority restoration sites. <p>The top priority restoration sites were selected based on their immediate potential for restoration (projects that might be achieved in the near future), as well as on their need for immediate action (projects where fleeting opportunities exist, warranting timely action). The strength of this report is its characterization of location, habitat, and water quality identified by specific project. It also has an excellent annotated bibliography of related resources. Describes restoration potential for the listed projects, but it does not attempt to scope the projects in terms of budget or construction.</p>
County of Los Angeles Department of Public Works	Los Angeles River Master Plan	<p>In 1989, Mayor Tom Bradley commissioned A Los Angeles River task force was commissioned to examine the Los Angeles River. Seven years later, the Los Angeles River Master Plan was adopted by the County of Los Angeles Board of Supervisors with help from a consortium of agencies, municipalities, environmental groups and individuals.</p> <p>The plan examined the river, reach by reach, for the main stem of the river, as well as Tujunga Wash downstream of Hansen Dam, to identify ways to revitalize the publicly-owned rights-of way. LACDPW facilitates the Master Plan Advisory group, which continues to meet periodically to focus on the implementation of the Plan, which includes the recent adoption of guidelines for signage and landscaping along the Master Plan reaches. The Master Plan focuses on the river right-of-way, and project recommendations are presented in general terms.</p>
County of Los Angeles Department of Public Works	San Gabriel River Corridor Master Plan	<ul style="list-style-type: none"> • Integrates the multiple goals of enhancing habitat, recreation, and open space while maintaining and enhancing long-standing goals for flood protection, water supply, and water quality. • Identifies priorities, provides guidance, and coordinates over 130 independently sponsored enhancement projects identified by the 19 cities along the river, the County of Los Angeles, and many other public agencies and community organizations that participated in developing the Master Plan. • Provides a plan framework, river enhancement project concepts, and case studies which work together to provide project sponsors performance criteria and examples for how to simultaneously address multiple goals and objectives in the design and development of their respective projects. <p>This will ensure that all future projects developed within the river corridor will work together as part of a larger, integrated whole reflecting the shared vision for a multi-objective approach to river corridor planning and project design. A significant stakeholder program was established in order to develop this plan.</p>

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
County of Los Angeles Department of Public Works Watershed Management Division	Dominguez Watershed Management Master Plan, 2004	Comprehensive document that: <ul style="list-style-type: none"> • assists stakeholders in the protection, enhancement, and restoration of the environment and beneficial uses of the Dominguez Watershed • provides overview of current conditions within the watershed • identifies and addresses watershed problems and issues • provides an action plan of recommended measures and projects • identifies potential funding opportunities to assist with implementation of the plan.
County of Los Angeles Department of Public Works Watershed Management Division	Sun Valley Watershed Management Plan	The primary objective of the Sun Valley Watershed Management Plan is to solve the chronic local flooding problem with a multipurpose solution, acknowledging that rainfall is a significant component of our water supply in this semi-arid region. The Sun Valley Watershed Stakeholders Group has been meeting since late 1998 to address the flooding problem in Sun Valley under the leadership of the Watershed Management Division, LACDPW.
Las Virgenes-Malibu Council of Governments	Watershed Management Area Plan for Malibu Creek Watershed	<ul style="list-style-type: none"> • Identifies goals that address water quality, water quantity, habitat restoration • Addresses the impacts of urban and rural development on storm water quality and diversion • Identifies ways to restore natural hydrologic processes within the watershed
Los Angeles and San Gabriel Rivers Watershed Council (LA&SGRWC)	Compton Creek Watershed Management Plan	The Compton Creek Watershed Management Plan, is currently being prepared by the Los Angeles and San Gabriel Rivers Watershed Council (LA&SGRWC). The objective of the plan is to expand and encourage local efforts to restore and improve water resources, habitat and recreation uses along the Compton Creek area.
North East Trees	Los Angeles River Bikeway and Greenway Planning Study	The Los Angeles River Bikeway and Greenway Planning Study assesses and recommends greening opportunities and bicycle circulation possibilities that will connect existing bikeways and greenways along the Los Angeles River. The study identifies several greening opportunities and develops a comprehensive bicycle network.
Regional Water Quality Control Board, Los Angeles Region	Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties. (Basin Plan), 1994	<p>The official water quality plan for the Los Angeles Basin, issued in 1994, designed to preserve and enhance water quality and protect the beneficial use of all regional waters.</p> <ul style="list-style-type: none"> • Designates beneficial uses for surface and ground waters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to state's anti-degradation policy. Describes implementation programs to protect all waters in the region • EPA "303d" list of impaired water bodies is updated every 3 years • As Total Maximum Daily Load (TMDL) criteria are announced, plan requirements are revised. <p>Excellent reference for characterization of surface and groundwater; beneficial use designations and impairments to these uses by water body or stream reach; and current regional water quality regulations.</p>

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) and Santa Monica Mountains Conservancy	Common Ground: from the Mountains to the Sea: San Gabriel and Los Angeles Rivers Watershed and Open Space Plan	The plan sets forth a detailed list of guiding principles for land, water, and planning. The plan provides general characteristics of the watersheds and includes general project selection criteria from the SMMC's work program, but it falls short of identifying actual project selection criteria, specific projects to be implemented, or budgets. Trails, habitat linkages, open space and preservation opportunities are at a gross planning scale only.
San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, and San Gabriel Council of Governments	Rio Hondo Watershed Management Plan	The purpose of the Rio Hondo Watershed Management Plan is to provide an organizing framework for municipalities, conservation organizations, and individuals to work together to improve the water quality, health, habitat, and recreation potential of the Rio Hondo Watershed. This Watershed Management Plan identifies goals and strategies necessary to manage the overall watershed as a healthy, life giving natural system. This plan also outlines steps to facilitate the establishment of a watershed consortium, which would be responsible for communication of information, identification of priorities, funding development, creation of new projects, and long term implementation of watershed improvements.
Santa Monica Bay Restoration Commission	Bay Restoration Plan	A comprehensive plan of action for Bay protection and management: <ul style="list-style-type: none"> • It outlines more than 250 actions, including 74 priority actions, that address critical environmental problems facing the Bay such as stormwater and urban runoff pollution, habitat loss and degradation and public health risks associated with seafood consumption and swimming near storm drain outlets. • It also outlines specific programs to address the environmental problems facing the Bay and identifies implementers, timelines, and funding needs.
Santa Monica Bay Restoration Commission	State of the Bay, 2004	An update on the environmental health of the Bay based on 27 environmental indicators that measures progress towards achieving the goals of the <i>Bay Restoration Plan</i> . The previous update was in 1998.
Santa Monica Mountains Conservancy	Rim of the Valley Trails Corridor Master Plan	A comprehensive, coordinated master plan for the recreational and environmental resources of the Corridor area by defining objectives and criteria for developing a system of trails and other recreation facilities, and for preserving viable wildlife areas and corridors.
South Coast Wildlands Project	Missing Linkages, South Coast Wildlands Project	The South Coast Wildlands Project brings a collaborative approach to regional planning, working with biologists and conservation scientists to develop platforms that engage biological experts in the region with methods for identifying and designing movement corridors that functionally connect habitats and sustain ecosystem processes. The South Coast Missing Linkages Project is producing conservation designs for 15 key habitat linkages associated with the South Coast Ecoregion.

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
The Trust for Public Land, and National Association of Counties	Greenprinting Los Angeles Initiative Plan	<p>The Greenprinting strategy is a land conservation strategy through which communities can protect quality of life, human health, and natural systems by creating an interrelated system of parks, trails, gardens and other protected lands. Greenprinting protects the places that sustain and define communities while allowing for appropriate development. The Plan:</p> <ul style="list-style-type: none"> • systematically assesses park needs in Los Angeles County and identifies potential priority park/open space areas. • envisions community space and recreational opportunities within a quarter mile walking distance of every family in the densely populated areas of Los Angeles. • revitalizes cities, guides growth, and protects water supplies and farmland. • uses GIS data to generate a multi-dimensional assessment of the social, economic and demographic conditions in neighborhoods and districts throughout Los Angeles County.
US Army Corps of Engineers Los Angeles District	Los Angeles County Drainage Area Recreation Study	<p>The Los Angeles County Drainage Area (LACDA) System Recreation Study investigated additional uses of the LACDA system for recreation. It is comprehensive in both scale and scope. Recommended recreational uses include: rubber dams to create water recreation, wildlife sanctuaries, parks (including skateboarding) and trails. It is detailed as to sites, conceptual plans, and costs. Since it was issued 25 years ago, many projects (and all the budgets) are out of date.</p>
US Army Corps of Engineers Los Angeles District	Los Angeles County Drainage Area Water Conservation and Supply Final Reconnaissance Report, 1994	<p>Investigated alternatives to raising flood control levee walls in the lower Los Angeles River. Investigated additional storage capability at Hansen Dam, Lopez Dam, Santa Fe Dam, and Whittier Narrows Dam. Sepulveda Dam and Basin, already considered at capacity, were not included. Reported positive cost/benefit ratios for additional dam storage, but there was not enough capacity added; the lower Los Angeles River levee walls were raised. Report is valuable for characterization of the LACDA system and dam capacity, and economic analyses.</p>
US Department of the Interior	San Gabriel River Watershed and Mountains Special Resource Study	<p>The National Park Service is currently developing the San Gabriel Watershed and Mountains Special Resource Study, to identify opportunities for collaborative management and partnerships amount local, state, and federal governments and other entities, in order to: 1) address current and future recreation and open space needs; 2) protect and restore significant natural resources and important habitats; 3) preserve historic and cultural resources; 4) maintain or improve water quality, water conservation and flood protection. A central issue is to determine whether there are nationally significant resources in the area that might warrant future National Park Service involvement.</p>

Table B-1. Existing Studies, Plans, and Reports Consulted

Agency	Planning Document	Policies, Programs, and Projects
US Department of the Interior	Santa Monica Mountains Comprehensive Plan	The Santa Monica Mountains National Recreation Area was formed in 1977. The National Park Service worked with the State of California to create a Santa Monica Mountains Comprehensive Plan, which was adopted in 1979. This led to the formation of the Santa Monica Mountains Conservancy (SMMC) to acquire, preserve, protect, restore, and enhance treasured pieces of the Santa Monica Mountains to form an interlinking system of urban, rural, and river parks; open space; trails; and wildlife habitats that are easily accessible to the general public. Visitor services, land use and development of the recreation area is governed through General Management Plans that are updated every five years. State and federal agencies share management duties and responsibilities of specific land preserves, but do not supersede local land use authority or regulation.

APPENDIX C

Planned or Existing Projects within the Region

PLANNED OR EXISTING PROJECTS WITHIN THE REGION

Multi-Benefit Project Examples

Some of these projects that would provide various levels of ecosystem restoration; habitat protection and improvement; parks, trails and recreation; or wetlands enhancement and creation are identified below. This is not intended to be a complete list of projects, only a summary of multi-benefit example projects that are identified in the following table.

Ecosystem Restoration

Topanga Creek Restoration Program. This is a multi-phased program that will implement the recommendations of the 2002 Topanga Creek Watershed and Lagoon Restoration Feasibility Study over several years. The primary goals of the program are to: restore habitat, improve passage opportunities for steelhead trout identify ways to improve sediment transport, improve water quality in all areas, and monitor water quality, sediment loads, streambank condition, and target species populations.

Whittier Narrows Nature Center Ecosystem Restoration. This project would create a 0.25-acre pond and line two existing lakes to reduce water loss from percolation, remove invasive plants, and restore native vegetation. The lakes could be interconnected to Lario Creek and water in the lakes could flow through the system and down to the Rio Hondo Spreading Grounds

Malibu Lagoon Habitat Enhancement Program. The project will enhance wetland habitats at Malibu Lagoon by enhancing tidal circulation and enhancing wildlife habitat. The enhancements were recommended in the 1999 Malibu Lagoon enhancement plan prepared by UCLA.

Ballona Creek Ecosystem Restoration Project. The Army Corps of Engineers is currently preparing a feasibility study to evaluate alternatives for channel modification, habitat restoration (coastal and freshwater wetlands and riparian), recreation, and related purposes along the lower reach of the Ballona Creek Proposed restoration measures include: re-grading and removal of fill, remove invasive and non-native plant species, reintroduction of a water source and installation of native plants to restore previously filled coastal wetlands. Other measures to be evaluated include features to improve or restore tidal regime in Oxford Basin, the Grand and Venice canals, and Ballona and Del Rey Lagoons; the potential for in stream wetland development in Centinela, Sepulveda and Ballona Creek; sediment loading in the upper watershed; and related recreation and educational opportunities.

Environmental and Habitat Protection and Improvement

Hahamongna Watershed Park Habitat Restoration and BMP Implementation. Hahamongna Watershed Park is the most important current habitat area in the urbanized portion of the Arroyo Seco watershed.

Flint Wash Restoration. This project will examine the feasibility of removing lined sections, secure funding, develop plans and secure necessary access for restoring sections where channel removal is possible.

Central Arroyo Park Habitat Restoration and BMP Implementation. This park provides a critical linkage between the more natural areas contained in Lower Arroyo Park to the south and Hahamongna Watershed Park to the north. Central Arroyo Park is highly developed; it contains among other structures the Rose Bowl, Brookside Golf Course, associated parking areas, and other related buildings and structures. This project proposes to: install an infiltration gallery at the end of the Seco Street Storm Drain prior to its discharge to the Arroyo Seco.

Lower Arroyo Park Habitat Restoration and BMP Implementation. This region contains some of the best remaining native habitats in the Arroyo Seco south of Devil's Gate Dam. This project seeks to remove the concrete lining, to increase infiltration of the Arroyo flow, restore aquatic habitat, reintroduce the Arroyo chub, protect/restore habitat with a focus on connecting isolated islands of existing native vegetation and minimizing human impacts on healthy habitat areas.

San Rafael Creek Restoration. This project seeks to develop a working group with the goal of identifying ways to protect and restore the creek while also respecting private property right, restore riparian habitat and remove exotic invasive species, remove the concrete lining and restore the natural confluence at the Arroyo Seco.

Santa Fe Dam Recreation Area and Habitat Enhancements. The County of Los Angeles Department of Parks and Recreation (LADPR) plans improvements to habitat areas and trails, including the protection and restoration of remnant alluvial fan sage scrub plant communities by replanting native plants and removing exotics.

Machado Lake Improvements. A designated Sensitive Ecological Area, this lake is one of the largest habitat areas in the sub region. It is used by a variety of wildlife species, approximately 200 species of birds use the park annually. This project will reduce contaminant concentrations and may result in the lifting of the fish consumption advisory and enable the reinstatement of recreational fishing and benefit wildlife that forage on aquatic life, including the endangered California least tern, which has been observed to forage on fish from the lake.

Stone Canyon Creek Restoration. Restore native habitat along the last natural remaining section of Stone Creek on UCLA's campus as well as provide outreach and education opportunities in order to meet long-term water quality and habitat enhancement goals, along with increased recreational/open space areas.

The Long Beach RiverLink. The RiverLink vision creates a network of gateways, pathways, connections, and destinations along the San Gabriel River. Relevant portion of the project will include specific projects that are designed to improve river and ocean water quality, enhance flood protection, provide low-impact recreational opportunities in the urban core, encourage groundwater recharge, reclaim and restores habitat for native and migrating species, connect greater Long Beach to the Los Angeles River and the San Pedro Bay.

Sepulveda Basin Habitat Enhancement. This project will improve the section of the Los Angeles River between Balboa Blvd and the new East/West Busway Bridge. The bridge is the dividing line between the concrete-lined river to the west and the living river in the Sepulveda Basin. Currently the area is heavily infested with invasive exotic vegetation including Arundo, Castor Bean, Fountain Grass, Poison Hemlock, Mexican Fan Palm. The project will remove these exotic species and restore native wildlife habitat, increase biodiversity, improve water quality and streamflows and create major improvements to the ecosystem functionality and aesthetic values of the river.

Arroyo Seco Watershed Feasibility Study. The Arroyo Seco Watershed Restoration Program is developing a comprehensive, long-term plan to restore the Arroyo Seco that runs from the San Gabriel Mountains to the Los Angeles River through Pasadena, South Pasadena and Northeast Los Angeles. Major elements of the plan include flood and stream management, water resources, habitat restoration and expanding recreational opportunities.

Recreation and Public Access

Annandale Golf Course Habitat Restoration and Infiltration. All runoff from the course and surrounding residences is routed through a large storm drain south underneath the 134 Freeway, where it eventually is

discharged to the open channel of San Rafael Creek. This project will work with Annandale Golf Course to use native plants and trees and to reduce runoff from the golf course and surrounding residences

The Welch Site BMP and Habitat Restoration. This project will install BMPs to treat runoff from an industrial/commercial area of the Arroyo Seco, restore habitat, and create a parkland in a densely packed urban neighborhood.

Lincoln Heights Freeway Interchange Restoration and BMP. Proposes to install a natural BMP such as an infiltration gallery or a subsurface flow treatment wetland that would be compatible with the habitat restoration activities, restores riparian and coastal sage scrub habitat throughout the site where possible and creates a mini-park with public access on the site

Morris Dam Peninsula Park. The largest available open space along the national forest section of the river, this 40-acre peninsula juts into the Morris reservoir at the former site of a Navy torpedo testing facility adjacent to Highway 39. It can be reclaimed and developed for recreational day-use, over-night camping, trails and an interpretive center for the national forest, including a historic military interpretive site. The development of this park would provide additional needed park facilities with parking and other site amenities to relieve the serious weekend congestion of Angeles National Forest visitors.

Azusa Canyon River Park. This City of Azusa project aims to acquire land to develop a river-focused park at the southern end of San Gabriel Canyon and will include a visitor's center, native plant garden, interpretive signage, restored habitat areas, and paths leading down to the river, a small play area and camping in a natural park area will be available.

San Gabriel Canyon Spreading Grounds (Concept Design Study). This project will study possibilities for providing landscaping, native habitat restoration, decorative fencing, interpretive signage, trails and other park amenities for public enjoyment and education at two deep spreading basins adjacent to the San Gabriel River. The 165-acre site project will be compatible with the groundwater recharge function of the two basins.

Wright-Romvary Properties. The City of Duarte plans to acquire a total of 365 acres of land for open space protection, trails and habitat restoration. The property is adjacent to Van Tassel Creek, a tributary of the San Gabriel River. This project is dependent on funding availability.

Pellesier Pocket Park. The current owner and developer of an adjacent site would like to develop this property as a pocket park for recreational use, including a bench and hitching post for equestrians.

San Gabriel River Discovery Center at Whittier Narrows Regional Park (Concept Design Study). This Project involves a new regional indoor/outdoor museum and conference center on the site of the existing Whittier Narrows Nature Center will focus on watershed and water-related topics, historical information and wildlife education. The project's innovative building design will demonstrate green building technologies and watershed-appropriate site development.

Woodland Duck Farm (Concept Design Study). A former duck farm facility, this 57-acre site will be redesigned to create a more natural environment and recreational experience more directly connected to the San Gabriel River. It will increase public open space, provide trails and potentially treat urban runoff. The RMC has acquired the land; an existing house will become RMC headquarters. There is also an equestrian center on the site operated by the Rio Trust.

Pio Pico State Historic Park. A new watershed enhancement project will include a watershed interpretive exhibit and native, drought-tolerant landscaping with a pedestrian and bicycle access way under the existing rail line.

Paseo del Rio at San Gabriel and Rio Hondo Spreading Grounds. These multi-objective LACDPW project will provide bike trails, new native and drought-tolerant landscaping, shade structures and other park-like amenities to beautify open space surrounding the existing spreading grounds

Santa Fe Springs Park Expansion. This project will expand an existing park for active recreational /passive recreation uses and habitat creation and Nature Sanctuary.

Downey Landing, City of Downey. This project will develop a new park with ballfields and a walking trail at what was once a parking lot. The project includes trailhead and trailside facilities, creek-like water treatment swale system, restrooms, a shade structure for educational purposes, benches, trashcans, drinking fountains and bike racks.

Riverview Park, Bellflower Riverview Park. This project will develop a new 15-acre recreation area with a natural, riverfront environment and bikeway.

Walteria Lake Enhancement. Improve this detention basin that drains 18 percent of Torrance and drains into Machado Lake and will include the addition of limited passive recreation such as a perimeter trail, viewing platforms, and benches for enjoying the scenery and observing wildlife.

Lafayette Creek Daylighting. This project will 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.

Wetlands Enhancement and Creation

Los Cerritos Wetland Restoration (Bryant and Bixby). This project proposes acquiring about 266 acres of land currently used for oil operations. The Bixby property is 181 acres and the Bryant property approximately 85 acres. The sites, located near the end of the river just north of Alamitos Bay, are surrounded by urban development but still provide valuable habitat for birds and a salt marsh field.

Gardena Willows Restoration (Remnant Tidal Wetlands Area). Wetland enhancement by the City of Gardena.

Hansen Dam Recreational Area Parking Lot and Wetlands Restoration Project. The proposed project involves the installation of bioswales, sand filtration systems, and constructed to capture, treat, and reuse wet and dry-weather flows from three parking lots at the Hansen Dam Recreational Area that currently drain untreated stormwater and dry-weather urban runoff into sensitive riparian and wetland habitat at Hansen Lake. The project would improve stormwater quality within the LA River Watershed, help meet the discharge limits of adopted TMDL's, remediate water quality impacts to sensitive habitats and special status/endangered species, provide beneficial water re-use, enhance and create wetland and riparian habitat, reduce flooding and restore trail areas, protect source water for the San Fernando Groundwater Basin, provide incidental groundwater recharge, and provide environmental, educational and recreational benefits to users of the recreation area.

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
1	Aliso Wash – Limekiln Creek Confluence Restoration Project	MRCA	x	x	x
2	Arroyo Seco Alternative Stream Extension	LA County Flood Control District	x	x	x
3	Arroyo Seco North Branch Creek Daylighting	LA County Flood Control District		x	x
4	Arroyo Seco Park	City of Los Angeles	x	x	x
5	Atwater Village West River Park	City of Los Angeles			x
6	Bridge Retrofit Program Stormwater Treatment Implementation Pilot Project	City of Los Angeles, Bureau of Engineering			x
7	Burbank Greenway	LA County Flood Control District			
8	Calabasas Dry Cyn Watershed Habitat & Water Quality Enhancement Project	City of Calabasas and the Mountains Restoration Trust	x	x	x
9	Calabasas McCoy & Dry Canyon Creek Evaluation and Protection Study	City of Calabasas	x	x	x
10	Confluence Park	City of Los Angeles		x	x
11	Cornfields Adjacent River Park	City of Los Angeles		x	x
12	Crescenta Valley Park	Crescenta Valley Water District		x	
13	Dorris Place	City of Los Angeles		x	x
14	Downey Rec Center	City of Los Angeles		x	x
15	Downtown River West Wetlands Park	City of Los Angeles, Bureau of Engineering	x	x	x
16	Dry Canyon Creek – 101 Freeway Restoration Project	MRCA	x	x	x
17	E. Valley LAR Greenway/Bikeway	City of Los Angeles		x	x
18	Eastside Soccer Fields Complex	City of Los Angeles			x
19	Full Capture Trash Removal Devices	City of Los Angeles			x
20	Hansen Spreading Grounds Structural Modifications and Operational Improvements Project	LA County Flood Control District		x	x
21	Hazard Park- NorthEast Trees	North East Trees	x		x
22	Hazard Park Stream Restoration	City of Los Angeles		x	x
23	Headworks LAR Wetlands and Water Protection Project Phase I	City of Los Angeles	x		x
24	Laguna Retention Basin Multiuse Improvements	LA County Flood Control District		x	x
25	Legion Lane Park	City of Los Angeles		x	x

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
26	Limekiln Canyon Stream Restoration and Habitat Improvement Project	City of Los Angeles, Bureau of Sanitation	x	x	x
27	Los Angeles River Headwaters Phase 1	Los Angeles County Flood Control District	x	x	x
28	Los Angeles River Headwaters Phase 2	Los Angeles County Flood Control District	x	x	x
29	Los Feliz Equestrian/ Pedestrian Bridge	City of Los Angeles		x	x
30	Lower Tujunga Wash Greenway Bikeway	City of Los Angeles		x	x
31	Marsh Street Park	MRCA	x	x	x
32	Montecito Heights/DebsPark	City of Los Angeles		x	X
33	Moorpark Park	City of Los Angeles		x	
34	Multiuse Wetlands Project at Children's Museum of Los Angeles, Hansen Dam Recreation Park	City of Los Angeles, Bureau of Sanitation	x	x	x
35	Nichols Sediment Placement Site (SPS) Multiuse Improvements	Los Angeles County Flood Control District		x	x
36	North Atwater Creek Restoration and Water Quality Enhancement	City of Los Angeles			x
37	North Branch Creek Daylighting in Sycamore Park	City of Los Angeles			x
38	Pacoima Wash Greenway Project: 8th Street Park-Resubmit	MRCA		x	
39	Pacoima Wash Greenway Project: Parkside Drive Park	MRCA		x	
40	Reseda Park	City of Los Angeles		x	
41	Rio Vista Blufftop Park	City of Los Angeles		x	
42	River Glen Riverfront Walk	City of Los Angeles	x	x	x
43	Sepulveda Basin Wetlands	City of Los Angeles	x	x	x
44	Sheldon Pit Stormwater Retention Project	Los Angeles County Flood Control District	x		x
45	Silver Lake Reservoir Complex Habitat Improvement Multiuse Project	City of Los Angeles, Bureau of Sanitation	x	x	x
46	South Los Angeles Wetlands Park	City of Los Angeles, Bureau of Sanitation	x	x	
47	Strathern Pit Multiuse Project	Los Angeles County Flood Control District	x	x	x
48	Sun Valley Powerline Easement Multiuse Enhancements	Los Angeles County Flood Control District		x	
49	Taylor Yard	City of Los Angeles			
50	Topanga Canyon Boulevard – Plummer Street Restoration Project	Mountains Recreation and Conservation Authority			x

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
51	Tujunga Wash Restoration Project Phase II	MRCA	x		x
52	Valley Steam Plant Multiuse Project	Los Angeles County Flood Control District			
53	W. Valley Los Angeles River Greenway / Bikeway	City of Los Angeles	x	x	x
54	Weddington Park Expansion	City of Los Angeles		x	x
55	Alhambra Wash	Amigos de los Ríos	x		
56	Arcadia Wash	Amigos de los Ríos	x		
57	Armstrong Multiuse Grounds	LACDPW			
58	Bell Riverfront Greenway	LACDPW		x	x
59	Citrus Spreading Grounds Modification Project	LACDPW			x
60	Colorado Lagoon Water, Sediment, Habitat, Restoration Master Plan	Long Beach Water	x	x	x
61	DeForest Wetland Habitat Restoration	Long Beach PRM	x		x
62	Duck Farm	WCA			
63	El Dorado Park Lakes Water Usage and Wetlands Restoration	Long Beach		x	
64	El Monte Storm Drain Daylighting/Green Infrastructure	City of El Monte			x
65	Emerald Necklace-Alhambra Wash to Eaton Wash	City of El Monte		x	
66	Emerald Necklace-Eaton Wash to Peck Park	City of El Monte		x	
67	Emerald Necklace-Peck Park to SG River	City of El Monte		x	
68	Emerald Necklace-SG River to Walnut Creek	City of El Monte		x	
69	Invasive Weed Control in Riparian Habitat	LA & SG Rivers Watershed Council			x
70	Large Landscape Conservation/Runoff Reduction Mgmt. and Educational Program	Central Basin Municipal Water District		x	x
71	Lower Los Angeles River Low Flow Diversion Systems	LACDPW			
72	Morris Dam Water Supply Enhancement Project	LACDPW			x
73	Peck Park Wetlands and Enhanced Recharge	LACDPW	x	x	
74	Peck Water Conservation Park	City of El Monte	x	x	x
75	SG River-Regional Spreading Grounds Telemetry Systems	LACDPW	x		
76	South Compton Creek Greenway and Bike Trail	LACDPW		x	x

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
77	Whittier Narrows Water Reclamation Plant UV Disinfection Facilities	LACSD	x		x
78	Wrigley Greenbelt	Los Angeles County Flood Control District			x
79	Construction of the Las Virgenes Creek Restoration Project	Las Virgenes Municipal Water District			x
80	Las Virgenes Creek Evaluation and Protection Study	Las Virgenes Municipal Water District	x	x	x
81	Las Virgenes Creek Naturalization: Removal of Artificial Structures and Fish Barriers	Las Virgenes Municipal Water District	x		x
82	Malibu Civic Center - Chili Cook-Off Land Acquisition	City of Malibu	x	x	x
83	Malibu Creek Watershed Urban Water Conservation and Runoff Reduction Project	City of Malibu	x	x	x
84	Decker Canyon Recycled Water Line Extension		x	x	x
85	Sewer and Road Project at Malibu Lake	Malibu Mountain Lake Club		x	x
86	Restoration of Southern Steelhead Habitat in Solstice Creek	National Park Services		x	x
87	Large Landscape Conservation/Runoff Reduction Management and Outreach Program	West Basin Municipal Water District		x	x
88	Onsite Wastewater Treatment System Grant Program to Upgrade and Maintain Systems in the Malibu Creek Watershed	City of Malibu			x
89	JWPCP Marshland Enhancement	Sanitation Districts of Los Angeles County			x
90	Large Landscape Conservation/Runoff Reduction Management Program	WBMWD		x	
91	16th Street Watershed Runoff Treatment, Reuse & Infiltration Project	City of Santa Monica	x		
92	Wilmington Drain Restoration Multiuse Project	LABOS, Watershed Protection Division	x		x
93	North Santa Monica Watershed Runoff Treatment, Reuse, and Infiltration Project - Stage One	LABOS, Watershed Protection Division			
94	Dockweiler Watershed Runoff Treatment, Reuse, and Infiltration Project - Stage One	LABOS, Watershed Protection Division		x	
95	Machado Lake Artificial Aeration and Circulation Project	City of Los Angeles, Department of Recreation and Parks	x		x
96	Ozone Park Retrofit Runoff Treatment, Reuse & Infiltration Project	City of Santa Monica		x	
97	Freeway Runoff Infiltration	City of Santa Monica			
98	Madrona/Palos Verdes Lateral	WBMWD			
99	Grand Boulevard Tree Wells	LABOS, Watershed Protection Division		x	x

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
100	Los Angeles Harbor Low-Flow Diversion	LACFCD			
101	Peck Park Canyon	Los Angeles Neighborhood Initiative (LANI)		x	x
102	Imperial Highway Sunken Median	LABOS, Watershed Protection Division			
103	Culver City BMPs	City of Culver City			x
104	Stone Canyon Creek at UCLA	UCLA Institute of the Environment			x
105	Ballona Wetlands Restoration Project	State Coastal Conservancy			
106	Lafayette Daylighting	LABOS, Watershed Protection Division			x
107	Goldsworthy Desalter	City of Torrance			
108	Lomita Integrated Storm to Vadose to Water Supply - Cypress Hill Reservoir	City of Lomita, WRD, and WBMWD	x		x
109	Lomita Integrated Storm to Vadose to Water Supply - Oceanview Depression	City of Lomita, WRD, and WBMWD			x
110	Ballona Bluff Vernal Pool Restoration	West Bluffs Conservancy and Ballona Ecosystem Education Project	x		
111	Colorado Lagoon Restoration (Tier 2)	City of Long Beach	x	x	x
112	Los Cerritos Wetlands Complex	Wildlife Conservation Board			
113	Los Cerritos Wetlands Conceptual Restoration Plan	Coastal Conservancy			
114	Coyote Creek Watershed Plan	County of Orange			
115	Lower Los Angeles River Acquisitions	City of Long Beach	x	x	x
116	DeForest-Dominguez Wetlands Restoration Preliminary Plan	Los Angeles County Department of Public Works	x	x	x
117	Hazard Park Wetlands Restoration	North East Trees	x	x	x
118	Machado Lake Habitat Restoration Project	City of Los Angeles	x	x	x
119	Devil's Dip Creek Restoration and Daylighting	North East Trees			x
120	Ballona Wetlands Restoration Planning	Department of Fish and Game	x	x	x
121	Topanga Creek Resotation Program	RCD of the Santa Monica Mountains	x		x
122	Las Flores Creek Restoration	City of Malibu	x		x
123	Malibu Lagoon Habitat Enhancement	Resource Conservation District of the Santa Monica Mountains	x		x
124	Upper Malibu Creek Fasibility Study (Ridge Dam)	California Department of Parks and Recreation	x		x
125	Cold Creek Riparian Acquisitions, Part 2.	Mountains Restoration Trust			x

Table C-1. Partial List of Planned or Existing Projects Within the Region

Nos.	Project	Lead Agency	Wetlands	OS/Recreation	Habitat
126	La Sierra Riparian Acquisition	Mountains Restoration Trust	x		x
127	Nicholas Canyon Watershed Acquisition	DPR		x	x
128	Solstice Creek Steelhead Access Implementation	National Park Service			
129	Trabuco Creek Fish Passage Project	Trout Unlimited			x
130	Aliso Creek Mainstem Restoration	County of Orange			x
131	Wood Canyon Stream Stabilization and Restoration	County of Orange	x		x
132	Upper Sulphur Creek Restoration Project	City of Laguna Niguel	x	x	x
133	Laguna Canyon Creek Restoration Project	City of Laguna Beach	x		x
134	Upper Newport Bay Ecological Restoration Implementation	County of Orange	x	x	x
135	San Joaquin Marsh Enhancement - Phase II Implementation	University of California, Irvine	x		x
136	Big Canyon Creek Restoration	City of Newport Beach	x	x	x
137	Santiago Creek Arundo Control and Habitat Restoration	Santa Ana Watershed Association	x		x
138	Orange Coast River Park	Friends of Harbor, Beaches and Park	x	x	x
139	Huntington Beach Wetlands Restoration Plan	Huntington Beach Wetlands Conservancy	x		x
140	Huntington Beach Wetlands - U.C. Acquisition	Huntington Beach Wetlands Conservancy	x		x
141	Bolsa Chica Wetlands Restoration	Steering Committee of 8 federal and state agencies	x		x
142	East Garden Grove Wintersburg Channel Treatment Wetland Feasibility Study	City of Huntington Beach			
143	Colorado Lagoon Restoration (at Alamitos Bay)	City of Long Beach	x		x
144	Los Cerritos Wetlands Complex - Acquisition	Wildlife Conservation Board	x		
145	Coyote Creek Watershed Plan	County of Orange	x		x
146	Lower Conejo Creek Acquisition	Coastal Conservancy			x
147	Kahler Russel Park, Streambed Restoration Project	City of Covina		x	x

Sources:

1. *San Gabriel and Lower Los Angeles Rivers Watershed IRWM Implementation Grant, Step 1.*
2. *Southern California Wetlands Recovery Project, 2006 Work Plan*
3. *South Bay IRWM Implementation Grant, Step 1.*
4. *North Santa Monica Bay Region IRWM Implementation Grant, Step 1.*
5. *Upper Los Angeles IRWM Implementation Grant, Step 1.*