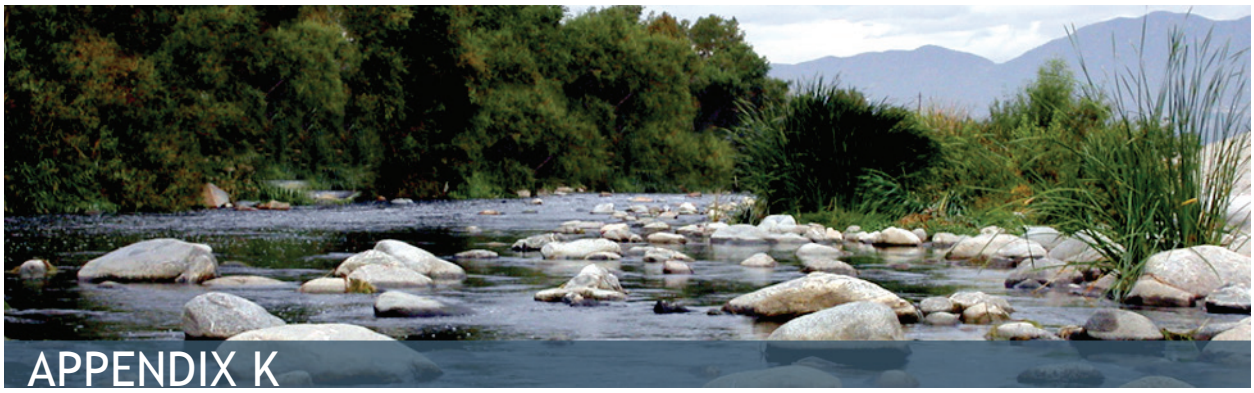

APPENDIX K

K. South Bay Subregional Plan

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South Bay Subregional Plan

Final

Prepared by:

RMC Water and Environment

In Association with:

Geosyntec consultants

October 2013

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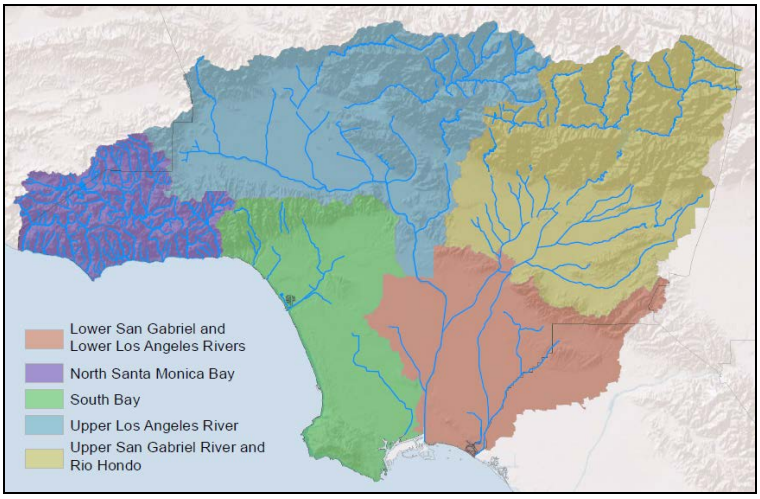
1 Background and Purpose of Subregional Plan

The South Bay Subregional Plan is one of five subregional plans that make up the Greater Los Angeles County Integrated Regional Water Management Plan (GLAC IRWM Plan). This Subregional Plan outlines the South Bay's physical setting, sources of water supply, water quality, environmental resources, planning objectives and targets, and partnership and multi-benefit opportunities. The purpose of the South Bay Subregional Plan is to outline its expected contribution to meeting the GLAC regional planning goals, objectives, and targets.

2 South Bay Subregion Description

2.1 Physical Setting

Figure 1: GLAC Subregional Boundaries



The South Bay Subregion of the Greater Los Angeles County Integrated Regional Water Management Region (GLAC IRWM Region) is located in the southwest area of Los Angeles County and is composed of the southeastern half of the Santa Monica Bay Watershed, along with the Dominguez Channel Watershed. The Subregion's watersheds consist of three defining characteristics—its coastline, its population and its industry. More than 30 miles of coastline in the South Bay attracts tens of millions of visitors every year, serve as an important recreation area for the area's residents, and in a few remaining pockets such as the Palos Verdes Peninsula, Madrona Marsh, Ballona Wetlands, portions of the Santa Monica Mountains and Baldwin Hills, support a diverse population of birds and other wildlife.

With over 2.6 million residents according to the 2010 census, the South Bay is one of the most dense and economically diverse urban areas of the region, creating both challenges to preserve and enhance local water resources and the natural environment, as well as unique opportunities for collaboration. Population projections from the Southern California Association of Governments (SCAG) estimate that the population within the South Bay could increase to over 3 million residents by 2035. The South Bay's industries--oil refining, power generation and transportation via the Port of Los Angeles, Los Angeles International Airport and major freeways—provide similar challenges and opportunities. (U.S. Census Bureau, 2012; SCAG, 2012)

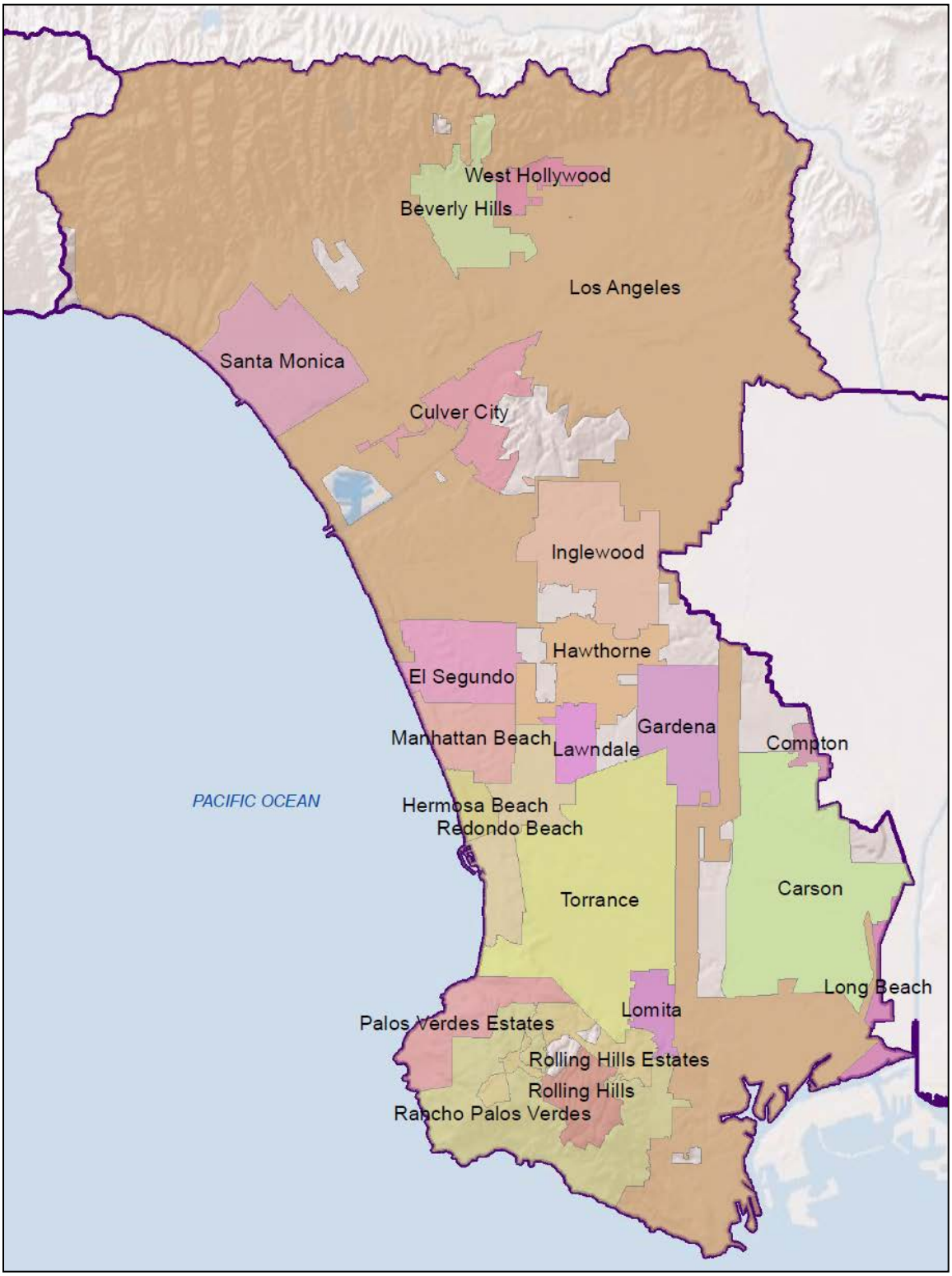
Political Boundaries

The South Bay Subregion is located within the Los Angeles County and includes over 20 cities and unincorporated areas. Figure 2 depicts the county and city boundaries of the South Bay Subregion.

Climate, Temperature, and Rainfall

The South Bay is within the Mediterranean climate zone, which extends from Central California to San Diego, and is characterized by winter precipitation, mostly falling in a few major storm events between November and March, followed by dry summers. Long-term annual average rainfall is approximately 12 inches per year, but can vary greatly from year to year and between the coast and the Santa Monica Mountains.

Figure 2: Cities in the South Bay Subregion



Geography and Geomorphology

The geography of the South Bay can generally be divided into two distinct types: coastal plain and mountain range (the Santa Monica Mountains). Most of the coastal plain is less than 1,000 feet in elevation.

Geology varies from Precambrian metamorphic rocks (1.7 billion years old) to alluvial deposits washed down from mountain canyons. Alluvial deposits of sand, gravel, clay and silt in the coastal plain are thousands of feet thick in some areas, due in part to the erosive nature of the neighboring San Gabriel and Santa Monica Mountains. The South Bay is webbed with fault systems including the Newport-Inglewood fault that runs from Newport Beach to Beverly Hills via Long Beach and Signal Hill.

2.2 Watersheds and Water Systems

Watersheds

The South Bay Subregion contains two major watersheds, the southeastern portion of the Santa Monica Bay watershed (which includes the Ballona Creek watershed) and Dominguez Channel watershed, in addition to many smaller watersheds which drain directly to the Santa Monica Bay. The watersheds are shown on Figure 3.

The Southeastern Santa Monica Bay Watershed includes the Santa Monica Mountains to the north, the Palos Verdes Peninsula to the south and reaches almost to downtown Los Angeles to the east. The130 square mile Ballona Creek Watershed, about 9 miles in length, is the largest subwatershed of the Southeast Santa Monica Bay Watershed but many smaller coastal watersheds are part of the larger watershed as well. (RWQCB, 2011)

The Dominguez Channel Watershed is 15 miles long and drains a densely urbanized area of approximately 133 square miles to the inner Los Angeles Harbor. The watershed covers the area just south of the Santa Monica Bay, its northern boundary beginning at Inglewood, extending south to Long Beach Harbor. The watershed generally has a low gradient, and its boundaries are not visually apparent in many locations, defined by the directions that underground storm drains flow. Within the Dominguez Channel Watershed there are five main sub-watersheds including the Upper Channel Watershed, Lower Channel Watershed, Retention Basins Watershed, Machado Lake Watershed and Harbors Watershed. (RWQCB, 2008)

Flood Management

Due to the Subregion's highly urbanized nature, flood management is important to protect human lives and property. The County and the many cities of the area have storm drains which flow within the watersheds. The Los Angeles County Flood Control District manages the regional flood infrastructure, in particular channelized streams (including Ballona Creek and Dominguez Channel), debris basins and flood control dams. Within the South Bay Subregion there are very few debris basins, all of which are located in the Santa Monica Mountains. (LACDPW, 2011)

Figure 3: Watersheds and Surface Waters in the South Bay Subregion

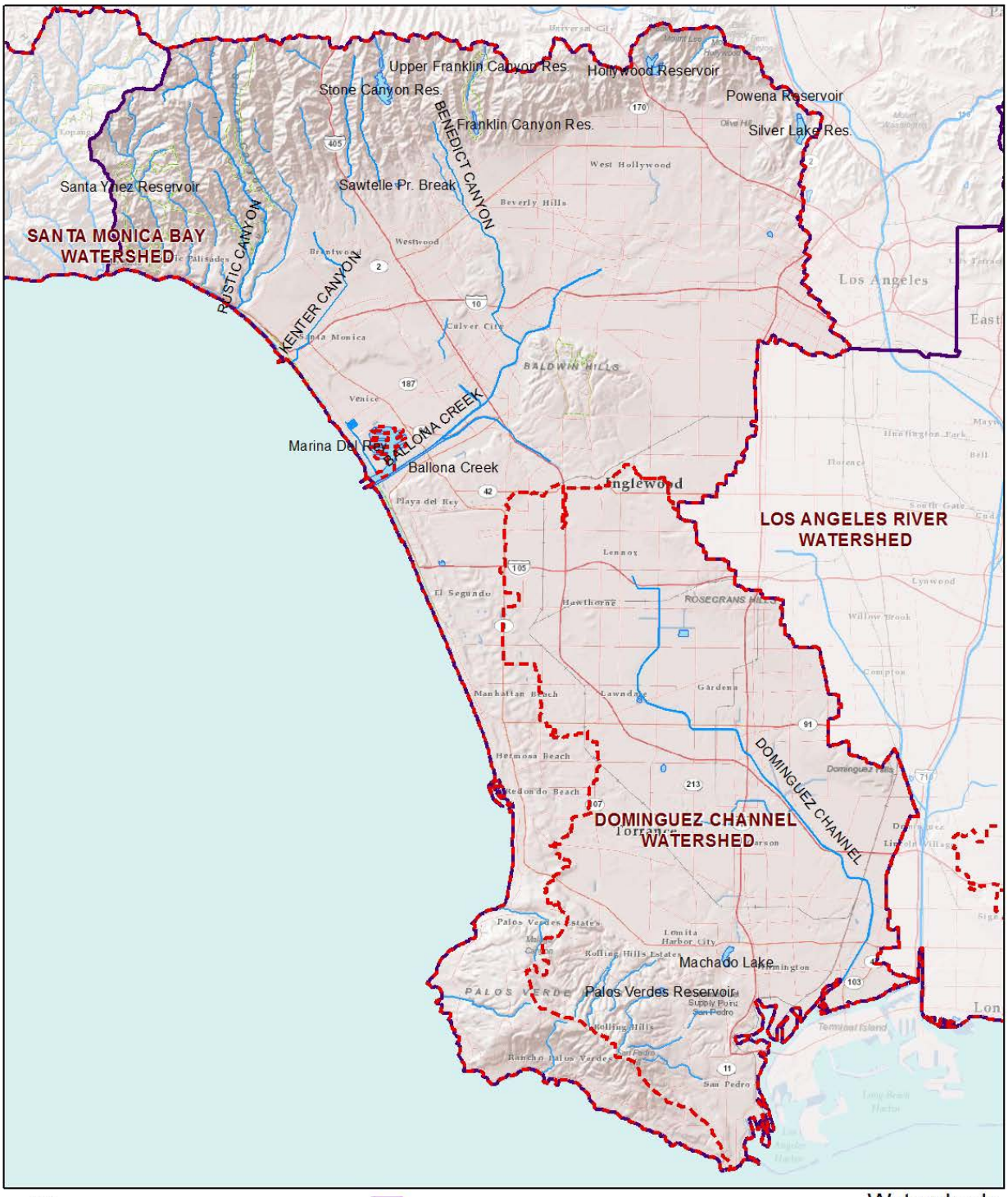


Figure 4: Wholesale Water Suppliers

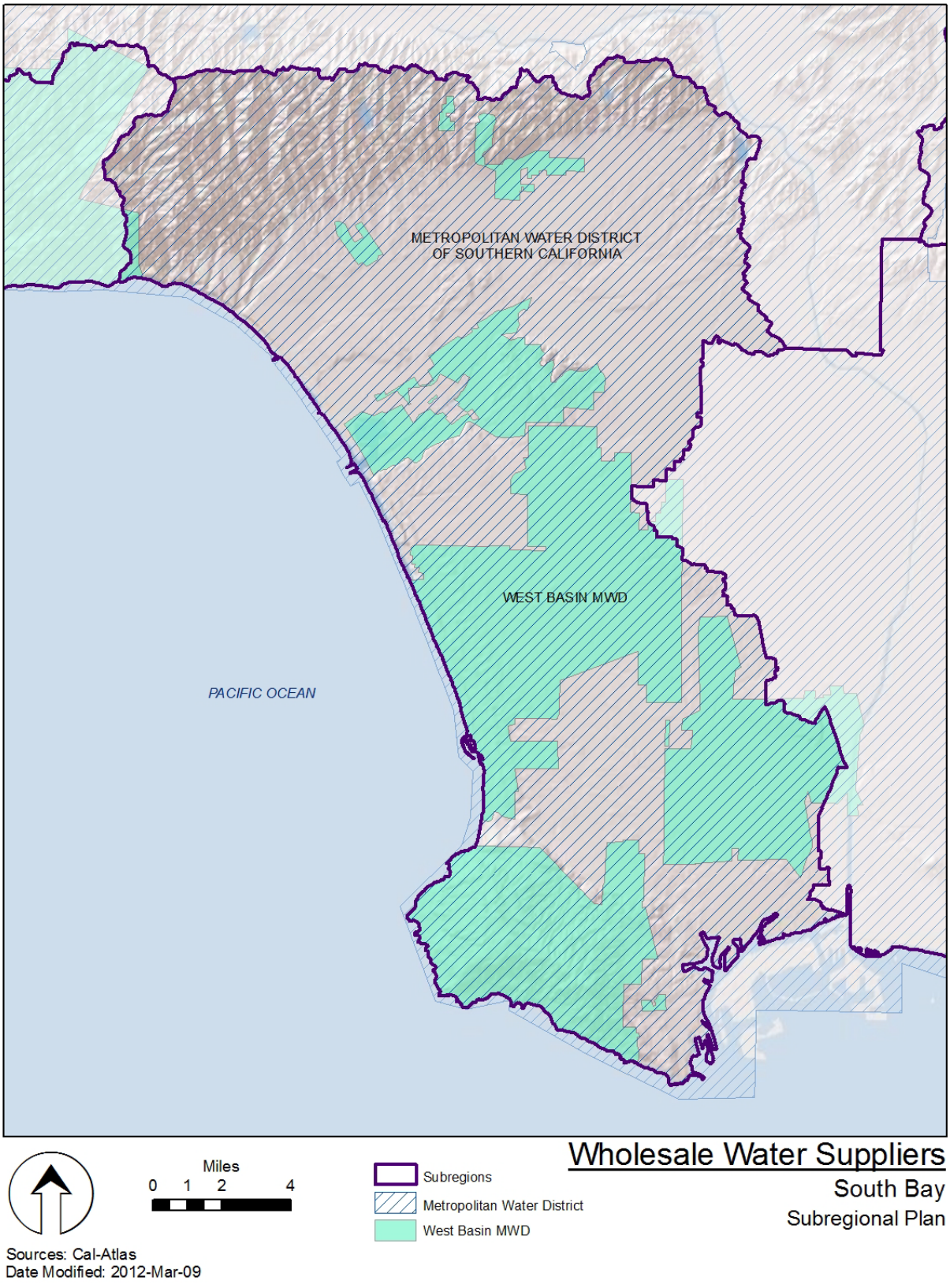
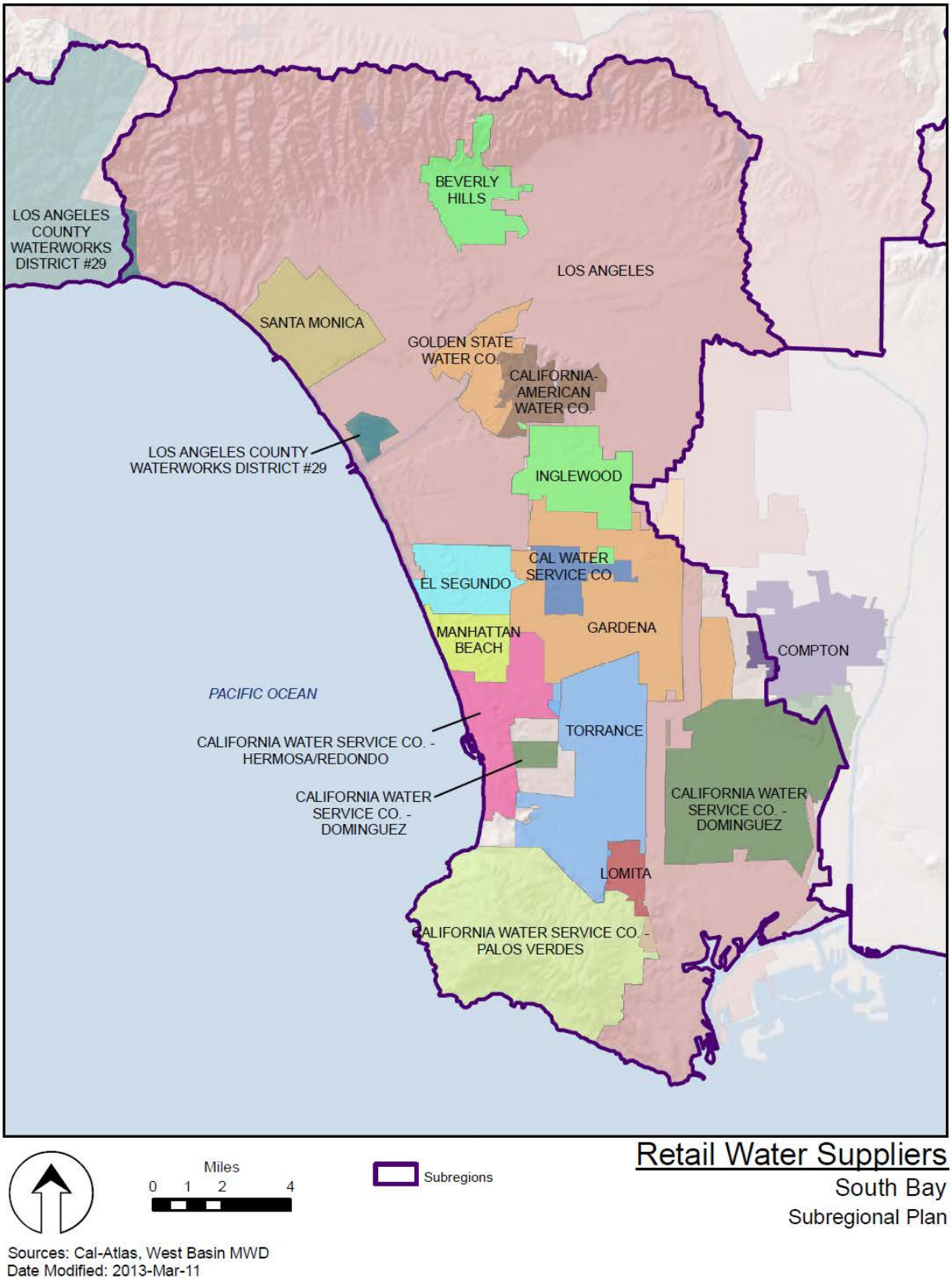


Figure 5: Retail Water Suppliers



Water Suppliers and Infrastructure

The water suppliers in the Subregion can be divided into wholesalers and retailers. Wholesalers (Figure 4) provide imported water and/or recycled water and to other agencies, while retailers (Figure 5) sell water to end users. The major wholesalers in the Subregion include West Basin Municipal Water District (WBMWD) and Metropolitan Water District of Southern California (MWDSC). The major retailers in the Subregion include Los Angeles Department of Water and Power (LADWP) and the cities of Santa Monica, Torrance, and Beverly Hills(shown in Figure 5). The retailers that are customer agencies of WBMWD include California American Water Company, California Water Service Company, Golden State Water Company, Los Angeles County Waterworks District #29, City of Lomita, City of Manhattan Beach, City of Inglewood, and City of El Segundo. These suppliers use a combination of imported water, groundwater, and recycled water to serve potable and non-potable demand in their service areas. Each of these major suppliers has written a comprehensive 2010 UWMP to estimate future water supply demands and availability, and which were utilized in the estimation of supplies discussed later in this plan.

Given that this Subregion is highly urbanized, there is extensive water infrastructure in place for the production of water and the delivery of water to both retailers and to end-users. A number of cities have groundwater wells in place for the pumping of the groundwater basins in the area. In addition, the MWDSC delivers water through imported water feeder pipelines to WBMWD, Torrance, Los Angeles, Santa Monica and Beverly Hills.

2.3 Sources of Water Supply

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

Sources of retail supply vary throughout the Subregion, as shown in Table 1. This table was developed based on 2010 Urban Water Management Plans (UWMPs) whose service areas cover a majority of the Subregion. These agencies include:

- WBMWD (portion within Subregion)
- City of Torrance
- City of Beverly Hills
- City of Santa Monica
- City of Los Angeles (portion within Subregion)

In addition to retail supply, replenishment supply is needed to both replenish the West Coast Groundwater Basin and to use with injection wells serving as seawater barriers. Table 2 shows 2010 supplies used to meet replenishment needs.

Table 1: Current Retail Supplies (acre-feet per year)

Supply	2010
Groundwater	53,000
Imported Water	405,000
Recycled Water	27,000
Desalinated Ocean Water	0
Stormwater	0
Water Use Efficiency	17,000
Total	**502,000**

Table 2: Current Replenishment Supplies (acre-feet per year)

Supply	2010
Imported Water	15,000
Recycled Water	8,000
Stormwater	0
Total	**23,000**

Groundwater

Groundwater is the only source of local potable supply in the Subregion. The major groundwater basins underlying the South Bay Subregion are the West Coast Basin, Santa Monica Basin and Hollywood Basin (Figure 6).

The West Coast Basin is adjudicated; therefore producers within this basin follow management guidelines established by their adjudication. The Santa Monica Basin and Hollywood Basin are both unadjudicated and the primary producers in each basin are Santa Monica and Beverly Hills, respectively.

Groundwater basin recharge can occur via existing and restored natural channel bottoms or percolation of rainwater (natural recharge); however natural recharge is typically insufficient to maintain basin water levels and current pumping levels due to the extent of impervious surfaces and the presence of clay soils in parts of the Subregion. There are currently injection wells in place in the West Coast Basin which inject recycled water and imported water along the coast to form barriers to seawater intrusion in two locations (the Dominguez Gap and West Coast Basin Barriers). Some underflow to the West Coast Basin from the neighboring Central Basin is known to occur.

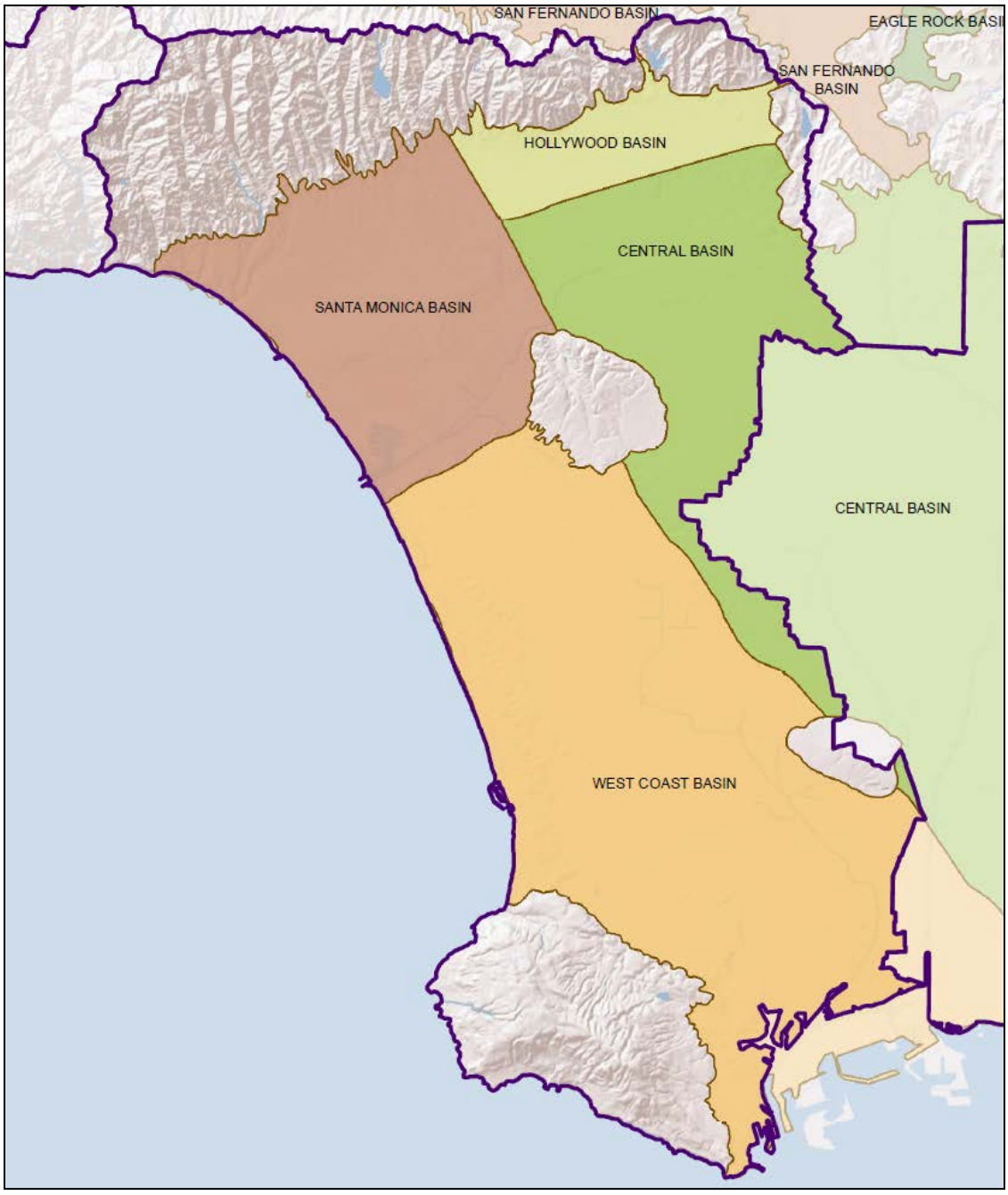
The recharged water augments and blends with groundwater, which is eventually extracted for potable use. Conjunctive use programs may also be implemented to recharge basins, where imported water is recharged via injection wells. Recharge also can occur “in-lieu” when an agency suspends production from its wells and uses other supplies. The reduction in pumping allows groundwater levels in the basin to recover. The amount of water that can be recharged in the basin may be limited by local runoff, recharge capacity, overlying groundwater demands, and water rights.

Imported Water

Imported water is the largest source of supply in the Subregion. The primary imported water wholesaler to the Subregion is MWDSC. WBMWD, the City of Los Angeles, and Torrance purchase water from MWDSC. WBMWD, in turn, wholesales imported water to retailers in the South Bay Subregion.

Imported water comes from the State Water Project, Colorado River Aqueduct, and the Los Angeles aqueducts.

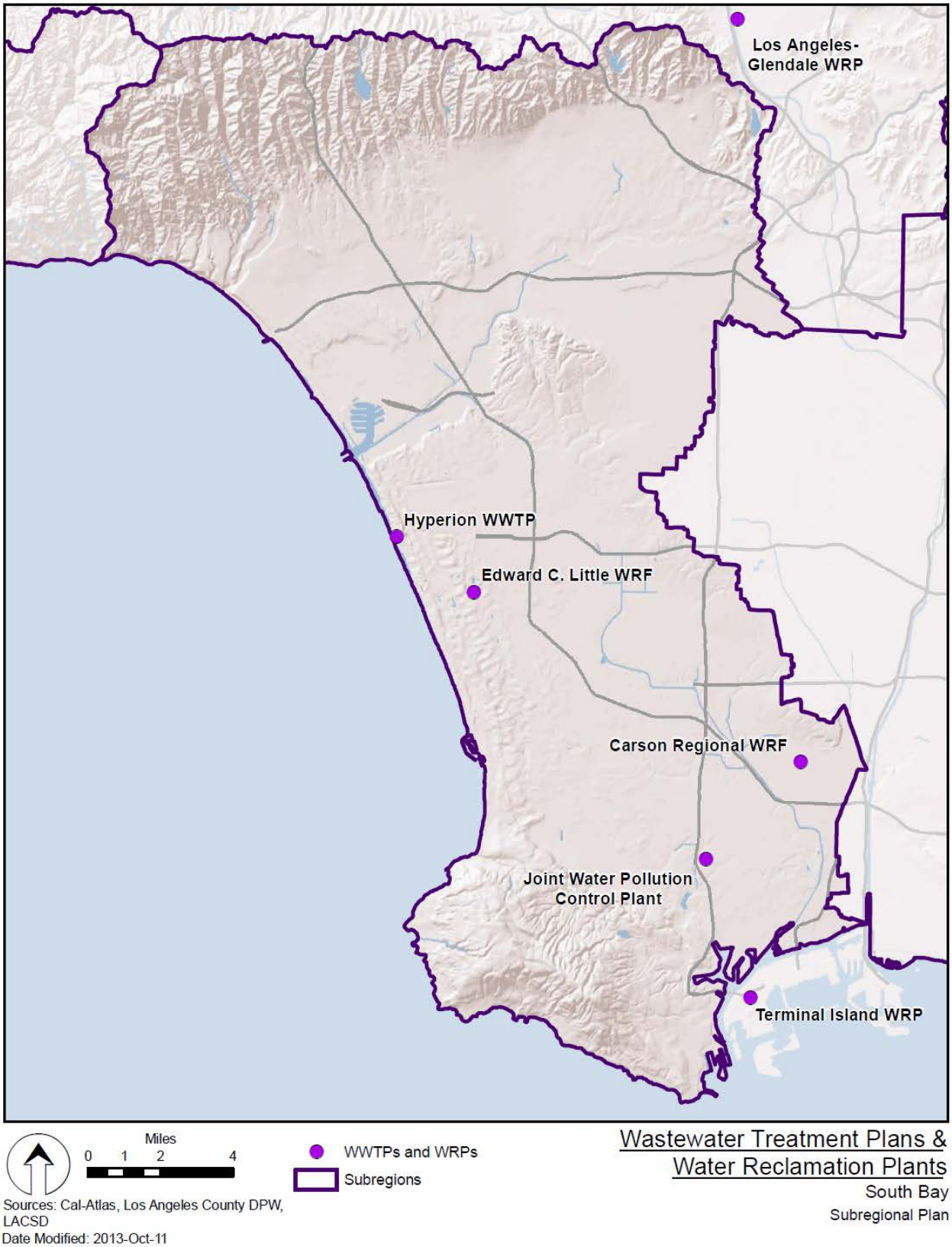
Figure 6: Groundwater Basins



Recycled Water

Recycled water is produced through treatment at a number of wastewater and reclamation plants including: the City of Los Angeles' Hyperion Treatment Plant, the County of Los Angeles Terminal Island Treatment Plant, the Edward C. Little WRF and the Joint Water Pollution Control Plant (JWPCP) (shown in Figure 7). In total, these WRPs have a capacity of approximately 790 million gallons per day

Figure 7: Wastewater Treatment Plants and Water Reclamation Facilities



(MGD), and treat nearly 40,000 AFY, using tertiary and advanced treatment, and reused for municipal uses (e.g., irrigation), industrial applications, and maintenance of seawater barriers in groundwater basins along the coast. The remainder is discharged to creeks and rivers, supporting riparian habitat in some locations, or directly to the ocean. The primary producers of recycled water in the Subregion are the Sanitation Districts of Los Angeles County, the City of Los Angeles, and WBMWD. Existing and future recycled water projects in the Subregion that were identified in the MWDSC's Integrated Water Resources Plan are shown in Table 3 and Table 4, respectively (MWD, 2010).

Table 3: Existing Recycled Water Projects

Sponsoring Agency	Project Name	Ultimate Capacity (acre-feet)
LADWP	Edward C. Little Water Recycling Facility Phase I-IV	1,000
City of Santa Monica	Santa Monica Urban Runoff Recycling Facility (SMURRF)	280
Torrance	Edward C. Little Water Recycling Facility Phase I-IV	7,800
West Basin MWD	Edward C. Little Water Recycling Facility Phase I-IV	54,800

Table 4: Future Recycled Water Projects

Sponsoring Agency	Project Name	Ultimate Capacity (acre-feet)
LADWP	LAX Cooling Towers	240
West Basin MWD	Carson Regional Water Recycling Facility Phase II Expansion Project to serve LADWP	9,300
	Edward C. Little Water Recycling Facility Phase V	5,026
	Carson Regional Water Recycling Facility Phase II Expansion Project to serve BP	2,100

Desalinated Ocean Water

Desalinated ocean water can add to the Region's water supply reliability by diversifying its water supply sources. WBMWD operates the Ocean Water Desalination Demonstration Facility and Water Education Center to evaluate and demonstrate ocean protection, energy recovery and cost reduction technologies with the goals of ensuring a full scale ocean-water desalination facility will be done in a cost and energy efficient manner while protecting the ocean. WBMWD is planning on expanding this facility in the future to provide up to 21,000 AFY of desalinated ocean water.

Stormwater Capture and Use

Stormwater capture and use is a method that can be used by municipalities both to add a source of supply to its water portfolio, and to reduce runoff that can contribute to flooding and water quality issues. Because this watershed has minimal opportunity to capture large quantities of water for infiltration to underlying water supply basins, stormwater capture and use will largely be used for irrigation purposes rather than directly for drinking water consumption. Stormwater use is currently taking place at a local level where the City of Los Angeles is planning on developing a Stormwater Capture Master Plan, and the

City of Santa Monica which actively promotes the use of rainwater for various non-potable applications through free workshops in addition to rain barrel and cistern rebates.

2.4 Water Supply and Demand

As water agency boundaries are not aligned with the subregional boundaries, water demand was estimated based on review of 2010 Urban Water Management Plans (UWMPs) for:

- West Basin MWD (portion within Subregion)
- City of Torrance
- City of Beverly Hills
- City of Santa Monica
- City of Los Angeles (portion within Subregion)

The demand projections in WBMWD's Regional UWMP were included as its service area covers the areas not covered by the individually listed cities. Given that the City of Los Angeles covers multiple subregions, the portion included in the South Bay Subregion was applied to the total demand estimated in the City of Los Angeles's UWMP to approximate the demand of the City of Los Angeles within the South Bay Subregion.

Demand projections for the South Bay Subregion can be seen in Table 5.

Table 5: Current and Projected Subregion Water Demand

2010	2015	2020	2025	2030	2035
426,000 AF	477,000 AF	498,000 AF	507,000 AF	518,000 AF	522,000 AF

2.5 Water Quality

The GLAC Region has suffered water quality degradation of varying degrees due to sources associated with urbanization, including the use of chemicals, fertilizers, industrial solvents, automobiles and household products. Both surface water and groundwater quality have been impacted by this degradation which can be classified as either point or nonpoint sources. Regulations are in place to control both types of sources, and are often updated to control constantly changing water quality issues.

The Federal Water Pollution Control Act Amendments of 1972, amended in 1977, are commonly known as the Clean Water Act. The Clean Water Act established the basic structure for regulating discharges of pollutants into the waters of the United States and gave the USEPA the authority to implement pollution control programs. In California, per the Porter Cologne Water Quality Control Act of 1969, responsibility for protecting water quality rests with the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs).

The Subregion has 303(d) listings related to both human activities and natural sources. Human activities can produce poor water quality due to trash, nutrients from wastewater treatment effluent, metals, and toxic pollutants. These pollutants can be carried in stormwater runoff and through point source discharges, impacting streams, canyon ecosystems, and eventually beaches and offshore waters. Natural sources of contaminants primarily include minerals and metals from underlying local geology.

Even though agencies and cities in the Subregion have significantly reduced pollutants that are discharged to water bodies from individual point sources since the Clean Water Act was established, many of the major water bodies are still considered impaired due to trash, bacteria, nutrients, metals, and toxic pollutants. Water quality issues affecting the Subregion's local surface waters and groundwater basins are discussed below.

Surface Water Quality

The watersheds in the South Bay Subregion serve many beneficial uses including: navigation, fishing, habitat, and aquatic habitats. Typically, surface water quality is better in the headwaters and upper portions of a watershed, and is degraded by urban and stormwater runoff closer to the Pacific Ocean. As a result, the major watersheds in the Subregion, (Dominguez Channel and Santa Monica Bay watersheds), and receiving waters (Santa Monica Bay) are 303(d) listed for several constituents, as shown in Table 6 and Table 7. (SWRCB, 2010). The locations of permitted point dischargers are shown in Figure 8. Please note that Figure 8 does not show MS4 and Caltrans discharges as these are non-point discharge permits.

Investigations are needed to determine natural background levels for some listings which may not be due to anthropogenic causes. However, the reports written in support of the Subregion's TMDLs include a source assessment for each impairment, and determine the major sources of each, as listed below:

- **Ballona Creek Metals TMDL:** Dry weather: storm drains, groundwater discharge, NPDES discharges; Wet weather: wet weather storm water flows (including MS4 permits issued to the County of Los Angeles and Caltrans, general construction permits, and general industrial storm water permits)
- **Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL:** Dry and wet weather urban runoff discharges from the storm water conveyance system, and through connecting tide gates to the Ballona Estuary from the Del Rey Lagoon and Ballona Wetlands, natural sources from birds, waterfowl and other wildlife
- **Ballona Creek Estuary Toxic Pollutants:** Dry weather: storm drains, groundwater discharge, NPDES discharges; Wet weather: wet weather storm water flows (including MS4 permits, general construction permits, and general industrial storm water permits)
- **Ballona Creek Trash TMDL:** Litter discarded to channels, and litter discarded then carried to storm drains by wind or runoff
- **Ballona Creek Wetlands Sediment and Invasive Exotic Vegetation TMDL:** Wet weather storm water flows (including MS4, general construction permits, and general industrial storm water permits), Ballona Creek watershed sediment loading, Playa Vista Freshwater Marsh, fill deposited in the wetland from construction activities, Southern California Gas Company activities in the area, Fiji Ditch
- **Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL:** Stormwater and urban runoff discharges, atmospheric deposition and fluxes from contaminated sediments into overlying water, loadings from contributing watersheds
- **Machado Lake Trash TMDL:** Litter from adjacent land areas, roadways and direct dumping and deposition to Machado Lake
- **Machado Lake Nutrient TMDL:** Dry weather: storm drains, groundwater discharge, NPDES discharges; Wet weather: wet weather storm water flows (including MS4, general construction permits, and general industrial storm water permits), fluxes from contaminated sediments into overlying water
- **Machado Lake Toxics TMDL:** Dry weather: storm drains, groundwater discharge, NPDES discharges; Wet weather: wet weather storm water flows (including MS4, general construction permits, and general industrial storm water permits), fluxes from contaminated sediments into overlying water
- **Santa Monica Bay Beaches Wet Weather Bacteria TMDL – major sources:** Runoff from residential, commercial, industrial, agricultural and undeveloped areas
- **Santa Monica Bay Beaches Dry Weather Bacteria TMDL – major sources:** Sanitary sewer and sewage plant overflows and spills, dry weather urban runoff

- **Santa Monica Bay Nearshore Debris TMDL – major sources:** Litter discarded to channels, creeks, lakes, beaches and the ocean
- **Santa Monica Bay DDTs and PCBs TMDL – major sources:** Sediments, Hyperion, JWPCP, dewatering from the cleanup of contaminated sites, dewatering related to construction projects, runoff
- **Los Angeles Harbor Bacteria TMDL:** Dry and wet weather urban runoff discharges from the storm water conveyance system, marina activities including waste disposal from boats, boat deck and slip washing, swimmer "wash-off", restaurant washouts, and natural sources from birds, waterfowl and other wildlife
- **Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL:** Dry and wet weather urban runoff discharges from the storm water conveyance system, waste disposal from boats, boat deck and slip washing, swimmer "wash-off", restaurant washouts, and natural sources from birds, waterfowl and other wildlife
- **Marina del Rey Harbor Toxics TMDL:** Urban storm water, marine sediments, deposition of airborne particles

Table 6: 303(d) listed waters with Approved TMDLs

303(d) Listed Waters and Impairments[1]	TMDL (Compliance Deadline)
Ballona Creek	
Metals: Copper, Lead, Selenium, Zinc, Toxicity	Ballona Creek Metals TMDL (2016)
Pathogens: Coliform Bacteria, Viruses (enteric)	Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL (2021)
Trash	Ballona Creek Trash TMDL (2015)
Ballona Creek Estuary	
Metals: Cadmium, Copper, Lead, Silver, Zinc	Ballona Creek Estuary Toxic Pollutants (2020)
Toxics: PAHs PCBs, Chlordane, DDT, Sediment Toxicity	
Bacteria	Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL (2021)
Ballona Creek Wetlands	
Trash	Ballona Creek Trash TMDL (2015)
Exotic Vegetation	Ballona Creek Wetlands Sediment and Invasive Exotic Vegetation TMDL (compliance schedule under development)
Habitat Alterations	
Hydromodification, Reduced Tidal Flushing	
Sepulveda Channel	
Indicator Bacteria	Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL (2021)
Metals: Lead	Ballona Creek Metals TMDL (2016)
Trash	Ballona Creek Trash TMDL (2015)
Dominguez Channel	
Metals: Copper, Lead, Zinc, Toxicity	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (2031)
Pesticides: Diazinon	
Dominguez Channel Estuary	
Pesticides: DDT, Chlordane, Dieldrin	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (2031)
Other Organics: Benzopyrene, Beno[a]anthracene, Chrysene, PCBs, Phenanthrene, Pyrene	
Metals: Lead, Zinc	
Sediment Toxicity	
Machado Lake	

Pesticides: Chlordane, DDT, Dieldrin, PCBs, ChemA	Machado Lake Toxics TMDL (2019)
Nutrients: Algae, Ammonia, Eutrophic, Odor	Machado Lake Nutrient TMDL (2017)
Trash	Machado Lake Trash TMDL (2012)
Torrance Carson Channel	
Metals: Copper, Lead	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (2031)
Coliform Bacteria	
Wilmington Drain	
Metals: Copper, Lead	Machado Lake Toxics TMDL (2019)
Los Angeles Harbor	
Pathogens: Indicator Bacteria, Beach Closures	Los Angeles Harbor Bacteria TMDL (2009)
Toxics: DDT, Dieldrin, Toxaphene, Chlordane	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (2031)
Metals: Cadmium, Chromium, Copper, Lead, Mercury, Zinc	
Sediment Toxicity	
Other Organics: 2-Methylnapthalene, Benzopyrene, Benzoanthracene, Chrysene, Dibenzanthracene, PCBs, Phenanthrene, Pyrene	
Marina Del Rey Harbor	
Toxics	Marina del Rey Harbor Toxics TMDL (2026)
Marina Del Rey Mothers' Beach and Back Basins	
Bacteria	Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL (2021)
San Pedro Bay	
Pesticides: DDT, Chlordane	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (2031)
PCBs	
Sediment Toxicity	
DDT	
Santa Monica Bay	
Debris	Santa Monica Bay Nearshore Debris TMDL (draft)
Bacteria	Santa Monica Bay Beaches Wet Weather Bacteria TMDL (2021) Santa Monica Bay Beaches Dry Weather Bacteria TMDL (2009)
DDTs, PCBs, Sediment Toxicity, Fish Consumption	Santa Monica Bay DDTs (water: 2014, sediment: 2023) and PCBs (water: 2014, sediment: 2034) TMDL
Santa Monica Bay beaches	
Bacteria	Santa Monica Bay Beaches Wet Weather Bacteria TMDL (2021) Santa Monica Bay Beaches Dry Weather Bacteria TMDL (2009)

1. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)

Table 7: 303(d) Listed Waters without Approved TMDLs

303(d) Listed Waters and Impairments[1]
Ballona Creek
Inorganics: Cyanide
Shellfish Harvesting Advisory
Ballona Creek Wetlands
Shellfish Harvesting Advisory

Santa Monica Canyon
Bacteria
Metals: Copper, Lead, Selenium
Nutrients: Ammonia
Dominguez Channel
Nutrients: Ammonia
Indicator Bacteria
Dominguez Channel Estuary
Nutrients: Ammonia
Coliform Bacteria
Benthic Community Effects
Torrance Carson Channel
Coliform Bacteria
Wilmington Drain
Coliform Bacteria
Los Angeles Harbor
Benthic Community Effects

2. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)

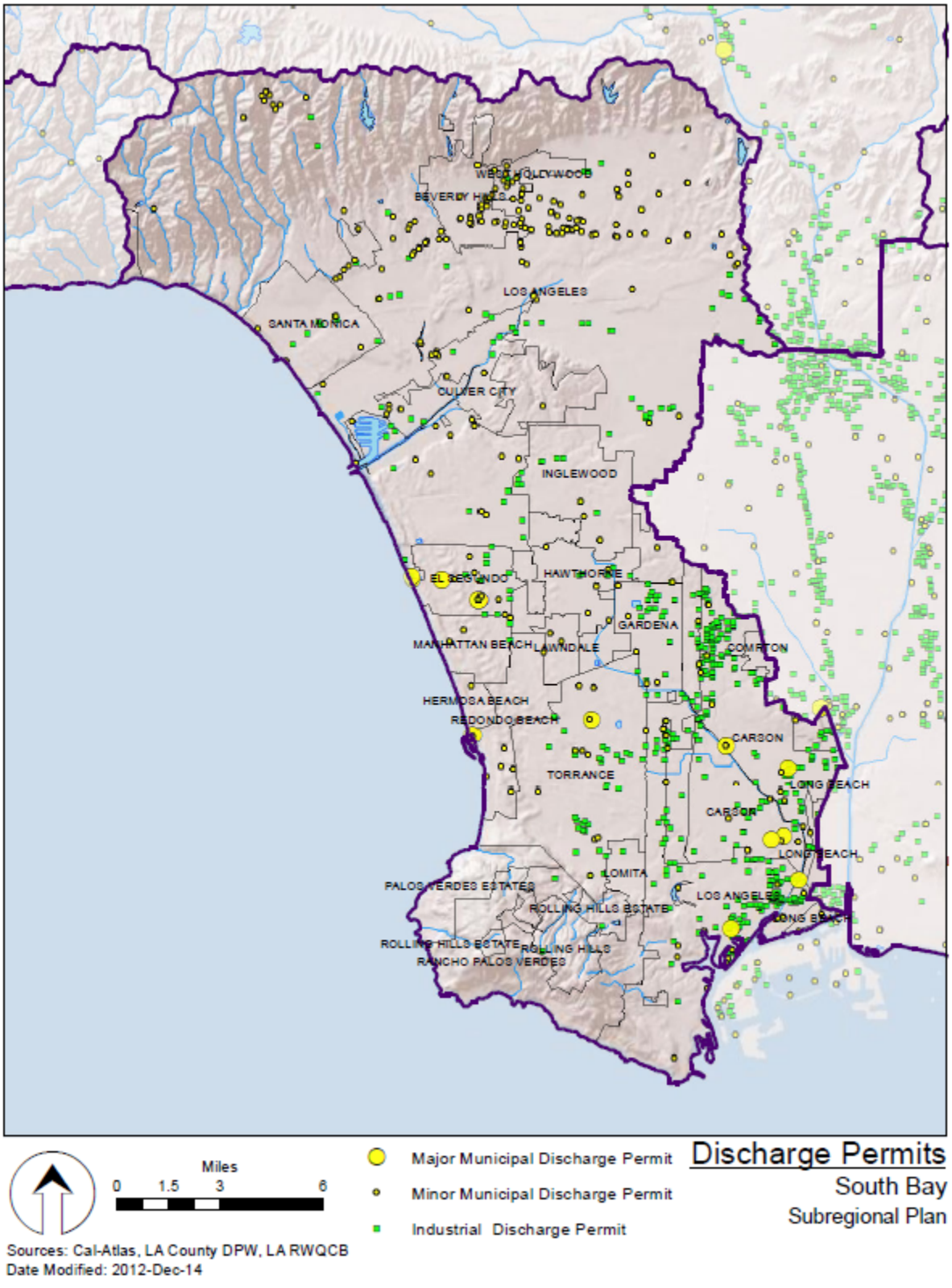
Groundwater Quality

Groundwater quality varies throughout the Subregion, based on naturally occurring conditions, historical land use patterns, and groundwater extraction patterns. Poor groundwater quality can be attributed to several factors including over-drafting of groundwater basins (sometimes resulting in seawater intrusion), industrial discharges, agricultural chemical usage, legacy contaminants in urban runoff, and naturally occurring constituents. The cost of treating these contaminants is often significant, and for some improperly disposed chemicals, effective treatment has not yet been identified. The Water Replenishment District of Southern California (WRD), which is tasked with groundwater management for the Central Basin and West Coast Basin, has implemented programs to assess treatment options and treat the contaminated groundwater in the West Coast Basin.

High levels of TDS in the Torrance/Hawthorne area of the West Coast Basin, and in the Hollywood Basin can be attributed to both seawater intrusion, and naturally occurring soil and geologic conditions in the region often result in elevated levels of dissolved solids. Increases in groundwater TDS concentrations are a function of the recharge of storm and urban runoff, imported water, and incidental recharge. Seawater intrusion is attributed to the extraction of groundwater above natural replenishment levels. To reduce this, Los Angeles County operates and maintains two seawater intrusion barrier systems along the coast that utilize recycled water and imported water to reduce the seawater intrusion in coastal aquifers. Additionally, the City of Beverly Hills, WBMWD, and WRD operate desalting facilities to reduce these high TDS levels (as discussed previously in the Water Supply section). (West Basin MWD, 2011; MWD, 2007)

Organic constituents of concern (TCE, PCE, and perchlorate) have been detected in the Santa Monica Basin, and are attributed to the past disposal of industrial solvents. This has required the City of Santa Monica to install air strippers to treat water pumped from certain wells. Additionally, a methyl tertiary butyl ethylene (MTBE) plume caused by leaking underground fuel storage tanks required the shutdown of a majority of the City of Santa Monica's wells in 1996. These wells have since been reactivated with the construction of a treatment facility to remove MTBE and organic contaminants. (MWD, 2007)

Figure 8: Permitted Discharges as of 2011



Coastal Ocean Water Quality

There are several indicators of coastal water quality. One of the most publicized is the annual report by Heal the Bay. The annual report evaluates California beaches, giving them a grade of A to F based on tests for bacterial pollution, which indicate how likely the water is to make swimmers sick. Statewide, 92% of California beaches earned A or B grades over the summer, the same as the previous year, according to the 2011 report. Heal the Bay's Report Cards rate California beaches over three time periods: summer dry, winter dry and wet weather. However, several South Bay beaches did not receive a passing grade. Cabrillo Beach in San Pedro earned an F for the eighth consecutive summer despite millions of dollars spent on municipal projects to improve water quality. Collaboration with SMBRC, EPA, LARWQCB, and other stakeholders is ongoing to implement and enforce water quality requirements including Santa Monica Bay Marine debris TMDL, and the City of Los Angeles Hyperion Wastewater Treatment Plant NPDES permit.

2.6 Environmental Resources

The environmental resources of the South Bay Subregion include aquatic habitats, riparian habitat, streams, wide beaches, rocky intertidal habitats, sandy dunes, beach bluffs, and parklands. Over time this network of natural resources has been striped with miles of concrete channels, culverts and underground pipes.

2.6.1 Aquatic Habitats

The South Bay Subregion was once an area replete with coastal aquatic habitat stretching from the Santa Monica Canyon watershed, south to the Dominguez Channel watershed. Of the remaining aquatic habitats, the most expansive area that remains is the Ballona Wetlands with lagoons near the mouth of Ballona Creek located in Playa del Rey in the City of Los Angeles. Another remaining historic aquatic habitat area in the Subregion includes the Madrona Marsh in Torrance. Existing aquatic habitats are shown in Figure 9.

Several organizations and governmental agencies have been active in the restoration of aquatic habitats in the South Bay Subregion. Those organizations include the Wetlands Recovery Project (WRP), the Santa Monica Bay Restoration Commission (SMBRC), the California State Coastal Conservancy, the Coastal Commission, the California Department of Fish and Wildlife Services (DFWS), Friends of Ballona Wetlands, and the cities of Manhattan Beach, Culver City, Inglewood, Los Angeles, and Santa Monica.

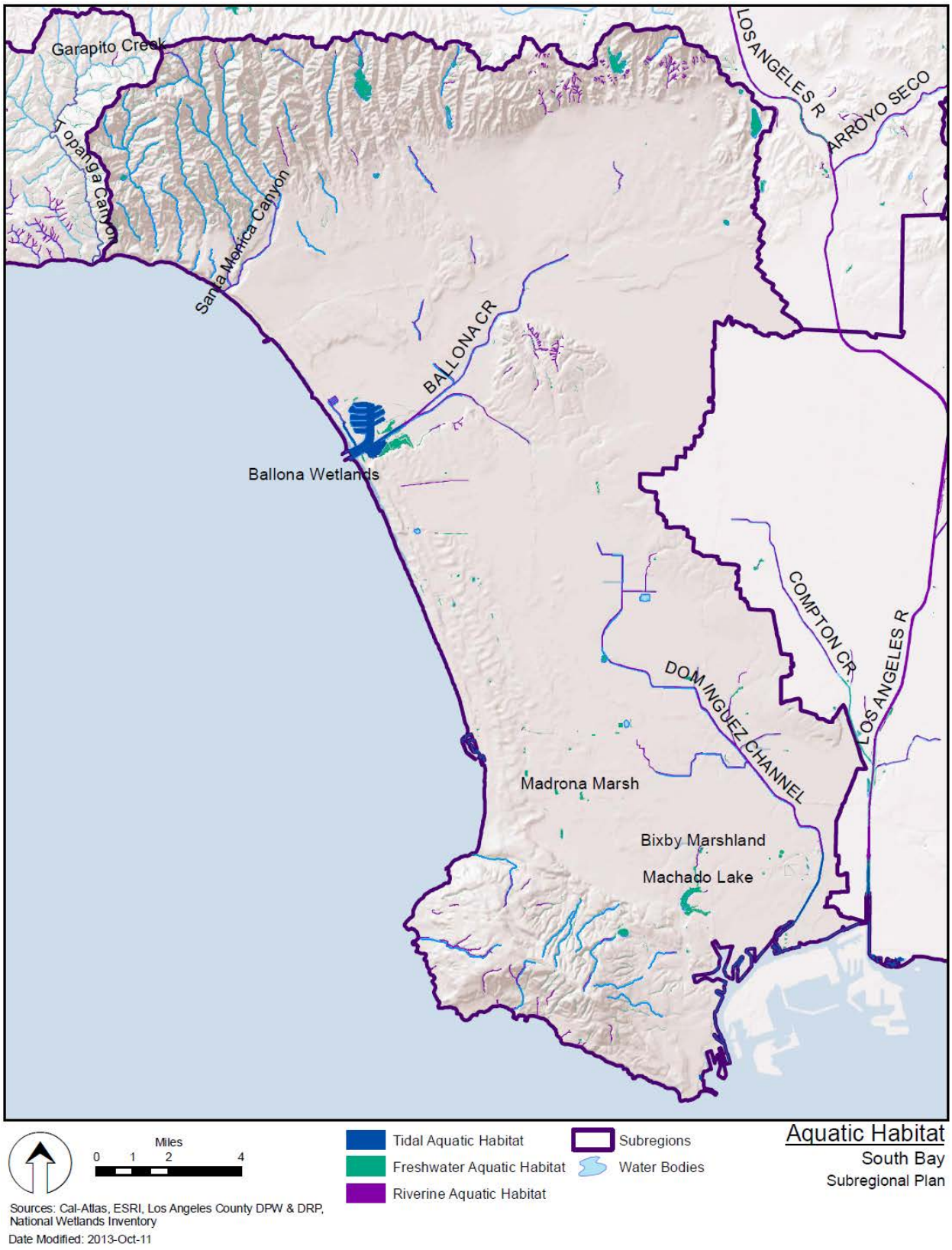
Ballona Wetlands

The Ballona Wetlands stretch from Playa del Rey to Venice and once occupied a 2,000-acre expanse of critical coastal habitat. Over time, the wetland has suffered from the loss of the historic connection with freshwater sources and the ocean thereby resulting in the loss of many ecological functions and many native species. In addition, it became the dumping site for dredging during the construction of Marina del Rey just to the north and the construction of the Ballona Creek Flood Control Channel.

In 2004, the State of California took title to a 600-acre parcel that encompasses a large portion of the historic Ballona Wetlands. The property was designated as a state ecological reserve - Ballona Wetlands Ecological Reserve (BWER) – and is the largest coastal wetland in the Santa Monica Bay. The property is owned by two state agencies, the DFWS and the State Lands Commission.

The Ballona Wetlands Project, spearheaded by the SMBRC under the auspices of the State Coastal Conservancy (SCC), endeavors to develop a plan of action to return the daily ebb and flow of tidal waters, maintain freshwater circulation and support a more natural and healthy ecosystem. Creating these suitable habitats and natural conditions will allow wetland vegetation to flourish and attract the insects, reptiles, amphibians, fishes, birds and mammals that call wetlands home. (Bay Restoration Foundation, 2011)

Figure 9: Aquatic Habitat in the South Bay Subregion



Madrona Marsh

The Madrona Marsh Preserve, located in Torrance, is the last vernal marsh remaining in the South Bay Subregion and one of few aquatic habitats located within its urban landscape. Formed eons ago when the mountains of the Palos Verdes Peninsula rose to the south, Madrona Marsh is a shallow depression fed by wet season storms, as the name "vernal" indicates. After the rainy season, evaporation, percolation and transpiration reduce the water depth by about one-quarter of an inch (6 mm) per day. By the end of August, the aquatic habitat is dry and remains so until the following rainy season. Situated on land that was set aside for oil production in 1924, Madrona Marsh was never developed—unlike the surrounding city—and remains a valuable natural habitat for birds, reptiles, insects and even small mammals. (Friends of Madrona Marsh, 2012)

Machado Lake

Machado Lake, located in Ken Malloy Harbor Regional Park along the Wilmington Drain, is a perennial freshwater lake and marsh that provides aquatic habitat to a number of species. Due to contamination by surrounding urban land uses, this area is undergoing ecosystem rehabilitation by the City of Los Angeles and Los Angeles County (SDLAC, 2010). Partial funding for this rehabilitation comes from the Proposition 50 Integrated Regional Water Management Grant Program.

2.6.2 Riparian Habitat

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

Due to the extensive urbanization on the coastal plain and inland valleys, current riparian habitat within the Subregion bears little resemblance to the pre-development conditions. Faber et al. (1989) estimated that 90- to 95-percent of the riparian habitat has been lost. Most native riparian habitat in the Subregion is located in the Santa Monica Mountains; in the restored riparian corridor below the Westchester Bluffs.

Ballona Creek

Ballona Creek is an approximately nine mile long flood control channel surrounded by urban development and traversed by roads, freeways, and infrastructure. The creek has the potential of providing a habitat corridor from Baldwin Hills to the Ballona Wetlands, but currently does not contain significant riparian habitat. However a 50 acre riparian corridor and freshwater marsh for stormwater management purposes were completed in the early 2000's and contains many willows, cattails and tule habitat areas.

The Ballona Creek Greenway Plan is the result of collaboration between the Ballona Creek Watershed Task Force and the SMBRC. It is a plan that will explore issues related not only to short-term recreational improvements but also to longer-term restoration design possibilities. The Task Force is comprised of state and local agencies, environmental organizations, private businesses, and resident stakeholders. Concurrently, SMBRC - with the aid of partner agencies such as the State Coastal Conservancy, Baldwin Hills Conservancy (BHC), Mountains Recreation Conservation Authority (MRCA), and City and County of Los Angeles – have embarked on the Lower Ballona Ecosystem Restoration Feasibility Study (LBERF) with the U.S. Army Corps of Engineers.

Stone Creek

UCLA and the University Lab School (ULS) campuses are conducting restoration efforts at Stone Creek which runs through the UCLA campus. Since 2007, the SMBRC has been working with support of the State Coastal Conservancy and the RWQCB to restore the stream with monthly volunteer weeding and planting events.

Dominguez Channel

The Dominguez Channel extends from the Los Angeles International Airport to the Los Angeles Harbor and drains large if not all portions of the cities of Inglewood, Hawthorne, El Segundo, Gardena, Lawndale, Redondo Beach, Torrance, Carson and Los Angeles. Dominguez Channel is in the Dominguez Watershed which is comprised of approximately 110 square miles of land in the southern portion of Los Angeles County. The remaining land areas within the watershed drain to several debris basins and lakes or directly to the Los Angeles and Long Beach Harbors. Because of the largely industrial land base in this watershed, very little native riparian vegetation remains. (RWQCB, 2008)

Madrona Marsh

The Madrona Marsh Preserve, located in Torrance, is the last vernal marsh remaining in the South Bay Subregion. Ongoing efforts are restoring native plants including wildflowers and butterfly species. The area has long been popular with bird watchers and the Audubon Society has used Madrona Marsh for their annual bird census since 1967. El Camino College uses it as an outdoor biology and botany lab. Torrance operates the Madrona Marsh Nature Center in cooperation with the Friends of the Madrona Marsh. (Friends of Madrona Marsh, 2012)

Bixby Marshland

The Bixby Marshland is a remnant of a formerly extensive, natural-freshwater aquatic habitat known as Bixby Slough. Over the years, most of Bixby Slough was destroyed due to development. The Bixby Marshland, a 17-acre marsh, located to the northwest of the Sanitation Districts of Los Angeles County Joint Water Pollution Control Plant (JWPCP) near the intersection of Figueroa Street and Sepulveda Boulevard in the City of Carson, has recently been restored by the Sanitation Districts of Los Angeles County (SDLAC, 2012). Partial funding for this restoration comes from the Proposition 50 IRWM Grant Program.

Beach Bluff Restoration

Beach bluff restoration is underway at several locations within the Subregion. The Los Angeles Conservation Corps is working with at-risk youth to restore three acres of bluff habitat adjacent to a Youth Center at Dockweiler Beach. The site is a priority restoration site due to its proximity to other native plant habitat supporting the federally endangered El Segundo blue butterfly within the dunes just west of Los Angeles International Airport. The Palos Verdes Peninsula Land Conservancy (PVPLC) has implemented a number of nature preserves that will preserve beach bluff areas, including the Vicente Bluffs, Abalone Cove, Alta Vicente, and the future Ocean Trails preserves. (Palos Verdes Peninsula Land Conservancy, 2012)

2.6.3 Upland Habitat

Upland habitat that exists further inland serves as a linkage between aquatic habitats. Within the Subregion, these habitats include the Los Angeles Coastal Plain and the Santa Monica Mountains to the north. A majority of the coastal plain has been urbanized, which inhibits linkage between aquatic habitats. The small portion of the Santa Monica Mountains in the northern portion of the Subregion are by contrast mostly open space and free of development, but impacted by invasive species and water quality issues. (RWQCB, 2011) PVPLC has developed preserves in upland areas, including the following: Agua Amarga, Three Sisters, Upper Filiorum, Portuguese Bend, and San Ramon. In addition, Rolling Hills Estates has established the Linden H. Chandler Preserve and the George F. Canyon Nature Preserve, and San Pedro has established the Fuel Depot managed area and the White Point Nature Preserve.

2.6.4 Significant Ecological Areas and Environmentally Sensitive Habitat Areas

Significant Ecological Areas (SEAs) are ecologically important areas that are designated by the County of Los Angeles as having valuable plant or animal communities. Similar to the SEAs are Environmentally Sensitive Habitat Areas (ESHAs), which are designated by the Coastal Commission via local coastal programs. SEAs are offered certain protections within the unincorporated portions of Los Angeles County.

Development proposals located within a SEA and outside incorporated City boundaries are reviewed by the Significant Ecological Area Technical Advisory Committee (SEATAC) which recommends changes to the project and mitigation measures to protect the habitat. The County of Los Angeles is in the process of updating the SEA designations and policies. (LACDRP, 2011) SEAs in the Subregion are shown in Figure 10 and include:

- Agua Amarga Canyon located on the Palos Verdes Peninsula with headwaters in the City of Rolling Hills Estates and passing through Rancho Palos Verdes and Palos Verdes Estates (not Redondo Beach)
- Ballona Creek in Venice
- El Segundo Dunes in Venice
- Harbor Regional Park which contains Machado Lake is located in the City of Los Angeles in San Pedro
- Madrona Marsh in Torrance
- Palos Verdes Peninsula Coastline
- Redondo Beach and San Pedro
- Portuguese Bend Preserve located in Rancho Palos Verdes
- Rolling Hills Canyons in Rolling Hills, Rolling Hills Estates, and Rancho Palos Verdes

2.6.5 Critical Habitat Areas

Critical habitat areas have been established by the endangered species act (ESA) to prevent the destruction or adverse modification of designated critical habitat of endangered and threatened plants and animals. The United States Fish and Wildlife Service (USFWS) through the Endangered Species Act (ESA) defines critical habitat as “a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.”

Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery.” A critical habitat designation typically has no impact on property or developments that do not involve a Federal agency, such as a private landowner developing a property that involves no Federal funding or permit. However, when such funding or permit is needed, the impacts to critical habitat are considered during the consultation with the USFWS.

Within the Subregion, there are 5,640 acres of designated critical habitat defined for the Coast California gnatcatcher, Brauton’s milk-vetch, and Palos Verdes blue butterfly, as shown in Figure 11.

Figure 10: Significant Ecological Areas in the South Bay Subregion

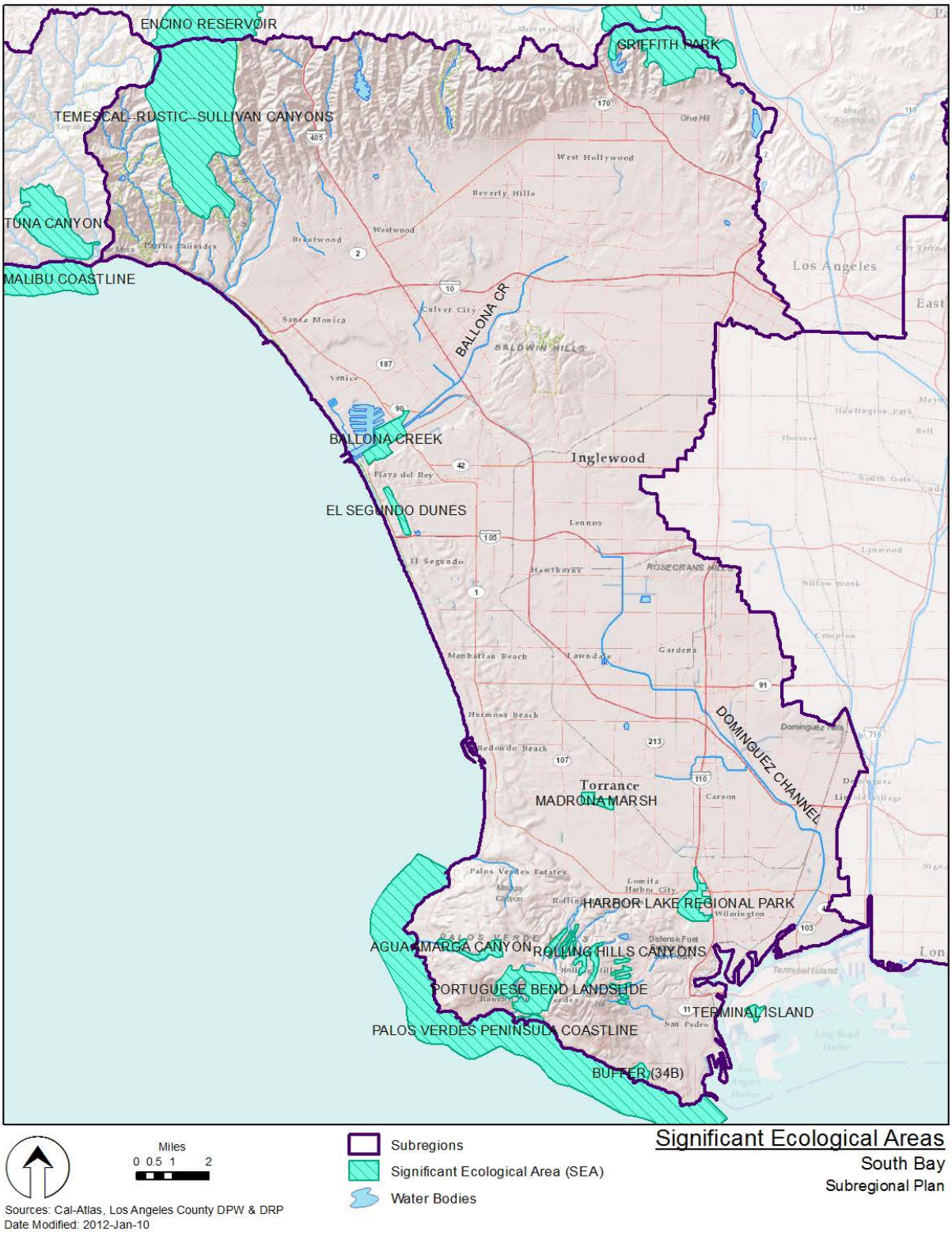
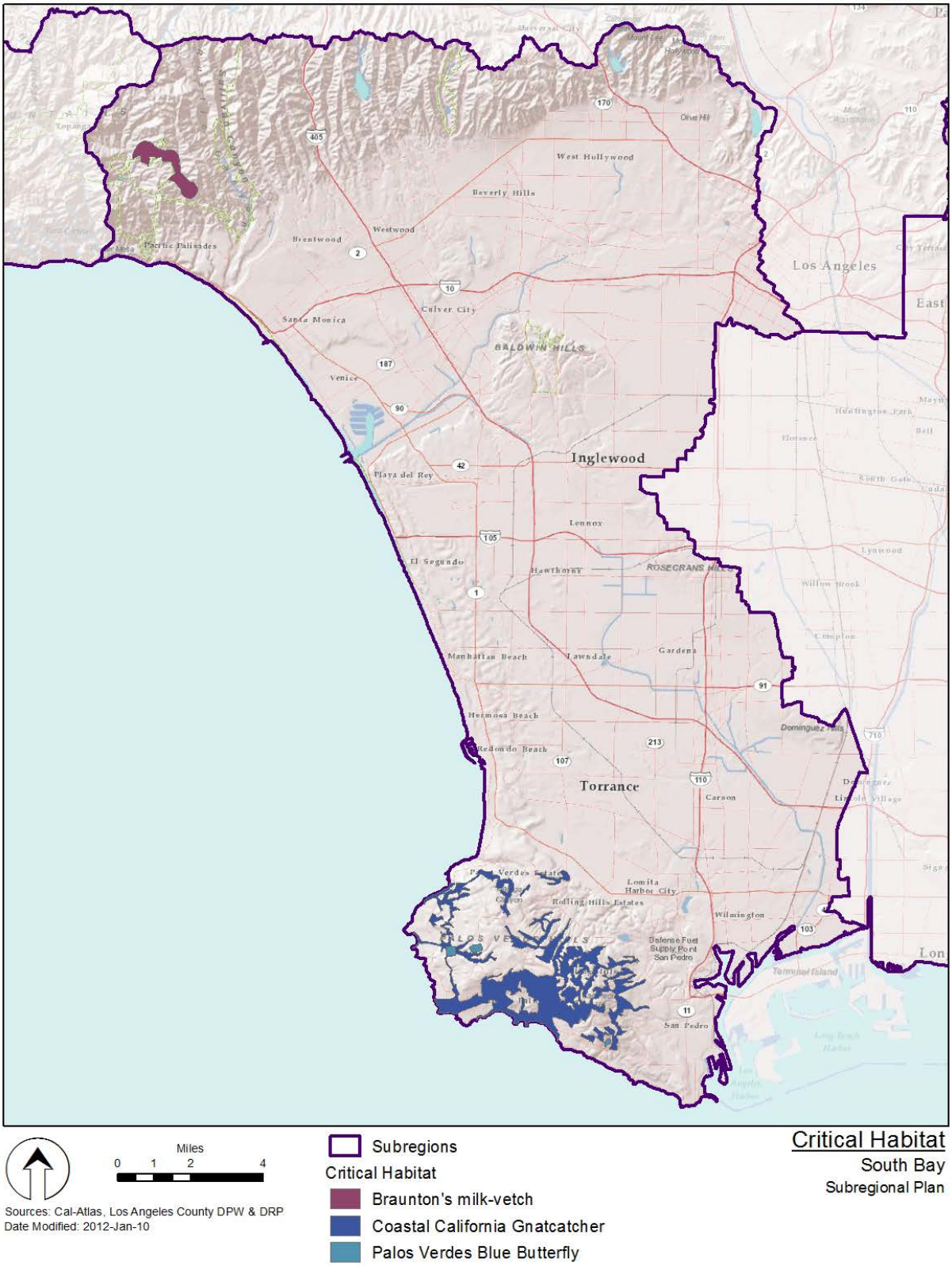


Figure 11: Critical Habitat Areas



2.6.6 Area of Special Biological Significance

In the mid-1970s, to protect sensitive coastal habitats, the SWRCB designated 34 areas on the coast of California as Areas of Special Biological Significance (ASBS), including the area between Mugu Lagoon in Ventura County and Latigo Point in Los Angeles County.

2.6.7 Marine Habitat

The marine environment of Santa Monica Bay includes a variety of habitats which provide food and shelter for thousands of species of marine life. The Marine Program of the SMBRC seeks to conserve and rehabilitate natural resources in the marine environment and improve the beneficial uses of the Bay. To do this, the Marine Program assesses the status of marine habitats in the Bay, restores degraded habitats, monitors the recovery of restored habitats, and participates in the development of policies that protect marine resources.

2.6.8 Ecological Processes

The Santa Monica Mountains in the northern portion of the Subregion comprise a large and complex Mediterranean ecosystem of coastal sage scrub, chaparral, oak woodlands, and associated riparian areas. Connecting habitats within this ecosystem has been a top conservation priority. Integrity and connectivity is evidenced, albeit limited, by the presence of the mountain lion, cougar, bobcat, gray fox, badger, mule deer and Steelhead trout.

Fire

Fire is an integral and necessary part of the natural environment and plays a role in shaping the landscape. Catastrophic wildfire events can denude hillsides which create opportunities for invasive plants and increase the potential for subsequent rains to result in debris flows that erode the landscape and can clog stream channels, damage structures, and injure inhabitants in the canyons and lower foothill areas.

Invasive Species

Invasive species in the Region have also substantially affected specific habitats and areas. Along with the rest of California, most of the Subregion's native grasslands were long ago displaced by introduced species. The receptive climate has resulted in the widespread importation of plants from around the globe for landscaping. Some plant introductions have resulted in adverse impacts. In many undeveloped areas, non-native plants such as arundo (*Arundo donax*), tree of heaven (*Alianthus altissima*) tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), salt cedar (*Tamarix ramosissima*) and cape ivy (*Senecio mikanioides*) are out-competing native flora. The removal of these particular species, which requires focused and repeated efforts, can provide substantial dividends in water savings and restored species diversity.

Slope Stability

The area in the northern portion of the Subregion is prone to slope stability problems such as landslides, mudslides, slumping and rockfalls. Shallow slope failure such as mudslides and slumping occur where graded cut and fill slopes have been inadequately constructed. Rockfalls are generally associated with seismic ground-shaking or rains washing out the ground containing large rocks and boulders. In particular, significant landslide activity has occurred in the Palos Verdes Peninsula area.

2.7 Open Space and Recreation

Open space and recreation area is limited in the Subregion due to it being highly developed. Parks, recreation and other open space in the Subregion can be seen in Figure 12. Acreage of recreation and open space lands within the Subregion is shown in Table 8. In total, of the Subregion's 210,000 acres,

approximately 24,000 acres (or 12%) are considered open space or recreation land areas. A majority of open space and recreation land areas are National Forest Land within the Santa Monica Mountains.

Table 8: Existing Recreation and Open Space Land Area

Land Type	Acres
Developed Urban Park and Recreation Area	3,900 acres
Open Space Lands (including aquatic habitats and National Forest)	20,100 acres
Greenways	70 acres
Other/Miscellaneous	240 acres
Total Area in Subregion	**24,310 acres**

2.8 Land Use

Land use within the South Bay Subregion reflects the historic pattern of urbanization as most of the coastal plain is occupied with residential, industrial, commercial, and institutional uses while most of the Santa Monica Mountains are principally open space. A breakdown of land use in the South Bay Subregion is depicted in Figure 13. This Subregion is considered to be nearly at build-out, meaning there is little to no additional open space available for development.

Table 9: Land Use in the South Bay Subregion

Land Use Type	Acres	Percentage
Residential	114,045	46%
Open Space / Recreation / Vacant	56,850	24%
Commercial	28,562	12%
Industrial	21,702	9%
Transportation, Utilities	15,073	6%
Agriculture	1,090	<1%
Mixed Urban	3,271	1%
Water	4,073	2%
No Data	748	<1%
Total	**245,416**	**100%**

Figure 12: Parks and Open Space in the South Bay Subregion

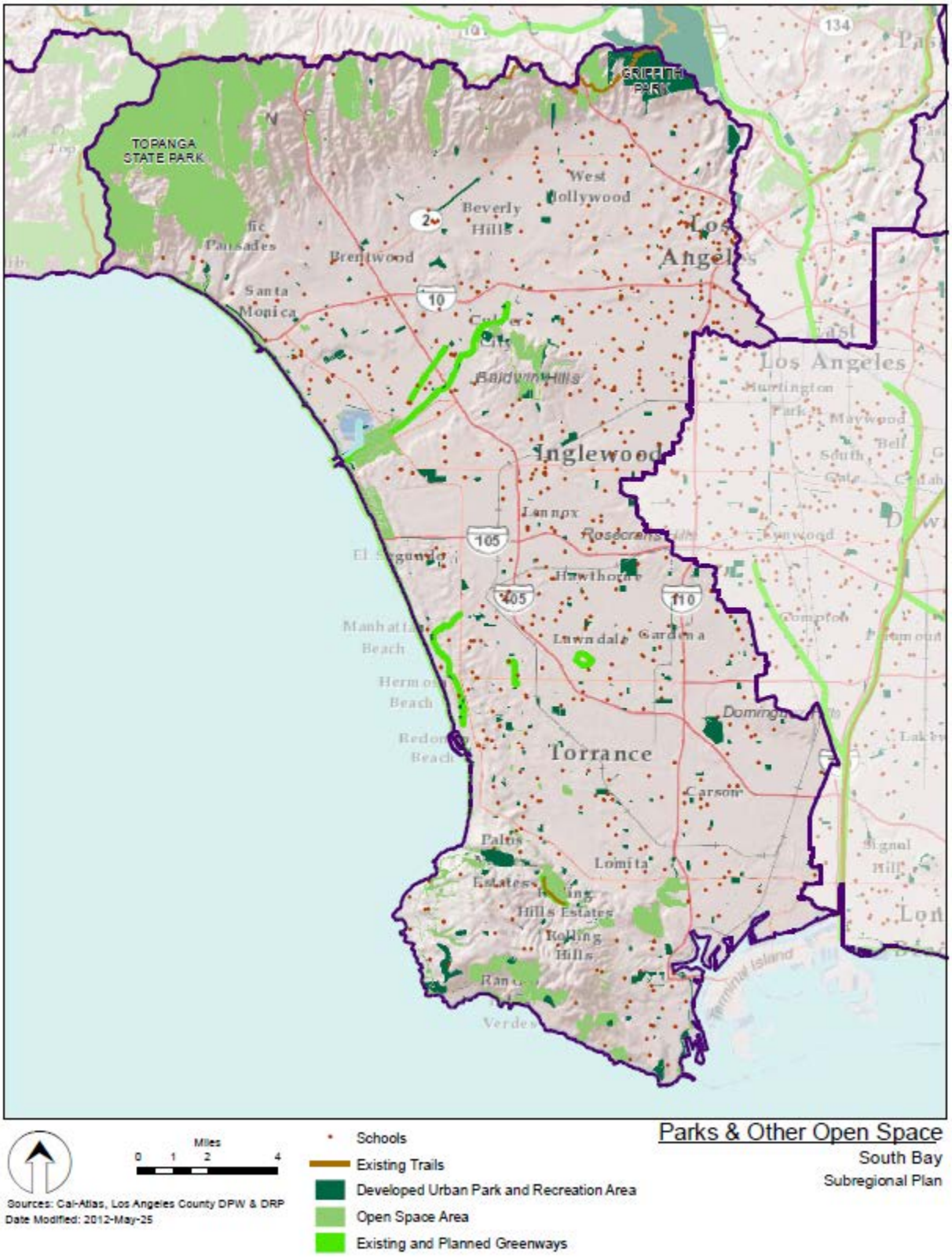
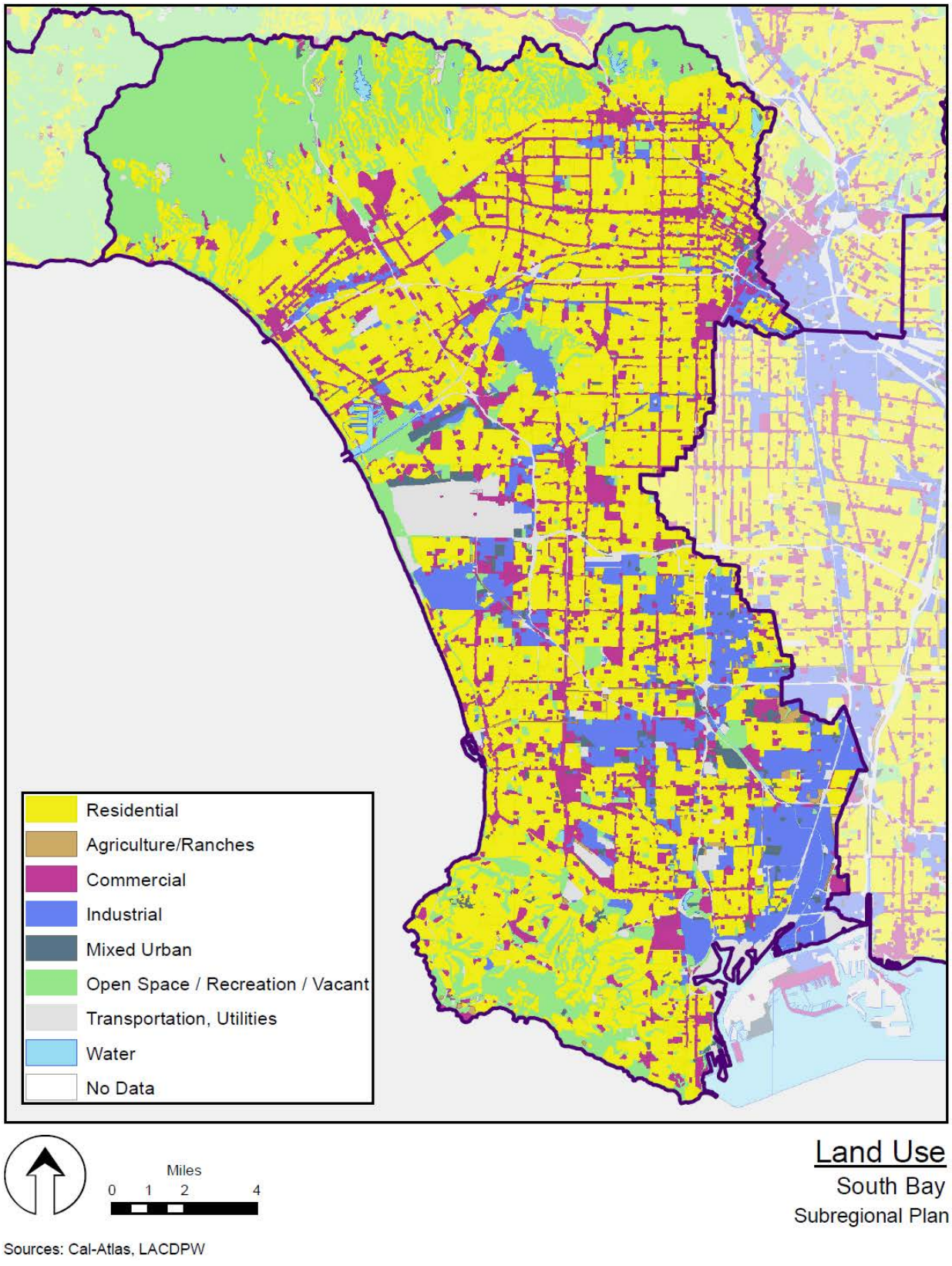


Figure 13: Land Use in the South Bay Subregion



3 Subregional Objectives and Targets

This section identifies the objectives for the Subregion and establishes quantified planning targets to the 2035 planning horizon that can be used to gauge success in meeting the objectives.

3.1 Objective and Target Development

The Greater Los Angeles County Regional IRWM Plan has developed regional goals, objectives, and targets. To assist the region in meeting these, objectives and targets have been developed for the Subregion. These objectives and targets are intended to help guide improvements to water supply, water quality, habitat, open space, and flood management to meet the Region's objectives and targets through Subregional planning.

Five objectives have been articulated, based on recent water resource planning documents. Workgroups composed of Stakeholders from within the Region were involved in establishing the Plan's objectives and targets. To establish quantifiable benchmarks for implementation of the plan, planning targets were defined based on much discussion within the regional workgroup. Objectives for five water resource areas were identified for the Subregion, which are discussed below (and summarized in Table 10).

3.2 Water Supply

Optimizing local water supply resources is vital for the Subregion to reduce its reliance on imported water and improve reliability of local water supplies should imported water supplies be reduced or interrupted due to environmental and/or political reasons. The Subregion plans on achieving this objective by conserving water through water use efficiency measures, creating an additional ability to pump groundwater, increasing the non-potable reuse of recycled water, adding ocean desalination, and increasing the capture and use of stormwater. In total, water supply targets will yield an additional 136,000 AFY of local supply for direct use, and 13,000 AFY of local supply for groundwater recharge.

To develop supply targets, water supply planning documents for agencies whose service areas cover a majority of the Subregion were examined for potential supply projects, and planned increases in supply between the years 2010 and 2035. The water supply targets for each Subregion were discussed in the *Water Supply Targets TM*.

3.3 Water Quality

Improving the quality of urban and stormwater runoff will reduce or eliminate impairment of rivers, beaches, and other water bodies within and downstream of the Subregion. Improving the quality of urban and stormwater runoff would also make these local water supplies available for groundwater recharge. Additionally, the Subregion will continue to improve groundwater and protect drinking water quality to ensure a reliable water supply.

The Subregion plans on achieving these objectives by increasing the capacity to capture and treat runoff and prevent certain dry weather flows (see table above). The water quality target was determined by setting a goal of capturing ¾" of storms over the Subregion. The Subregion's target is to develop 12,700 AF of new stormwater capture capacity (or equivalent) per ¾ inch storm. An emphasis will be given to the higher priority areas which will be determined by project-specific characteristics provided by the project proponent, including land use in the proposed project area, runoff and downstream impairments. The assumptions and calculations used to determine this target and catchment prioritization can be found in the *Water Quality Objectives and Targets TM*.

3.4 Habitat Objective and Targets

Protecting, restoring, and enhancing the Subregion's native habitats is vital to preserving areas that will contribute to the natural recharge of precipitation and improve downstream water quality. Additionally, the protection, restoration, and enhancement of upland habitat, wetland/marsh habitat, riparian habitat and buffer areas will help restore natural ecosystem processes and preserve long-term species diversity. Subregional targets for habitat were not developed, but Regional habitat target development is discussed in the *Open Space, Habitat and Recreation TM*.

3.5 Open Space and Recreation Objective and Targets

Open space and recreation areas provide space for native vegetation to create habitat and passive recreational opportunities for the community. In addition, open space and recreation areas may preserve or expand the area available for natural groundwater recharge (though only in the forebay areas), improve surface water quality to the extent that these open spaces filter, retain, or detain stormwater runoff, and provide opportunities to reuse treated runoff for irrigation. Subregional targets for open space and recreation were not developed, but Regional open space and recreation target development is discussed in the *Open Space, Habitat and Recreation TM*.

3.6 Flood

Improved integrated flood management systems can help reduce the risk of flooding, and protect lives and property. The Subregion plans on meeting this objective by reducing 2,310 acres of local unmet drainage needs. The local unmet drainage target was determined by looking at Special Flood Hazard Areas (SFHAs), also known as flood plains, as defined by FEMA, compared to land uses and the presence of structures. Detailed assumptions and calculations used to develop the Subregion's flood target can be found in the *Flood Management Objectives and Targets TM*.

Table 10: Subregional Objectives and Planning Targets

Objectives		Subregional Planning Targets
Improve Water Supply		
Optimize local water resources to reduce the Subregion's reliance on imported water.	Water Use Efficiency	Conserve 38,000 AFY of water by 2035 through water use efficiency and conservation measures.
	Ground Water	Create ability to pump an additional 35,000 AFY using a combination of treatment, recharge, and storage access.
	Recycled Water	Increase indirect potable reuse of recycled water by 13,000 AFY. Increase non-potable reuse of recycled water by 36,000
	Ocean Desalination	Add ocean desalination by 21,000 AFY.
	Stormwater	Increase capture and use of stormwater runoff by 6,000 AFY that is currently lost to the ocean.
Improve Water Quality		
Comply with water quality regulations (including TMDLs) by improving the quality of urban runoff, stormwater, and wastewater.	Runoff (Wet Weather Flows)	Develop[1] 12,700 AF of new stormwater capture capacity (or equivalent) spatially dispersed to reduce region-wide pollutant loads, emphasizing higher priority areas[2].
Enhance Habitat		
Protect, restore, and enhance natural processes and habitats.	Habitat targets were not developed to the subregional level – only to the regional level.	
Enhance Open Space and Recreation		
Increase watershed friendly recreational space for all communities.	Open space and recreation targets were not developed to the subregional level – only to the regional level.	
Improve Flood Management		
Reduce flood risk in flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches.	Sediment Management and Integrated Flood Planning	Reduce flood risk in 2,310 acres of flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches.

[1] Stormwater capture capacity assumes (1) providing storage volume equivalent to runoff from the 0.75", 24-hour design storm event, (2) designing BMPs to retain the captured volume to the maximum extent practicable via infiltration, evapotranspiration, or harvest and use, and (3) designing BMPs to provide effective treatment to address pollutants of concern for the remaining portion of the captured volume that is not retained. Projects deviating from these specifications may be demonstrated to be equivalent based on comparison of average annual volume captured and/or average annual pollutant load reduction for pollutants of concern. Pollutants of concern are defined as those pollutants expected to be generated from the land uses within the subwatershed and for which the downstream water bodies are impaired (TMDL, 303(d) listed).

[2] High priority areas will be determined based on project-specific characteristics such as project area land use, precipitation, imperviousness and downstream impairments.

4 Partnership and Multi-benefit Opportunities

Many agencies and other entities have successfully been working together for decades on many collaborative projects. For instance in this Subregion, the entire system of flood management, conservation of local water supply, and recreation is a longstanding set of activities and facilities that represents collaboration and integration among the Los Angeles County Flood Control District, West Basin MWD, the Water Replenishment District, other water agencies, LA County Dept of Parks & Recreation and others. Projects that seek to enhance or extend these existing activities should be encouraged, because often they will be the most cost-effective.

Implementation of projects is the vehicle to meeting the objectives and planning targets discussed in Section 3. Integration and collaboration can help these projects achieve synergies and, at times, increase their cost-effectiveness in meeting multiple objectives. In addition to the collaboration described above, the GLAC IRWM Region will continue to build upon a wealth of potential multi-benefit project opportunities for partnership projects including:

- **Local Supply Development:** Alternative supply development such as distributed stormwater capture projects are often too costly for a water supply agency to construct on their own for water supply purposes only. The near-term unit cost can be well in excess of the cost of imported water. However, partnerships often help to share the costs, thus providing opportunities for more complex, multi-benefit projects (such as water quality improvement) that otherwise might not be accomplished.
- **Improving Stormwater Quality:** In preparing this update of the IRWM Plan, a methodology to identify priority drainage areas based on their ability to improve water quality for the coastal and terrestrial waters was developed. Integrated projects that can provide water quality benefits can be cited relative to that prioritization to achieve the highest benefits.
- **Integrated Flood Management:** Earlier studies, such as the Sun Valley Watershed Management Plan (2004), demonstrated the potential for similar cost-effective synergies between flood control, stormwater quality management, water supply, parks creation and habitat opportunities. Flood control benefits usually achieved through significant traditional construction projects can sometimes be accomplished with alternative multi-benefit projects.
- **Open Space for Habitat and Recreation:** When habitat is targeted for restoration, there are often opportunities for cost-effective implementation of flood control, stormwater management and passive recreation (such as walking and biking trails) as well.

These benefit synergies and cost effectiveness outcomes can best be attained when the unique physical, demographic and agency service area attributes of the region are considered. In addition to existing collaborative processes, the GLAC IRWMP has developed the geodatabase tool to assist in identifying areas and partnerships conducive to both inter-subregional and intra-subregional integrated project development. This section discusses these tools as well as some preliminary analyses on the South Bay Subregion's potential partnerships and integrated project opportunities.

4.1 GLAC IRWMP Integration Process and Tools

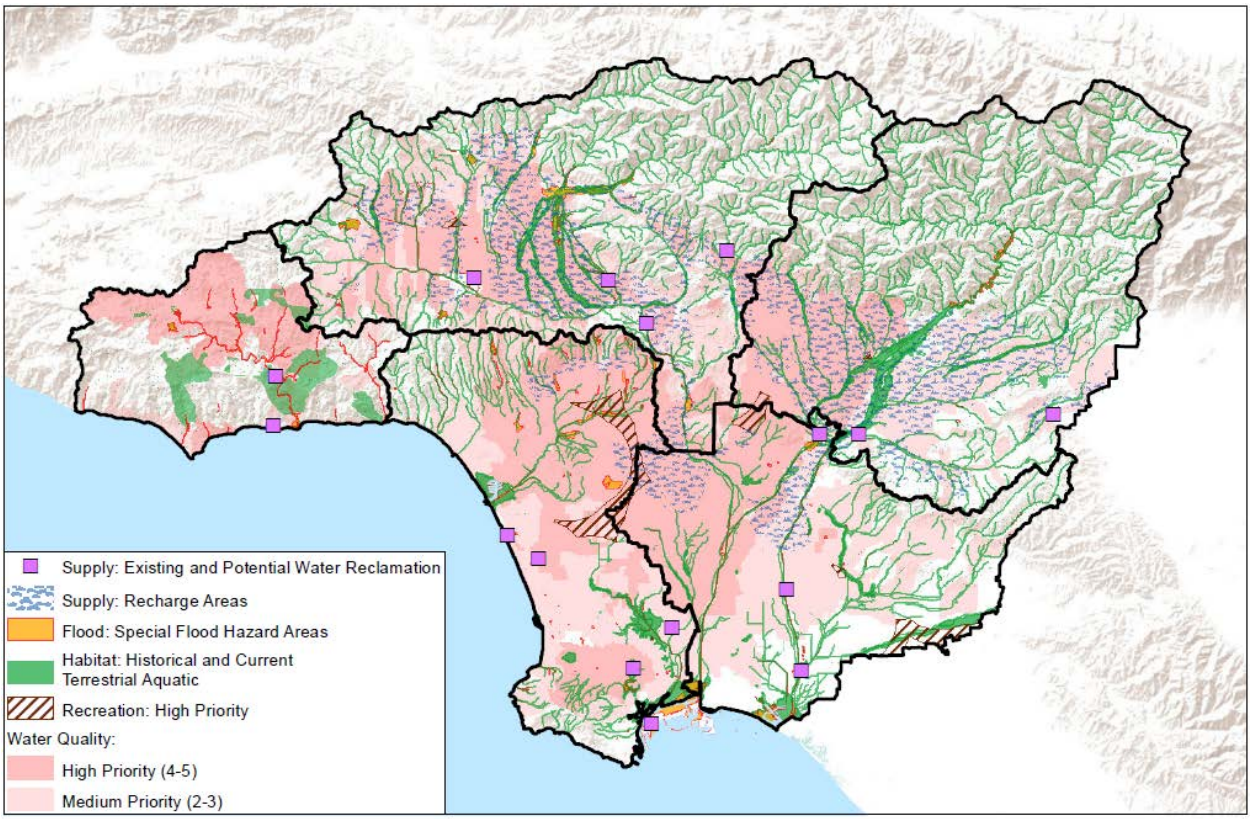
As part of the objectives and targets update process, the GLAC Region compiled and developed several geo-referenced data layers to assist in spatially identifying priorities and potential opportunities to achieve water supply, water quality, habitat, recreation and flood management benefits. These data layers were initially used individually to determine the objectives and planning targets for each water management

area. However, these datasets can also be overlaid to visually highlight areas with the greatest potential to provide multiple benefits. The resulting Potential Benefits Geodatabase (Geodatabase) can also align these areas relative to other layers containing agency service areas and jurisdictions – allowing for project proponents and partners to be identified.

Potential Benefits Geodatabase

The GLAC IRWMP Potential Benefits Geodatabase is a dynamic tool that should be updated as new data is made available in order to maintain its relevance in the IRWM planning context. However, in order to provide an analysis of potential integration and partnership opportunities for the 2013 GLAC IRWM Plan, current data layers were overlaid and analyzed. The key layers used are shown in Figure 14 and described in Table 11. It should be noted that these datasets may not be complete or in need of further refinement and therefore will be updated on an as-needed basis – which is part of the dynamic process previously described. Therefore, the Geo-database should only be used as an initial step in identifying multi-benefit potential and by no means used to invalidate the potential for achieving benefits in other areas.

Figure 14: GLAC Region Potential Benefits Geodatabase Layers



Using the Geodatabase

The Geodatabase is a dynamic visual tool. The data layers and maps shown in this Section are only some of a multitude of ways to package and view the datasets to help with the integration process. It is important to note that not all data that could be useful in identifying integration and partnership potential for the region is easily viewed spatially in this format. Therefore the Geodatabase should only be used as one of several potential integration tools or methods.

The Geodatabase can also be used to identify the potential for further integration between existing projects included in an IRWMP. Currently the GLAC Region has web-based project database (OPTI) that

geo-references all projects included in the IRWM. As part of the 2013 Plan Update, this dataset of projects will eventually be updated and prioritized. This resulting project dataset could be included as a layer in the Geodatabase or conversely, the existing Geodatabase layers could be uploaded to OPTI for public viewing and made available to OPTI users. In the future, additional layers, such as groundwater quality and general plan areas, can be added to the Geodatabase to enhance the ability of project proponents to identify integration opportunities. Either way, by overlaying the current projects on top of the potential benefit layers, additional benefits could be added to existing projects or linked to other projects and proponents through those benefits.

Table 11: Potential Benefit Geodatabase Layers

Data Layer	Description
Supply: Recharge Areas[1]	Shows areas where soils suitable for recharging are above supply aquifer recharge zones. Thereby indicating that water infiltrating in these areas has the potential to increase groundwater supplies.
Supply: Existing and Potential Water Reclamation[2]	Shows locations of existing wastewater and water reclamation plants.
Flood: Special Flood Hazard Areas[3]	Shows some of the areas that would benefit from increased drainage to alleviate flooding potential.
Habitat: Historical and Current Terrestrial Aquatic[4]	Shows the combined current and historical habitat areas that would indicate the potential for aquatic habitat protection, enhancement, or restoration benefits to be derived. (Note: North Santa Monica Bay Subregion did not have similar data so it shows Significant Ecological Areas instead[5].)
Recreation: High Priority[6]	Shows areas that have the greatest need for open space recreation given the distance from current open space recreation sites.
Water Quality: Medium and High Priority[7]	Shows watershed areas with medium and high priority and therefore relative potential to improve surface water quality.

[1] Created using Los Angeles County's groundwater basins shapefile overlaid with soils and known forebays shapefiles.

[2] Created by RMC Water and Environment for the Los Angeles Department of Water and Power's Recycled Water Master Planning program to show sources of wastewater that could be made available for recycled water use.

[3] Created by Federal Emergency Management Agency to define areas at high risk for flooding (subject to inundation by the 1% annual chance flood event) and where national floodplain management regulations must be enforced.

[4] From *Regional restoration goals for wetland resources in the Greater Los Angeles Drainage Area: A landscape-level comparison of recent historic and current conditions using GIS* (C. Rairdan, 1998) and additional current aquatic habitat is based on the extent of current habitat derived from the National Wetlands Inventory.

[5] Significant Ecological Areas are those areas defined by Los Angeles County as having ecologically important land and water systems that support valuable habitat for plants and animals.

[6] Created for the *GLAC IRWM Open Space for Habitat and Recreation Plan (2012)*, and shows where there is less than one acre of park or recreation area per one thousand residents.

[7] Created for the *GLAC IRWM Water Quality Targets TM (2012)*, which ranked catchments based on TMDLs, 303(d) listings and catchments that drain into Areas of Special Biological Significance (ASBS).

4.2 South Bay Integration and Partnership Opportunities

Planning for the GLAC Region is primarily done on a subregional level, given that each subregion has a unique set of physical opportunities and stakeholders that create opportunities for project identification and collaboration. Therefore, the Geodatabase layers are more useful when examined and discussed on a subregional scale. Figure 14 focuses on the South Bay Subregion and highlights just a few unique areas within the subregion that have potential for generating multiple benefit projects. The areas described here are meant to provide examples of potential multiple benefits areas and are not meant to be a comprehensive inventory of opportunities. As subregions move forward to identify potential projects, it will be necessary to examine localized site characteristics (such as land uses) to confirm that it will be possible to meet the potential benefits discussed below.

The South Bay Subregion's integration potential is notable relative to other subregions in a few ways:

- There are minimal areas suitable for groundwater recharge.
- It has the largest area in need for open space recreation.
- It has great potential for coastal habitat preservation, enhancement and restoration.
- There are significant areas with a high priority water quality improvement potential.

What is not obvious from Figure 15 is that relative to other subregions, the South Bay is heavily dependent upon imported water supplies given limited groundwater recharge potential. Therefore local supply development anywhere within the Subregion would be considered to provide great benefits.

The following paragraphs describe the circled areas in Figure 15 where integration and partnership opportunities could be found based upon the Geodatabase layers and multiple benefit analysis performed. There are multiple areas beyond those few highlighted here for further exploration by the South Bay Subregion stakeholders and project proponents.

A: Hollywood Basin Water Supply and Water Quality

Although limited, there are areas with the potential for groundwater recharge in the northern area of the subregion (Beverly Hills and Hollywood areas) that could recharge the Hollywood Groundwater Basin. These recharge areas also predominately lie within high priority areas for water quality improvements. Given that this area is heavily urbanized, it would be well suited for decentralized stormwater capture and use projects as well as infiltration BMP's that could achieve water quality and groundwater water supply benefits. Potential partnerships between LA County DPW, and the cities of Beverly Hills and West Hollywood and Los Angeles as well as several NGO's could result in multi-benefit projects.

B. Mid City Los Angeles Water Quality, Flood Management Habitat and Recreation

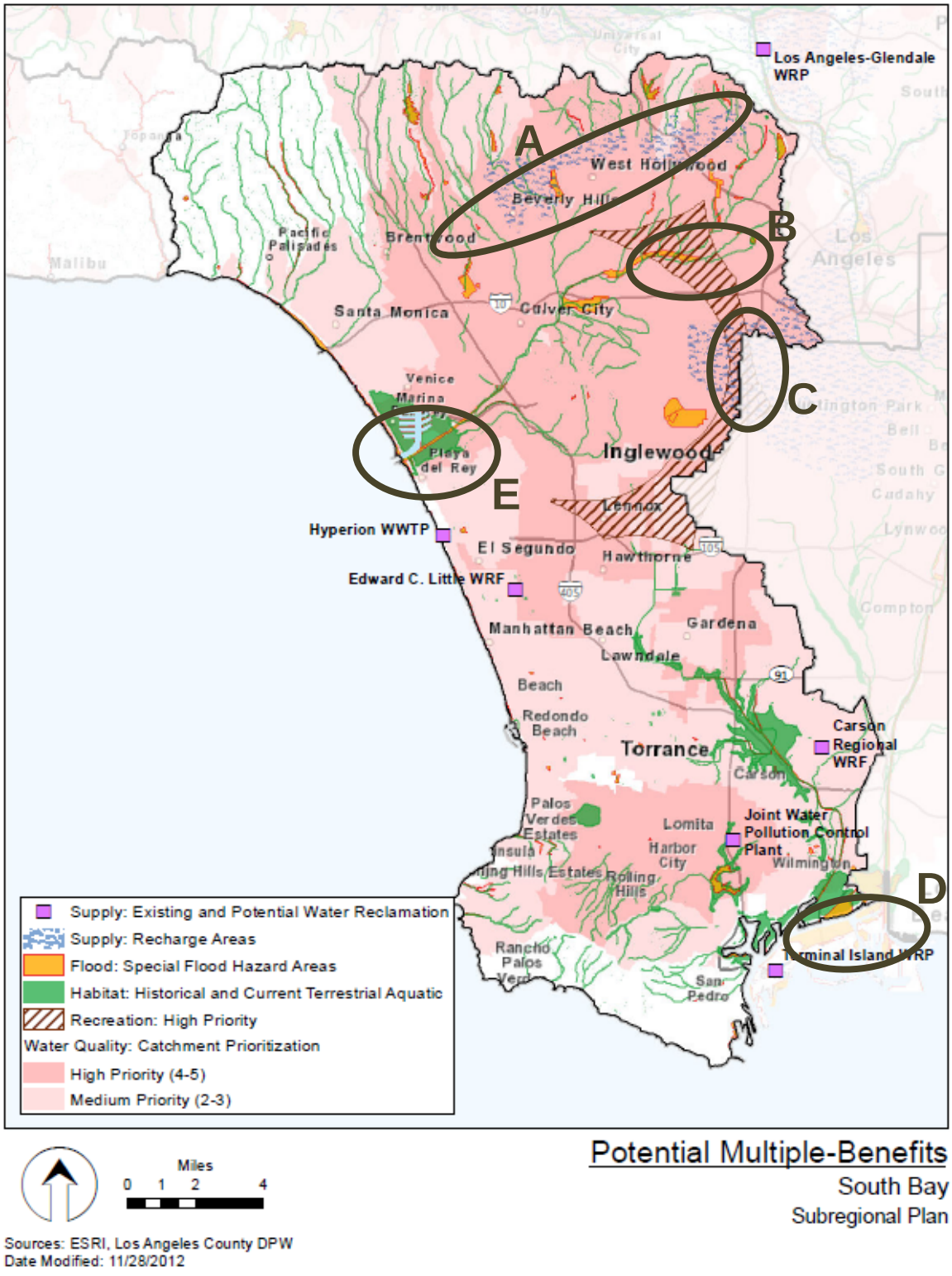
Historically, this area was the upstream area of Ballona Creek but has since then become heavily urbanized. These unique characteristics provide an area with opportunities for both flood management and water quality improvements. The area's current urban density may limit the ability to provide habitat benefits however recreation opportunities could still be feasible in the area on a neighborhood scale. Projects could provide multiple benefits when coupled with water quality improvement components and flood management.

C. South Central Intra-subregional Groundwater Recharge, Recreation and Water Quality

The northern-most boundary between the South Bay and Lower Los Angeles and San Gabriel River subregions is South Central Los Angeles. This area has a high recharge potential and water quality improvement priority as well as a great need for open space recreation for the heavily urbanized neighborhoods. Therefore, this area has great potential for generating integrated projects that could provide benefits to both subregions. Projects could include stormwater landscaping BMPs on a site (yard) and neighborhood (park) scale to capture and infiltrate stormwater flows in open areas. Close proximity to

regional water reclamation plants can also provide additional supplies to further enhance current use of recycled water for groundwater recharge. Project partners could be WBMWD, WRD and the City of Los Angeles.

Figure 15: South Bay Subregion Potential Multiple-Benefits



D. Dominguez Channel Flood Management, Water Supply and Coast Habitat

Another area for a potential intra-subregional project with the Lower Los Angeles and San Gabriel Subregion is at the mouth of the Dominguez Channel. The area also houses the City of Los Angeles' Terminal Island Water Reclamation Plant that could supply recycled water supplies for potable offset for agencies in both subregions though their joint involvement in the Central Basin. Although heavily industrial, there is potential for habitat benefits if such a project were conceived that could also improve the flood management needed in the area. Partnerships between the cities of Los Angeles, Carson, Long Beach, WRD and WBMWD could result in integrated projects.

E. Marina del Rey Water Quality and Coastal Habitat

The Ballona Creek empties into the Santa Monica Bay at Marina del Rey. This coastal area is home to the Ballona Wetlands that are in the process of being restored through past and future new projects that will further increase its habitat and water quality value and benefits. The presence of Ballona Channel (a stream and flood control channel) also provides opportunities for the management of flood waters and coastal inundation as a result of climate change. There are also opportunities for added freshwater wetland treatment upstream of the salt marsh areas that could incorporate passive activity trails.

Potential project partners are the State Fish and Wildlife Services, the Coastal Conservancy, and the Santa Monica Bay Restoration Commission, along with the LACFCD, non-profit groups (such as the Friends of Ballona Wetlands and Ballona Creek Renaissance) and cities of Los Angeles and Culver City.

The Oxford Flood Control Basin manages stormwater flows into Marina del Rey. While it is principally a flood control basin, it has potential for stormwater quality management and habitat restoration as well with potential partners including LACFCD and LA County Beaches and Harbors.

Venice Canals and Ballona Lagoon areas also provide opportunities for low impact development to minimize flooding and enhance water quality and open space habitat for the City of Los Angeles and local neighbors and environmental groups.

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Exhibit A. Regional Imported Water Information

State Water Project

The SWP is a system of reservoirs, pumps and aqueducts that carries water from Lake Oroville and other facilities north of Sacramento to the Sacramento-San Joaquin Delta and then transports that water to central and southern California. Environmental concerns in the Sacramento-San Joaquin Delta have limited the volume of water that can be pumped from the SWP. The potential impact of further declines in ecological indicators in the Bay-Delta system on SWP water deliveries is unclear. Uncertainty about the long-term stability of the levee system surrounding the Delta system raises concerns about the ability to transfer water via the Bay-Delta to the SWP.

The MWD contract with the Department of Water Resources (DWR), operator of the SWP, is for 1,911,500 acre-feet/year. However, MWD projects a minimum dry year supply from the SWP of 370,000 acre-feet/year, and average annual deliveries of 1.4 million acre-feet/ year. These amounts do not include water which may become available from transfer and storage programs, or Delta improvements.

MWD began receiving water from the SWP in 1972. The infrastructure built for the project has become an important water management tool for moving not only annual deliveries from the SWP but also transfer water from other entities. MWD, among others, has agreements in place to store water at a number of groundwater basins along the aqueduct, primarily in Kern County. When needed, the project facilities can be used to move stored water to southern California.

Colorado River Aqueduct

California water agencies are entitled to 4.4 million acre-feet/year of Colorado River water. Of this amount, the first three priorities totaling 3.85 million acre-feet/year are assigned in aggregate to the agricultural agencies along the river. MWD's fourth priority entitlement is 550,000 acre-feet per year. Until a few years ago MWD routinely had access to 1.2 million acre-feet/year because Arizona and Nevada had not been using their full entitlement and the Colorado River flow was often adequate enough to yield surplus water to MWD. According to its 2010 Regional UWMP, MWD intends to obtain a full 1.2 million acre-feet/year with possible water management programs with agricultural and other holders. MWD delivers the available water via the 242-mile Colorado River Aqueduct, completed in 1941, which has a capacity of 1.2 million acre-feet per year.

The Quantification Settlement Agreement (QSA), executed in 2003, affirms the state's right to 4.4 million acre-feet per year, though water allotments to California from the Colorado River could be reduced during future droughts along the Colorado River watershed as other states increase their diversions in accord with their authorized entitlements. California's Colorado River Water Use Plan and the QSA provide numeric baseline to measure conservation and transfer water programs thus enabling the shifting to conserve water (such as the lining of existing earthen canals) and to shift some water from agricultural use to urban use. Since the signing of the QSA, water conservation measures have been implemented including the agriculture-to-urban transfer of conserved water from Imperial Valley to San Diego, agricultural land fallowing with Palo Verde, and the lining of the All-American Canal.