Lower San Gabriel and Los Angeles River Subregional Plan

Draft

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1 Background and Purpose of Subregional Plan

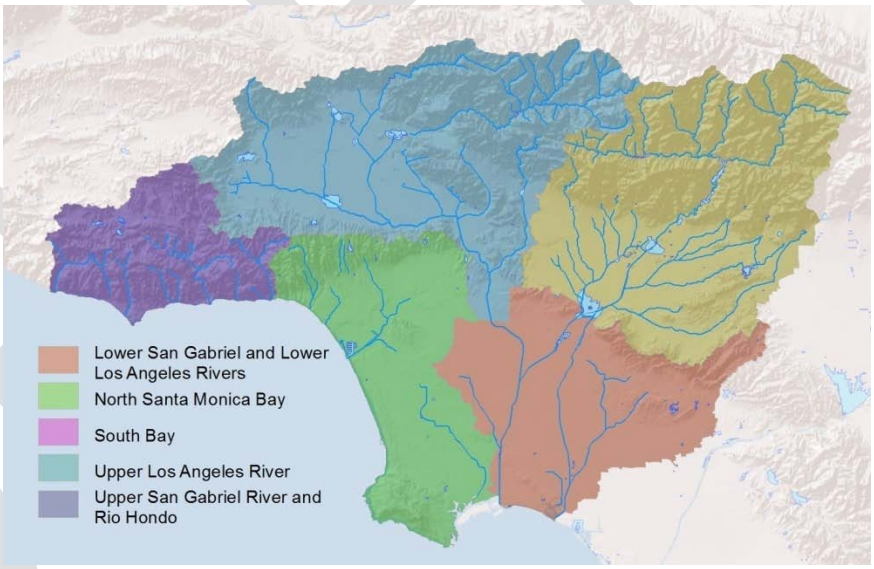
The Lower San Gabriel and Los Angeles River Subregional plan is one of five Subregional plans that make up the Greater Los Angeles County Integrated Regional Water Management Plan (GLAC IRWM Plan). This Subregional plan describes the Lower Los Angeles and San Gabriel's physical setting, sources of water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

2 Lower San Gabriel and Los Angeles River Description

2.1 Physical Setting

The Lower San Gabriel and Los Angeles River Subregion of the GLAC IRWM Region is located in the Southwest portion of the Los Angeles County urbanized area (Figure 1). The Subregion is also comprised of several dozen water agencies/companies and other entities which have an interest in a variety of water management issues.

Figure 1: GLAC Subregional and Watershed Boundaries



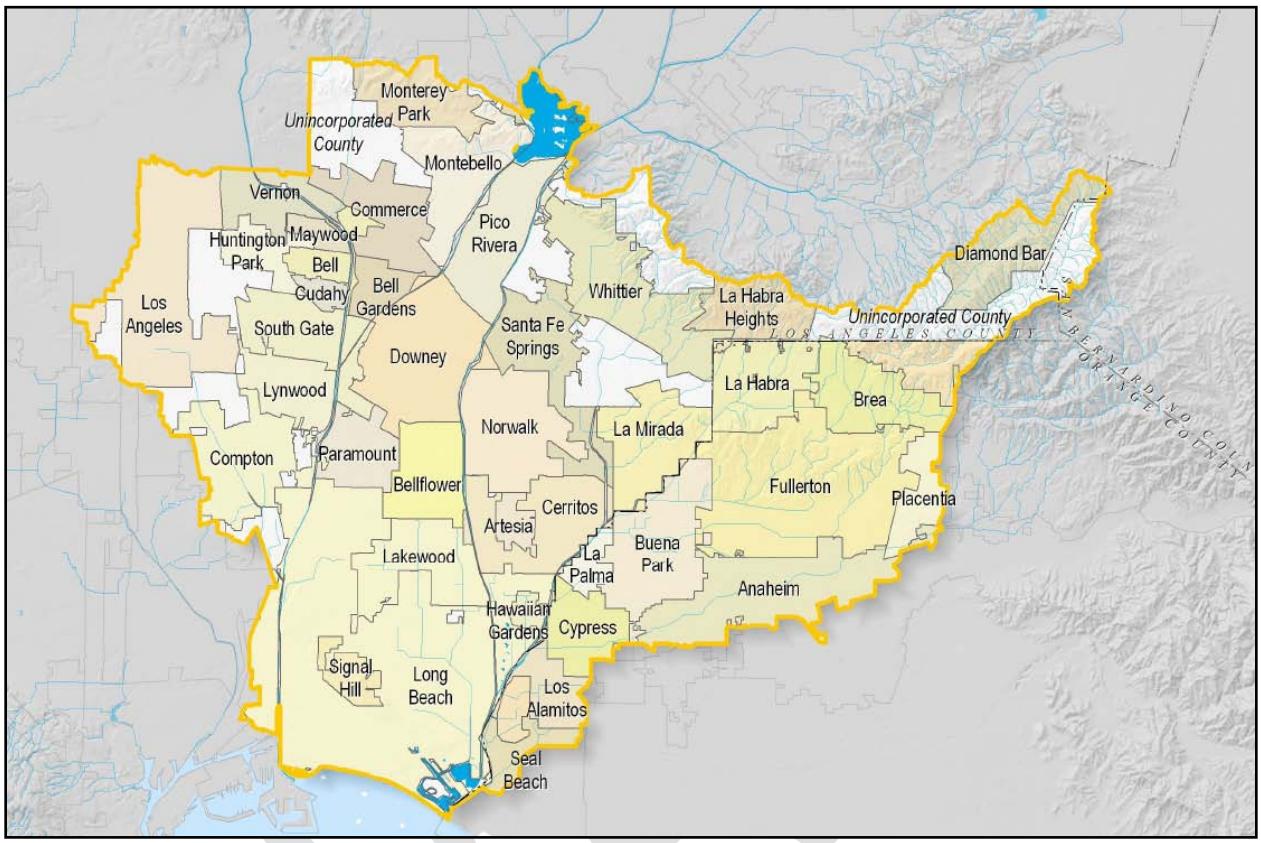
The large expanses of urban and suburban development are home to approximately 3 million residents. Further, it has the most densely developed commercial and industrial land uses coupled with the least amount of open space on a per acre basis in the GLAC. Population projections from the Southern California Area Governments (SCAG) estimate that the population within the Subregion could increase to over 3.4 million residents by 2035. (SCAG, 2012; U.S. Census Bureau, 2012)

The Subregion has one of the greatest water recharge capacities in the GLAC due to the Montebello Forebay recharge basins located just downstream of the Whittier Narrows Gap. This Subregion is in the lower reaches of a vast metropolitan area and therefore has significant water quality issues along with tremendous opportunities for conjunctive use, recycled and reclaimed water use, desalination and wetlands restoration in the estuaries of the San Gabriel and Los Angeles Rivers.

Political Boundaries

The Lower San Gabriel and Los Angeles Subregion consists of 39 cities and several unincorporated areas of Los Angeles County. Figure 2 depicts the county and city boundaries of the Lower San Gabriel and Los Angeles River Subregion.

Figure 2: Cities in the Lower San Gabriel and Los Angeles River Subregion



Climate, Temperature, and Rainfall

The Lower San Gabriel and Los Angeles River Subregion is within the Mediterranean climate zone, which extends from Central California to San Diego. Summers are typically dry and hot while winters are wet and cool. Precipitation typically falls in a few major storm events between November and March.

Geography and Geomorphology

The geography of the Lower San Gabriel and Los Angeles River Subregion is made up of the coastal plain. The area is generally of low elevation, stretching from the Pacific Ocean in the south to the Puente Hills in the north.

2.1.1 Watersheds and Water Systems

Watersheds

The Lower San Gabriel and Los Angeles River Subregion primarily consists of the lower San Gabriel River watershed and the Los Angeles River watershed (Figure 3). The San Gabriel River watershed begins in the San Gabriel River Mountains, and stretch across the San Gabriel Valley, then down to the Pacific Ocean. The Los Angeles River watershed begins from the Santa Monica Mountains on the east to the San Gabriel Mountains to the west and encompasses the entire path of the Los Angeles River which flows across the coastal plain into the San Pedro Bay. The Lower San Gabriel River watershed is made up of a number of tributaries, including: the Upper San Gabriel River watershed, Coyote Creek, La Mirada Creek, Fullerton Creek, Brea Creek, and Carbon Creek. Tributaries to the lower Los Angeles River watershed include: the Upper Los Angeles River watershed, Rio Hondo, and Compton Creek.

Flood Management and Infrastructure

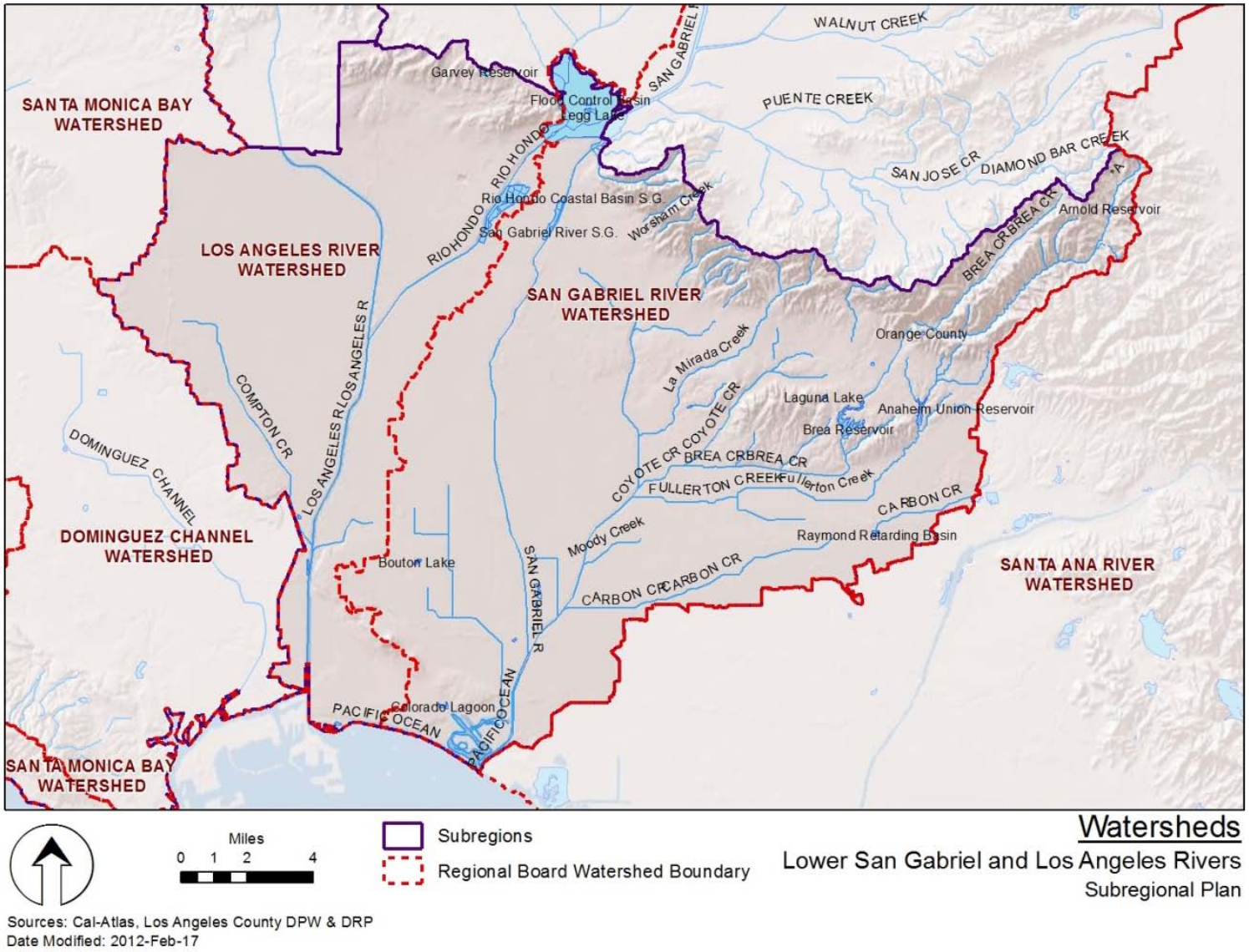
Flood management is important to protect human lives and property, particularly in the Lower San Gabriel and Los Angeles River where flooding has been an issue in the past due to the growth of population and pressure for development in the lower watersheds. The Los Angeles County Flood Control District manages and maintains most of the Subregion's flood infrastructure, such as storm drains, culverts, stormwater management ponds, and flood control channels.

An extensive system of dams, debris basins, reservoirs and flood control channels has been constructed throughout the Los Angeles River and San Gabriel River watersheds through the years by the Los Angeles County Flood Control District and the U.S. Army Corps of Engineers as development encroached upon more flood prone areas and increased impervious area caused more runoff. Dams and reservoirs upstream of the Subregion often operate secondarily as water conservation facilities. The only major flood control reservoir within the Subregion is located at the Whittier Narrows Dam which stretches across both the San Gabriel River and Rio Hondo near to where they enter the Subregion. The main San Gabriel and Los Angeles Rivers, and their many tributary stream channels often have concrete banks and bottoms constructed to reduce the risk of flooding. Portions of the Los Angeles River and San Gabriel River have not been lined to allow for rising groundwater. (RWQCB, 2000)

Water Suppliers and Infrastructure

The major water suppliers in the Lower San Gabriel and Los Angeles River watershed include Central Basin MWD, Compton, Long Beach, and Fullerton, in addition to portions of Anaheim and the Municipal Water District of Orange County. These suppliers use a combination of imported water, recycled water, and groundwater to serve potable and non-potable demand in their service areas (Figure 4). Each of these major suppliers has written a comprehensive 2010 Urban Water Management Plan (UWMP) to estimate future water supply demand and availability. These data were utilized in the estimation of supplies later in this plan.

Figure 3: Watersheds of the Lower San Gabriel and Los Angeles River Subregion



Sources: Cal-Atlas, Los Angeles County DPW & DRP
Date Modified: 2012-Feb-17

Figure 4: Wholesale Water Suppliers

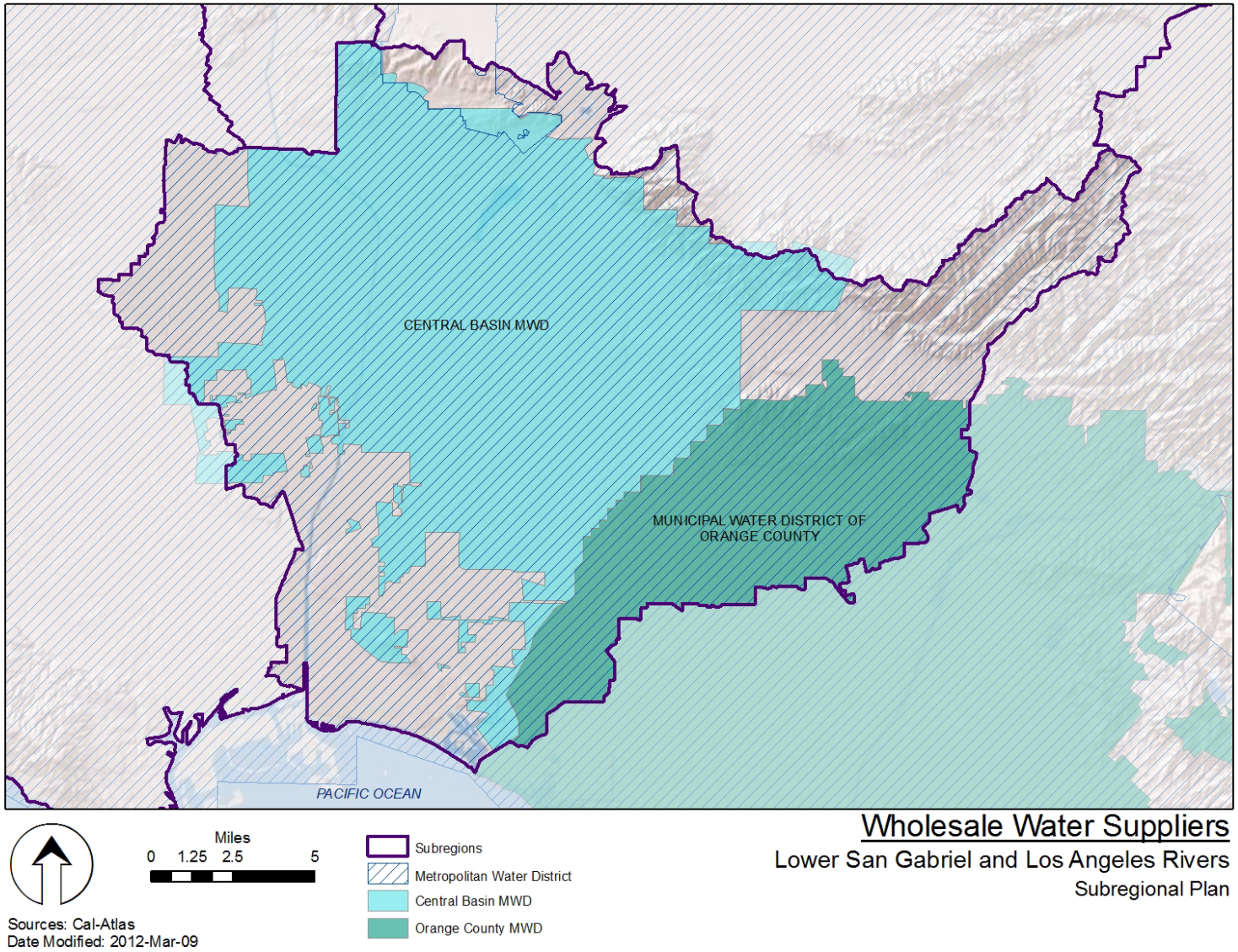
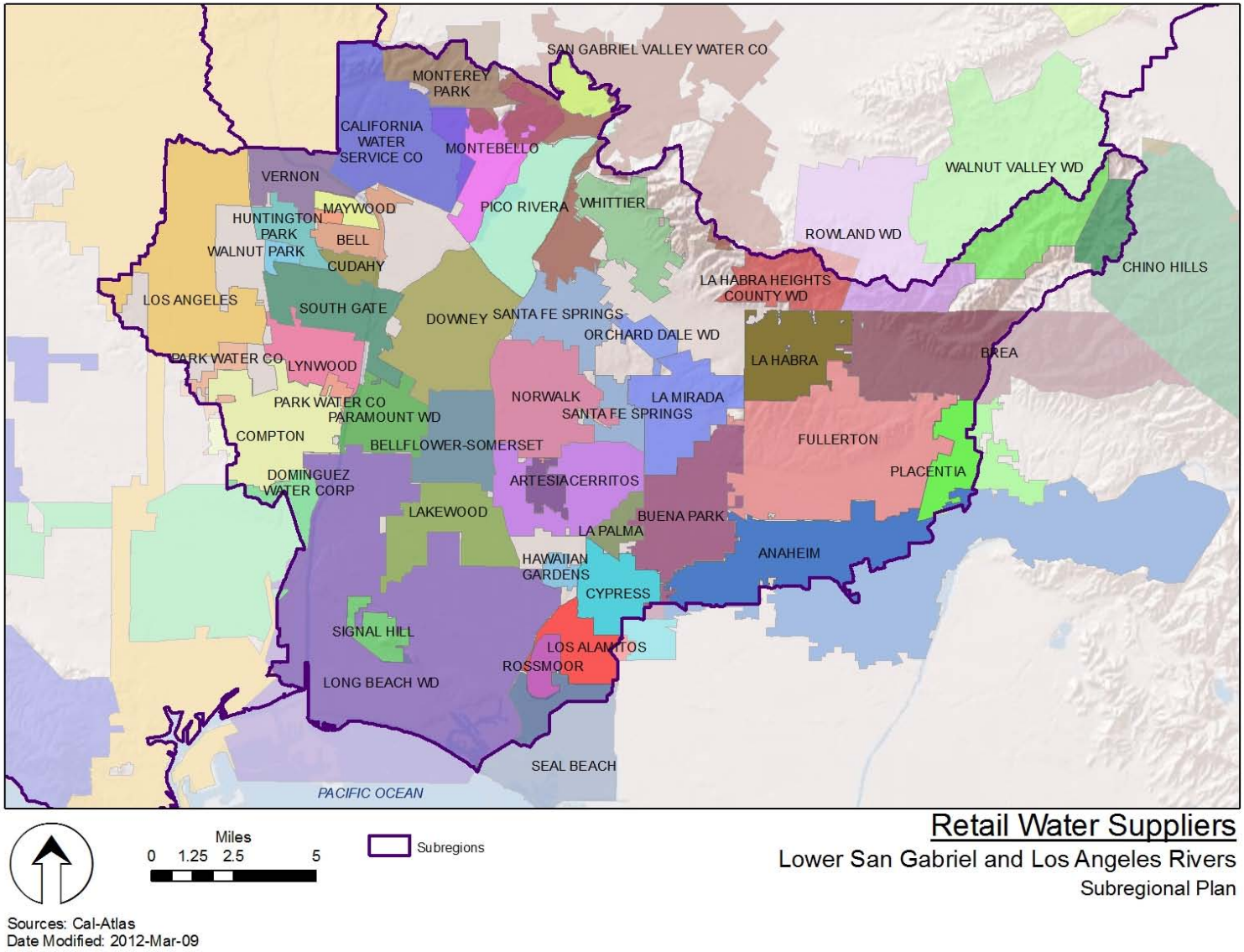


Figure 5: Retail Water Suppliers



2.2 Sources of Water Supply

The Lower San Gabriel and Los Angeles River Subregion depends primarily on groundwater, imported water and recycled water to meet its water demands. Water is imported through the California State Water Project (SWP), the Colorado River Aqueduct, and the Los Angeles Aqueducts. Major water supply sources are described below.

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:

- City of Los Angeles (portion within Subregion)
- City of Long Beach
- City of Fullerton
- Central Basin MWD

In addition to retail supply, replenishment supply is needed to replenish the Central Coast groundwater basin and to use with injection wells serving as sea water barriers. Table 2 shows the projected supplies to be used to meet replenishment needs.

Table 1: Projected Supplies (acre-feet per year)

Supply	2010	2015	2020	2025	2030	2035
GW	261,000	261,000	264,000	265,000	265,000	266,000
IW	125,000	120,000	128,000	121,000	120,000	114,000
RW	30,000	34,000	35,000	38,000	39,000	39,000
Desalination	-	-	-	5,000	5,000	10,000
Conservation	-	-	1,000	2,000	2,000	3,000
Stormwater	-	-	-	-	1,000	1,000
Water Transfer	-	2,000	2,000	2,000	2,000	2,000
Total	**416,000**	**417,000**	**430,000**	**433,000**	**434,000**	**435,000**

Table 2: Projected Replenishment Supplies (acre-feet per year)[1]

	2010	2015	2020	2025	2030	2035
Imported Water	23,000	23,000	23,000	23,000	23,000	23,000
Recycled Water	41,000	41,000	41,000	41,000	41,000	41,000
Stormwater	52,000	52,000	52,000	52,000	52,000	52,000
Total	**116,000**	**116,000**	**116,000**	**116,000**	**116,000**	**116,000**

[1] Replenishment supplies based on 10-year average of replenishment in Coastal Plain area as reported in Los Angeles County Hydrologic reports. Included are groundwater basin recharge (100% contribution to groundwater supply) and sea water barrier injection (60% contribution to groundwater supply)

Surface Water

There is no direct potable use of surface water within this Subregion; however, surface water flow from the Los Angeles River, Rio Hondo and the San Gabriel River is used to recharge groundwater at spreading grounds which are discussed further in the groundwater section.

Groundwater

Groundwater is a major water supply in this Subregion, representing approximately 55% of water supplies in 2010. The primary groundwater basin is Central Basin, in addition to the West Coast Basin, La Habra Basin and Orange County Basin. The Central Basin is adjudicated through the Central Basin Judgment, with the total amount of allowable extraction rights set at 217,367 AFY. The California Department of Water Resources serves as Watermaster for the Central Basin, while the Water Replenishment District (WRD) of Southern California is responsible for ensuring an adequate supply of replenishment water to offset groundwater production through monitoring, and various groundwater reliability programs and projects.

Groundwater recharge can occur via existing and restored natural channel bottoms, percolation of rainwater (natural recharge) and underflow from neighboring basins, however, natural recharge is typically insufficient to maintain basin water levels and current pumping levels due to the extent of impervious surfaces. To augment the groundwater which naturally recharges Central Basin, artificial recharge using river water, imported water, recycled water and runoff augments and blends with groundwater, and is eventually extracted for potable use. Artificial recharge facilities in the Central Basin include the following (LACDPW, 2011):

- Dominguez Gap Spreading Grounds – recharge controlled flows from the Los Angeles River and uncontrolled flows from storm drains
- Rio Hondo Coastal Spreading Grounds – recharge controlled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier narrows Dam, uncontrolled runoff via San Gabriel River and Rio Hondo channel, and imported and recycled water
- San Gabriel Coastal Spreading Grounds – recharge controlled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier narrows Dam, and imported and recycled water
- San Gabriel River at Montebello Forebay – in-river recharge controlled releases from San Gabriel Canyon Dams, Santa Fe Dam and Whittier narrows Dam, uncontrolled runoff via San Gabriel River and Rio Hondo channel, and imported and recycled water
- Alamitos Gap Barrier Project – injects imported water and recycled water to prevent seawater intrusion

The West Coast Basin, also adjudicated, lies mostly in the South Bay Subregion to the west, but a small portion lies in the Lower San Gabriel and Los Angeles Rivers Subregion. Like Central Basin, West Coast Basin is managed by the California Department of Water Resources and WRD. This basin is hydrologically connected to Central Basin, receiving underflow at the Dominguez Gap. 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). (West Basin MWD, 2011)

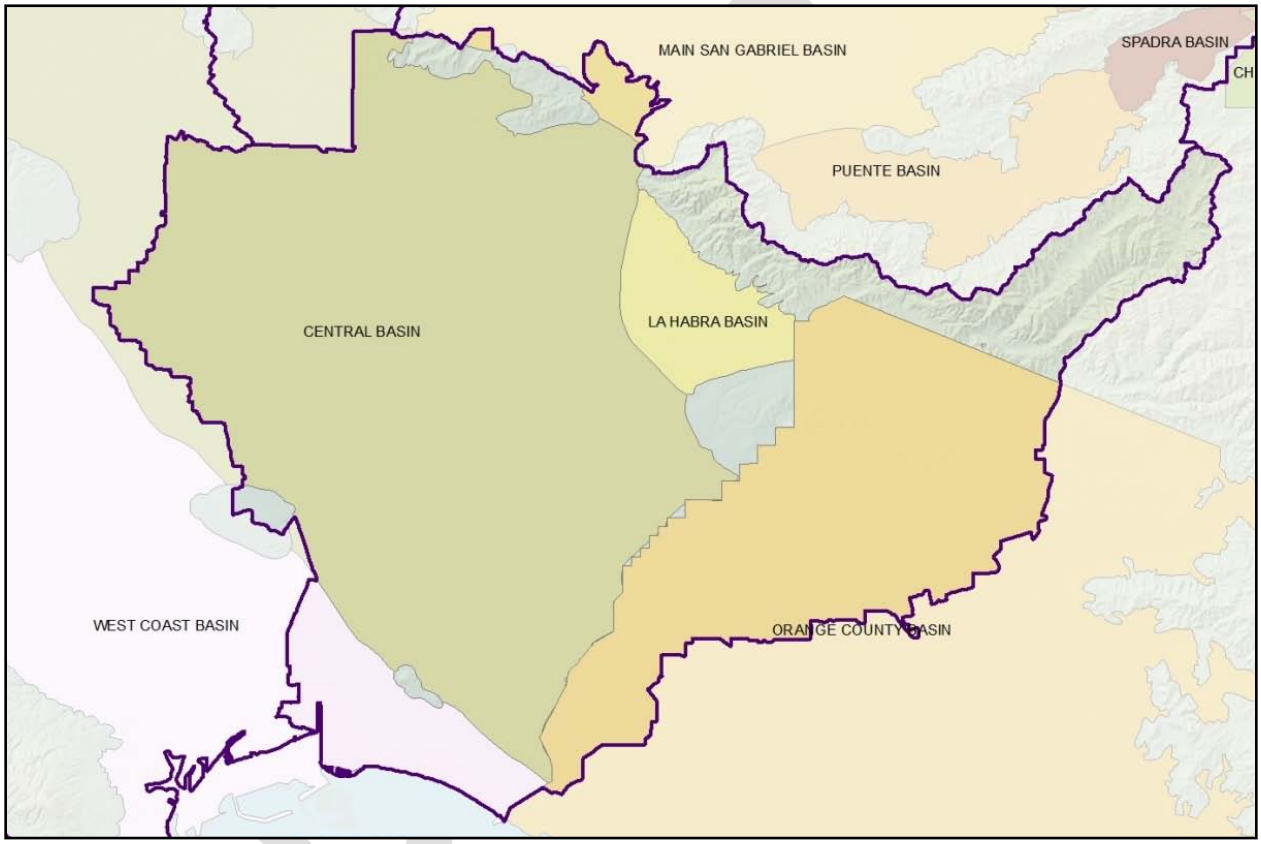
The Orange County Basin underlies the eastern portion of the southeastern portion of the Subregion. This basin adjudicated, and is managed by the Orange County Water District. Recharge to the Orange County Basin is primarily from the Santa Ana River through permeable sands and gravels within the forebay

areas. Recharge also occurs through precipitation, irrigation, and other native incidental recharge. Artificial recharge activities include injection through wells at the Talbert and Alamitos seawater barriers, and spreading of imported and recycled water at spreading grounds.

La Habra Basin is located in northern Orange County, north of the Orange County Basin. Little groundwater production occurs in this basin due to low transmissivity and poor water quality caused by high TDS, sulfates, nitrates and color. The La Habra Basin is currently unmanaged.

In addition to the above discussed basin, some water agencies utilize groundwater pumped from the San Gabriel Basin to the northeast of the Subregion, including: the City of Whittier, California Domestic Water Company, San Gabriel Valley Water Company and Suburban Water Systems.

Figure 6: Groundwater Basins of the Lower San Gabriel and Los Angeles River Subregion



Imported Water

Imported water represents a large portion of supply within the Subregion. Water is imported from northern California via the SWP and from the Colorado River, and is made available to water users through Central Basin MWD and the Cities of Compton, Long Beach and Los Angeles. The City of Los Angeles also imports water through the Los Angeles Aqueduct from the Owens River-Mono Basin.

Recycled Water

Recycled water serves the Subregion both for non-potable reuse and for groundwater recharge. Recycled water demand is met by water reclamation plants both within the Subregion, and outside the Subregion, though only those water reclamation plants inside the Subregion's boundaries will be explored here.

Within this Subregion, recycled water is produced by the Sanitation Districts of Los Angeles County at the Whittier Narrows Water Reclamation Plant (WRP), Los Coyotes WRP and Long Beach WRP (shown in Figure 7). In total, these WRPs have a capacity of 77.5 million gallons per day (MGD) and produce approximately 57,000 AFY. Of this, approximately 18,000 AFY are used for non-potable reuse, and 7,000 AFY are used for groundwater replenishment. The remainder of the treated effluent is discharged to rivers and flows to the ocean. Lastly, though just outside the Subregion, the San Jose WRP's recycled water supplies are used extensively in the Subregion for groundwater recharge in the Montebello Forebay and for the Central Basin MWD's non-potable reuse customers. The San Jose WRP's capacity is 100 MGD, with supplies of 30,000 AFY used for recharge and 4,000 AFY for non-potable reuse.

Recycled water plants across the Region are shown in Figure 7.

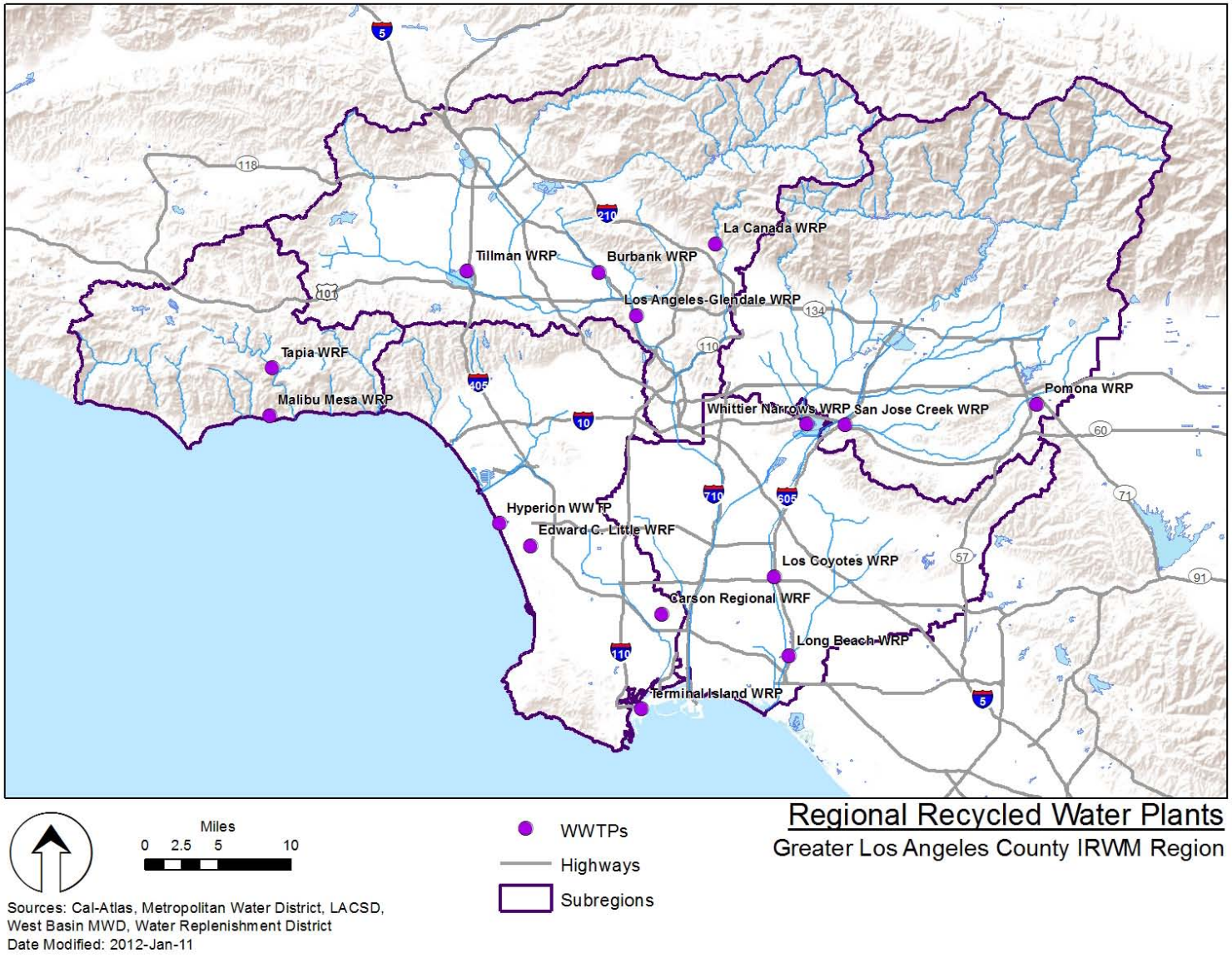
Desalination

Desalinated ocean water is not currently used as a supply source in this Subregion, but has been explored by various agencies, including a partnership of the Long Beach Water Department, the Los Angeles Department of Water and Power, and the U.S. Bureau of Reclamation. This partnership undertook research to assess the feasibility of ocean water desalination as a source of potable water through the use of a prototype desalination plant. Should the partnership move forward with a full-time production facility, a project would likely move forward in the next 10-15 years.

Rainwater-Stormwater Use

Stormwater use, also known as rainwater harvesting, 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. The City of Los Angeles is planning on developing a Stormwater Capture Master Plan to increase the capture and use of stormwater, which would impact the portions of the Subregion intersecting the City of Los Angeles.

Figure 7: Water Reclamation Facilities in the GLAC Region



2.3 Water Supply/Demand

As water agency boundaries are not aligned with the Subregional boundaries, an estimate of the actual Subregion's water supply and demand was not readily available for this Plan. Water supply and demand for the region was estimated based on review of 2010 Urban Water Management Plans (UWMPs).

Estimated demand projections for the Subregion are listed in Table 3. Demand was calculated using the 2010 UWMPs for City of Los Angeles, Long Beach Water Department, City of Fullerton, and Central Basin MWD. All agencies have incorporated water conservation measures into water planning and practice. This practice involves the implementation of best management practices (BMPs) as prescribed by the California Urban Water Conservation Council in order to meet the requirements of SBx7-7 (Steinberg, 2009), also known as the 20x2020 Plan. Member agencies of MWD assist the Subregion by implementing incentive programs that provide rebates to water conservation and recycled water use projects and programs.

Table 3: Lower San Gabriel and Los Angeles River Subregion Demand Projections (acre-feet per year)

Water District	2010	2015	2020	2025	2030	2035
City of Los Angeles[2]	98,239	107,921	112,092	113,810	115,881	115,492
Long Beach	54,128	55,219	55,244	55,249	54,698	54,652
Fullerton	27,860	32,305	32,881	32,658	32,602	32,792
Central Basin MWD	244,393	266,825	273,285	281,470	283,355	285,040
Total	**424,620**	**462,270**	**473,502**	**483,187**	**486,536**	**487,976**

2.4 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 projects. 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.

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 Sates 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 SWRCB sets statewide policies and develops regulations for the implementation of water quality control programs mandated by state and federal statutes and regulations. The RWQCBs develop and implement Basin Plans designed to preserve and enhance water quality. The determination of whether water quality is impaired is based on the designated beneficial uses of individual water bodies, which are established in the Basin Plan. As mandated by Section 303(d) of the Federal Clean Water Act, the

[2] Approximately 18% of the Lower San Gabriel and Los Angeles River region is located within the City of Los Angeles, therefore only 18% of the City of Los Angeles 2010 UWMP water demand values were accounted for.

SWRCB maintains and updates a list of "impaired" water bodies that exceed state and federal water quality standards. To address these impairments, the RWQCBs identify the maximum amount of pollutants that may be present without impairing the designated beneficial uses, and are known as Total Maximum Daily Loads (TMDLs). In addition to development of the TMDLs the RWQCBs develop and implement the NPDES permits for discharges from wastewater treatment and water reclamation plants of treated wastewater effluent to surface water bodies.

The Subregion has 303(d) listings related both human activities and natural sources. Human activity produces poor water quality due to trash, nutrients from wastewater treatment effluent, metals, and toxic pollutants. These pollutants are 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 Subregion serve many beneficial uses including: municipal and domestic supplies, groundwater recharges, recreation, wildlife habitat, warm freshwater habitat, wetland habitat, industrial process supply, preservation of rare and endangered species, shellfish harvesting, fish migration, and fish spawning. Typically, surface water quality is better in the headwaters and upper portions of watershed, and is degraded by urban and stormwater runoff closer to the Pacific Ocean. As a result, the major watersheds in the Subregion, (lower Los Angeles River and Lower San Gabriel River), and receiving waters are 303(d) listed for several constituents, as shown in Table 4 and Table 5. (SWRCB, 2010)

The locations of permitted dischargers are shown in Figure 8. (RWQCB, 2011)

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 conduct a source assessment for each impairment, and determine the major sources of each, as listed below:

- **Los Angeles River Bacteria TMDL:** Dry and wet weather stormwater system discharges, wildlife, direct human discharge, septic systems, re-growth or re-suspension of sediments
- **Los Angeles River Metals TMDL:** Dry weather: Publically owned treatment works (POTWs) including Tillman WRP, LA-Glendale WRP and Burbank WRP, tributary flows, groundwater discharge and flows from other permitted NPDES discharges; wet weather: storm flow through permitted storm sewer systems; atmospheric deposition, natural geologic conditions
- **Los Angeles River Nutrient TMDL:** Discharges from POTWs, including Tillman WRP, LA-Glendale WRP and Burbank WRP, urban runoff, stormwater, groundwater discharge
- **Trash TMDL for the Los Angeles River Watershed:** Stormwater discharges, direct deposition by people or wind
- **Legg Lake Trash TMDL:** Litter from adjacent areas, roadways and direct dumping and deposition, storm drains
- **San Gabriel River Metals and Selenium TMDL:** Dry weather: Storm drains, WRPs, power plants; Wet weather: stormwater runoff through permitted storm sewer systems, Caltrans permit, general construction storm permits, and industrial storm permits; draining of open space areas, atmospheric deposition
- **San Gabriel River East Fork Trash TMDL:** Picnicking and camping

- **Colorado Lagoon Pesticides, PAHs, PCBs, Metals, etc. TMDL:** Urban runoff and stormwater discharges from municipal storm sewer systems and Caltrans, sediment loading caused by runoff from urban, recreational park areas, atmospheric deposition
- **Los Cerritos Channel Metals TMDL:** Permitted stormwater discharges, atmospheric deposition
- **Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria:** Storm sewer discharge permittees, Caltrans facilities, vessels covered under the VGP, industrial and construct stormwater permittees, general NPDES permits, various nonpoint sources such as dogs on beaches, recreational vehicle parks, marina slip activities, waterfowl, human beach use
- **El Dorado Parks Lakes TMDLs:** Runoff, irrigation, groundwater and potable water inputs used for supplemental water additions, atmospheric deposition
- **North, Center, and Legg Lake TMDLs:** Permitted stormwater discharges, irrigation, groundwater used for supplemental water additions to maintain lake level, groundwater discharge from a Superfund site, atmospheric deposition

Table 4: 303(d) Listed Waters with Adopted TMDLs

303(d) Listed Waters and Impairments[1]	TMDL
Colorado Lagoon	
Chlordane	Colorado Lagoon Pesticides, PAHs, PCBs, Metals etc. TMDL
Dieldrin	
PCBs	
DDT	
Metals: Lead, Zinc	
PAHs	
Sediment Toxicity	
Benthic Community Effects	
Compton Creek	
Bacteria	Los Angeles River Bacteria TMDL
Metals: Copper, Lead	Los Angeles River Metals TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Nutrients: pH	Los Angeles River Nutrient TMDL
Coyote Creek	
Metals: Copper, Lead, Selenium, Zinc	San Gabriel River Metals and Selenium TMDL
Los Angeles River	
Nutrients: Ammonia, Nutrients (Algae), pH	Los Angeles River Nutrient TMDL
Bacteria	Los Angeles River Bacteria TMDL
Metals: Copper, Lead, Zinc, Cadmium	Los Angeles River Metals TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Los Angeles River Estuary	
Trash	Trash TMDL for the Los Angeles River Watershed
Bacteria	Long Beach City Beaches and Los Angeles River Estuary TMDLs for Indicator Bacteria
Rio Hondo	
Nutrients: Ammonia, Nutrients (Algae), pH	Los Angeles River Nutrient TMDL
Bacteria	Los Angeles River Bacteria TMDL
Metals: Copper, Lead, Zinc, Cadmium	Los Angeles River Metals TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
San Gabriel River	
Trash	San Gabriel East Fork Trash TMDL
Metals: Copper, Lead, Zinc, Selenium	San Gabriel River Metals and Selenium TMDL

303(d) Listed Waters and Impairments[1]	TMDL
San Gabriel River Estuary	
Metals: Copper, Nickel	San Gabriel River Metals and Selenium TMDL
Legg Lake	
Trash	Legg Lake Trash TMDL
Nutrients: ammonia, odor, pH	North, Center and Legg Lake TMDLs
Metals: copper, lead	
Los Cerritos Channel	
Metals: copper, lead, zinc	Los Cerritos Channel Metals TMDL
El Dorado Park Lakes	
Nutrients: algae, ammonia, eutrophic, pH	El Dorado Park Lakes TMDLs
Metals: Mercury	
Lead	No TMDL determined necessary by EPA
Copper	Cleanup and Abatement Order established for the City of Long Beach

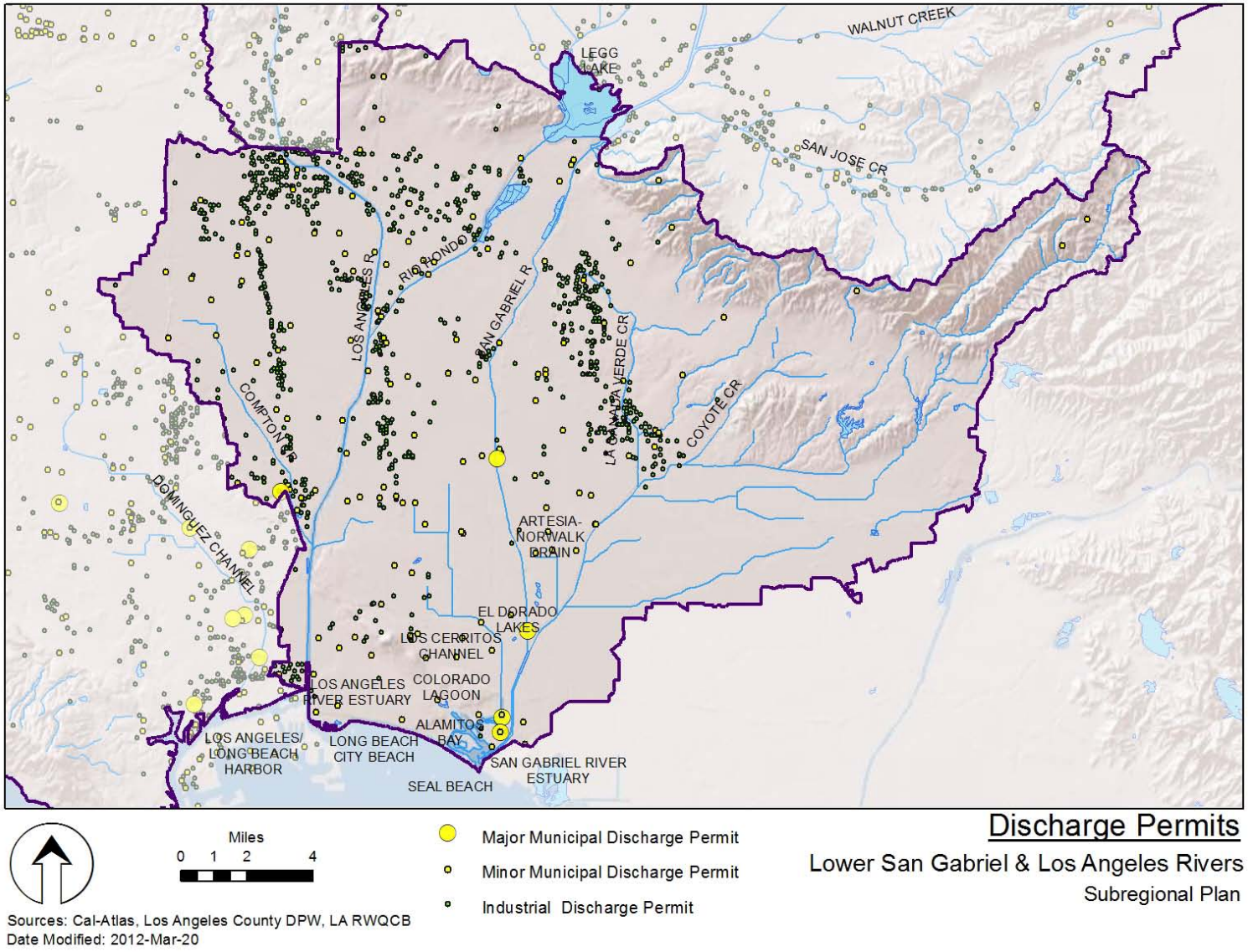
1. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report

Table 5: 303(d) Listed Waters without Adopted TMDLs

303(d) Listed Waters and Impairments[1]		
Alamitos Bay		
Bacteria		
Compton Creek		
Benthic Community Effects		
Coyote Creek		
Diazinon	Toxicity	Nutrients: Ammonia, pH
Bacteria		
Los Angeles River		
Cyanide	DDT	Oil
Diazinon	Dieldrin	Dibenz[a,h]anthracene
Los Angeles River Estuary		
Chlordane	PCBs	DDT
Sediment Toxicity		
Los Cerritos Channel		
Ammonia	DEHP	Chlordane
Bacteria	Trash	pH
Rio Hondo		
Cyanide	Oil	Diazinon
San Gabriel River		
Bacteria	Cyanide	pH
San Gabriel River Estuary		
Dioxin	Oxygen, Dissolved	
San Pedro Bay		
Chlordane	DDT	PCBs
Sediment Toxicity	ChemA	Bacteria
Nitrogen/Nitrate	Toxaphene	Toxicity

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

Figure 8: Permitted Dischargers as of 2011



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.

Central Basin is generally of good quality but has some localized areas of poor quality primary along the basin margins and in those aquifers affected by seawater intrusion. As stated previously, WRD monitors and manages both levels and water quality in Central Basin. The primary constituents of concern in this basin include: TDS, VOCs, perchlorate, nitrate, iron and manganese, and chromium. WRD has determined through its monitoring and sampling program that special interest constituents including arsenic, hexavalent chromium, MTBE, total organic carbon, color and perchlorate do not pose a substantive threat to the basin. (MWD, 2007)

High levels of TDS in the Torrance/Hawthorne area of the West Coast Basin can be attributed to both sea-water intrusion and naturally occurring soil and geologic conditions in the region. Increases in groundwater TDS concentrations are primarily attributed to seawater intrusion, but are also 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 treated wastewater and imported water to reduce the seawater intrusion in coastal aquifers. Additionally, West Basin MWD and WRD operate desalting facilities to reduce these high TDS levels (as discussed previously in the Water Supply section). (MWD, 2011)

In order to mitigate localized groundwater quality problems, WRD established a Safe Drinking Water Program to provide pumpers with wellhead treatment equipment to remove VOCs from the groundwater which has restored over 30,000 AFY of groundwater to beneficial use. Seawater intrusion is controlled in the basin through the Alamitos Gap Barrier Project run by the Los Angeles County Department of Public Works. (WRD, 2012)

Water quality in the Orange County Basin is managed by the Santa Ana Water Project Authority (SAWPA). In addition to quality issues (including high TDS) due to seawater intrusion, this basin's constituents of concern include: nitrate, VOCs, perchlorate, color, and NDMA. There are several groundwater treatment projects within the basin, though they don't fall within this Subregion. (MWD, 2011)

Near-Shore 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 from Memorial Day to Labor Day 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 last year, according to the 2011 report. Additionally, constituents such as PCBs, metals, DDT and other pesticides, and PAHs have been found in coastal waters.

2.5 Environmental Resources

Due to the Subregion being highly urbanized, with its rivers engineered to protect homes and businesses from flooding and to provide for water conservation, large areas of wetland have been lost. Despite their altered state, the Subregion's channels still serve as habitat for wildlife.

2.5.1 Habitats

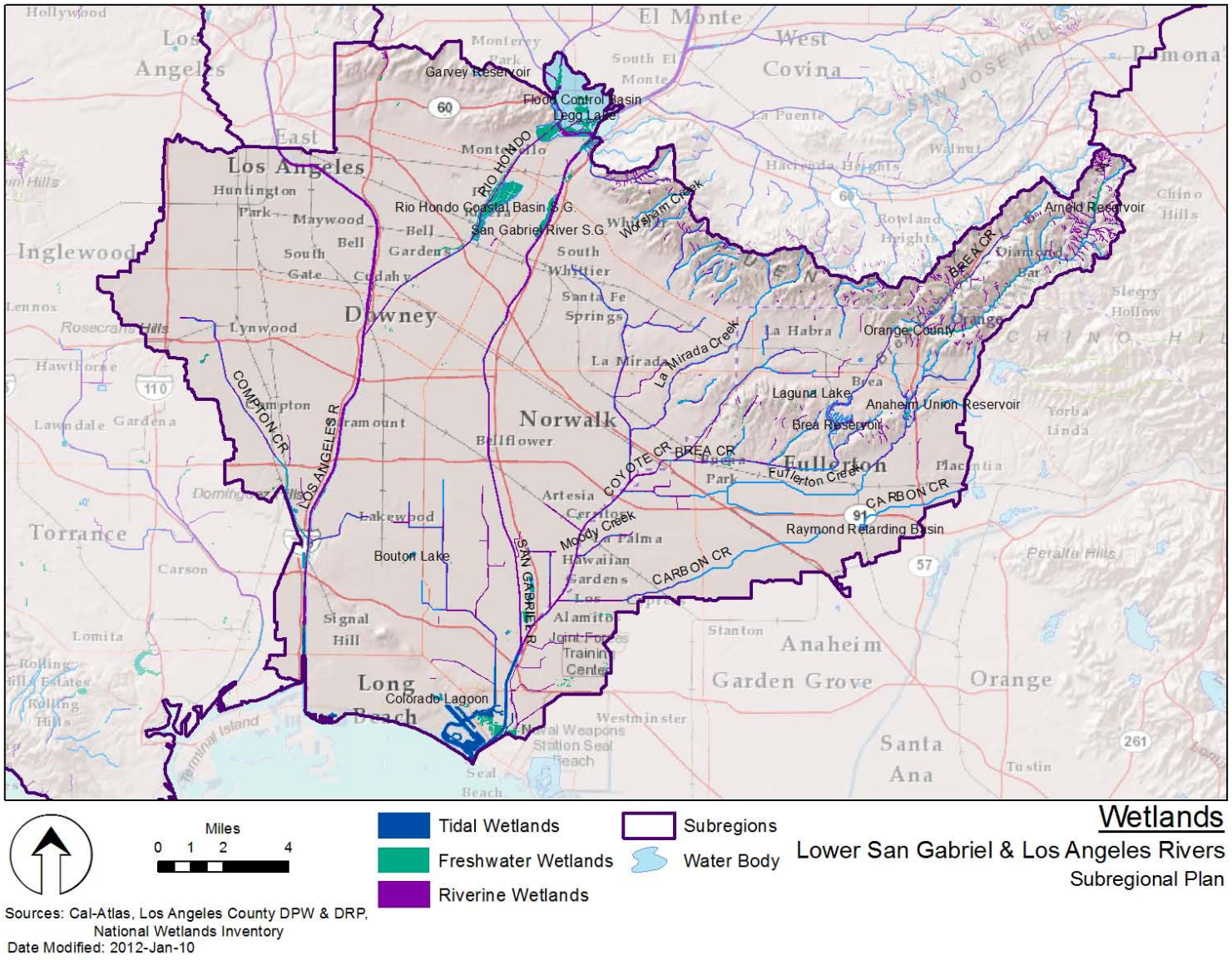
The lower watersheds of the Los Angeles and San Gabriel Rivers has been found by biological condition assessments to be more degraded, have fewer feeding strategies, and a dominance of organisms more tolerant of pollution than the upper watersheds.

Most of the Subregion's wetland habitats have been destroyed or converted to other habitat, and much of the remaining habitat has been degraded by poor water quality or other human activities. Despite this, some areas of wetland habitat still exist, as shown in Figure 9. Three types of wetland can be found in the Subregion including:

- **Tidal wetlands:** Wetland habitats that are inundated by tides, either seasonally or year-round. Marine harbors, a man-made habitat, are also considered tidal wetlands for the purposes of this Subregional Plan.
- **Freshwater wetlands:** Wetlands such as depressional marshes, lakes and ponds. For the purposes of this Subregional Plan, freshwater wetlands include man-made habitats such as flood control basins and ponds which may include areas of freshwater wetlands. It is important to note that although some spreading grounds and some stormwater Best Management Practices such as detention basins, swales and depressional areas, also provide ecosystem benefits, they belong under a separate category and should not be subject to the same protection criteria
- **Riverine wetlands:** Streambed and wetlands associated with rivers and streams, including upper and lower riverine habitats and dry washes. Man-made habitats considered riverine wetlands include concrete-lined channels and soft-bottomed channels. Note that "riparian" is sometimes used to mean riverine wetlands.

In addition to wetland habitat, upland habitat is a valuable resource to ecosystems in the Subregion as it serves as a linkage between wetland habitats. Within the Subregion, these habitats include the Los Angeles Coastal Plain and the Puente Hills. A majority of the coastal plain has been urbanized, which inhibits linkage between wetlands. The Puente Hills, located in the north eastern portion of the Subregion, are by contrast mostly open space mostly free of development, but impacted by invasive species and water quality issues. (RWQCB, 2011)

Figure 9: Existing Wetland Habitat



2.5.2 Significant Ecological Areas

Los Angeles County developed the concept of significant ecological areas in the 1970s in conjunction with adopting the original general plan for the County.

The Significant Ecological Area (SEA) Program is a component of the Los Angeles County Conservation/Open Space Element in their General Plan. This program is a resource identification tool that indicates the existence of important biological resources. SEAs are not preserves, but are areas where the County deems it important to facilitate a balance between limited development and resource conservation. Limited development activities are reviewed closely in these areas where site design is a key element in conserving fragile resources such as streams, oak woodlands, and threatened or endangered species and their habitat.

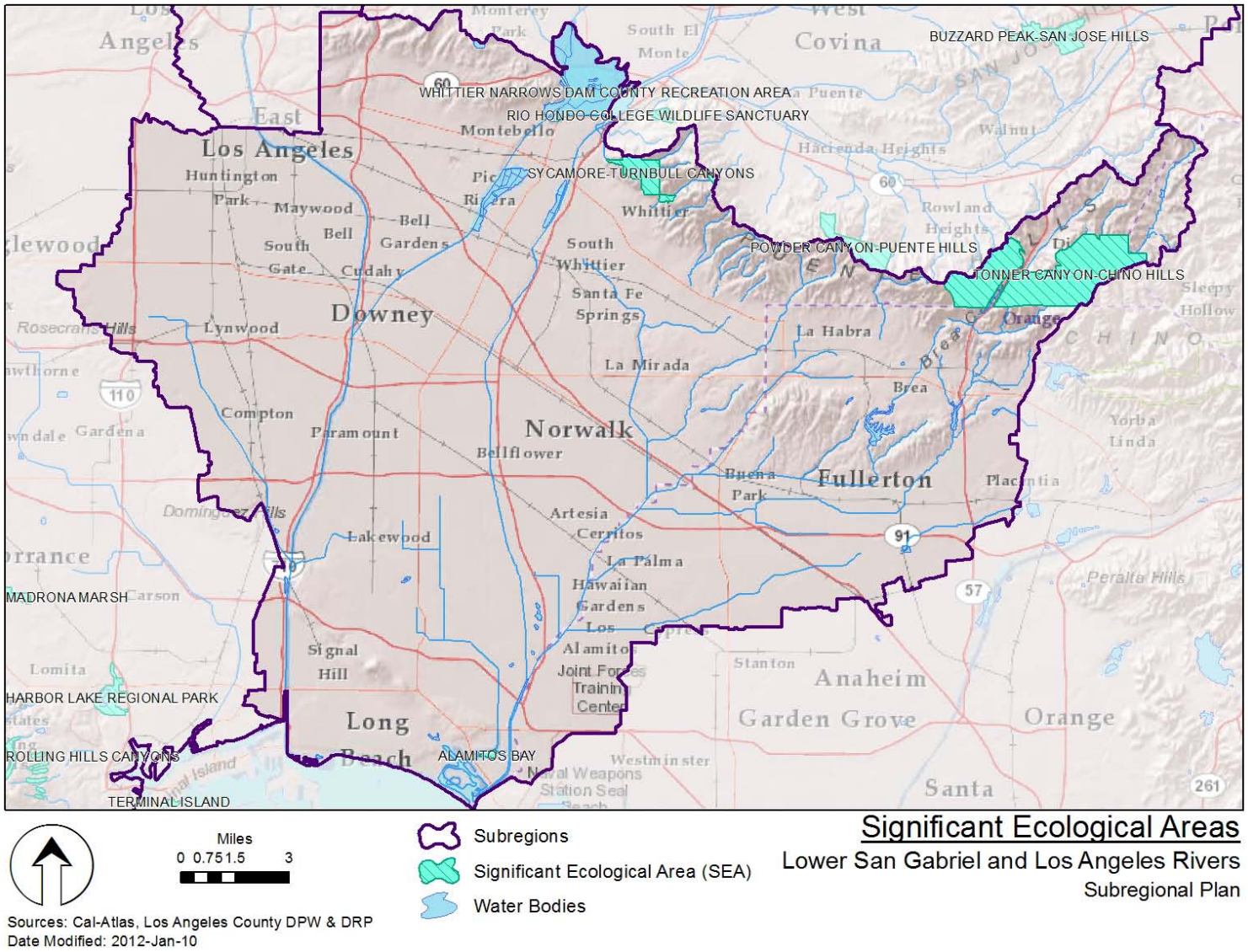
Proposed development is governed by SEA regulations. The regulations, currently under review, do not to preclude development, but to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. The SEA conditional use permit requires development activities be reviewed by the Significant Ecological Area Technical Advisory Committee (SEATAC). Additional information about regulatory requirements is available on the Los Angeles County website. (Los Angeles County Planning, 2012, http://planning.lacounty.gov/sea/faqs).

Within the Subregion, SEAs include:

- Whittier Narrows Dam County Recreation Area
- Sycamore-Turnbull Canyons
- Powder Canyon-Puente Hills
- Tonner Canyon-Chino Hills
- Alamitos Bay

These SEAs can be seen in Figure 10.

Figure 10: Significant Ecological Areas of the Lower San Gabriel and Los Angeles Subregion



2.5.3 Ecological Processes

The open space areas in the northern and-eastern portions of the Subregion known as the Puente-Chino Hills Wildlife Corridor is an unbroken zone of natural habitat extending nearly 31 miles from the Cleveland National Forest in Orange County to the West end of the Puente Hills above Whittier Narrows (LSA, 2007). This is a biologically rich area that provides critical habitat to endangered species and upland habitat, and connectivity between various habitat types. Ecological processes exist in this area, as described below.

Fire

Fire is an integral and necessary part of the natural environment and plays a role in shaping the landscape, yet the management of most open space areas historically relied on fire suppression which has resulted in open spaces with varying fuel loads. 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. In recent years, more enlightened open space management practices have attempted to incorporate fire as a natural force for renewal while minimizing risks to lives and property.

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. The removal of this 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.

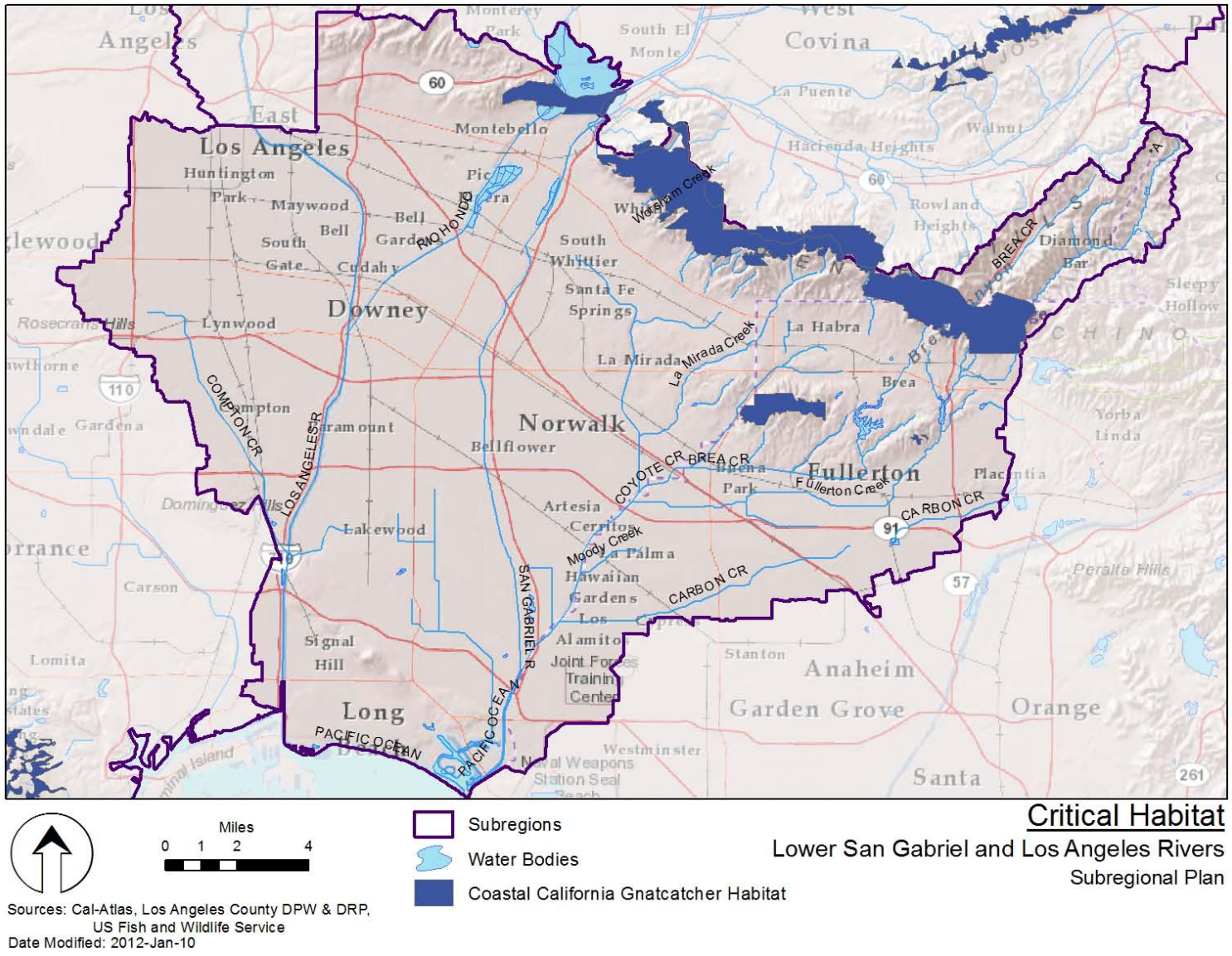
2.5.4 Critical Habitat Areas

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 is 9,350 acres of designated critical habitat defined for the Coast California gnatcatcher as shown in Figure 11.

Figure 11: Critical Habitat Areas



2.6 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 6. In total, of the Subregion's 231,000 acres, approximately 13,000 acres (or 6%) are open space or recreation land areas. A majority of the areas are developed urban park and recreation areas.

Table 6: Existing Recreation and Open Space Land Area

Land Type	Acres
Developed Urban Park and Recreation Area	7,000 acres
Open Space Lands	5,090 acres
Greenways	550 acres
Other/Miscellaneous	50 acres
Total Area in Subregion	**12,690 acres**

2.7 Land Use

Land use within the Lower San Gabriel and Los Angeles River Subregion reflects the historic pattern of urbanization as most of the interior valley is occupied with residential, industrial, commercial, and institutional uses while most of the foothills and mountains are principally open space. The overall land use breakdown is shown in Table 7. The greatest area of land use is residential and commercial and industrial.

Table 7: Land Use in the Lower San Gabriel and Los Angeles River Subregion

Land Use Type	Acres	Percentage
Vacant	31,674	11%
Residential	134,533	47%
Commercial	36,999	13%
Industrial	35,602	12%
Transportation, Utilities	19,935	7%
Open Space / Recreation	11,104	4%
Agriculture	3,208	1%
Mixed Urban	221	<1%
Water	11,148	4%
No Data	606	<1%
Total	**287,880**	**100%**

Figure 12: Parks, Recreation and Other Open Space

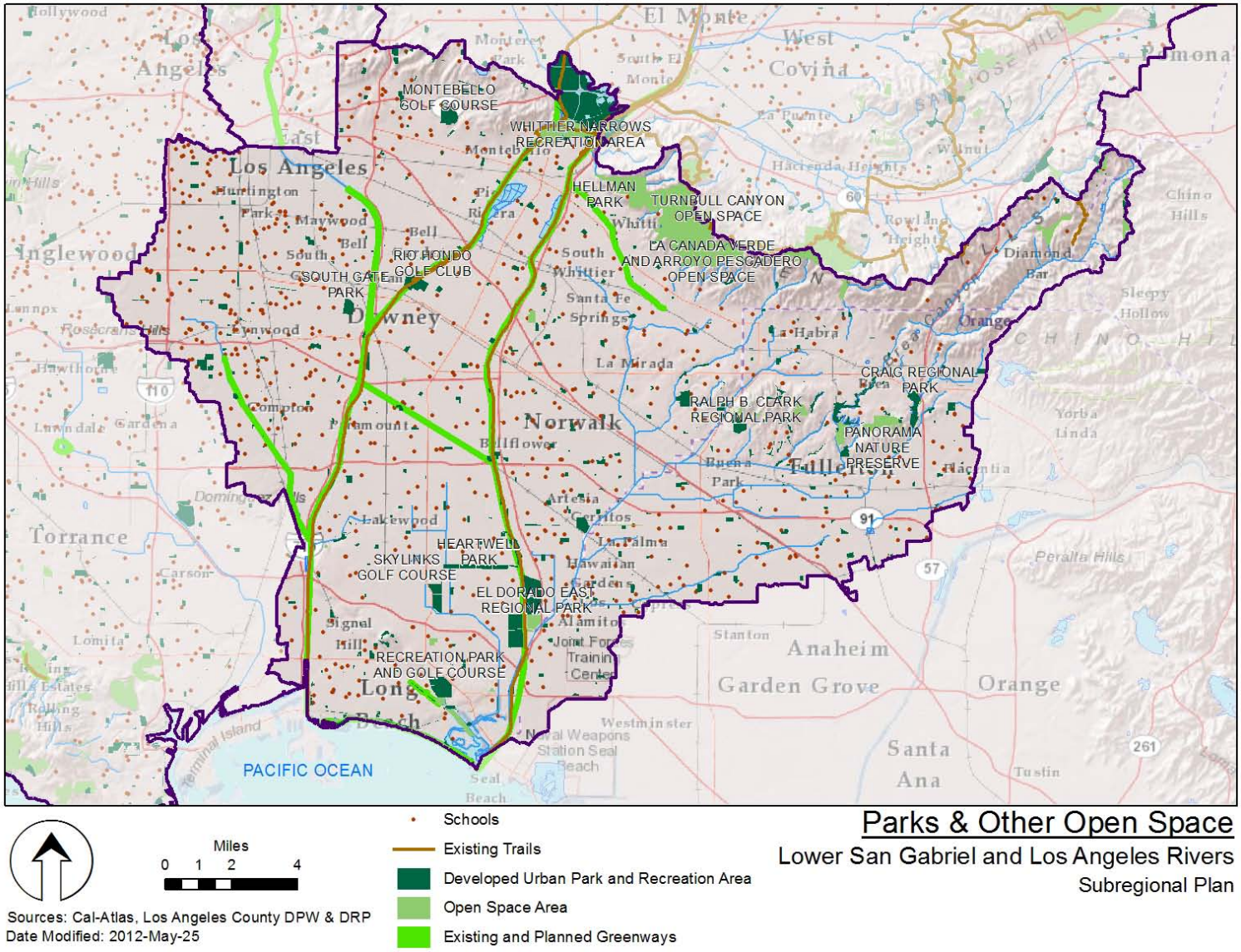
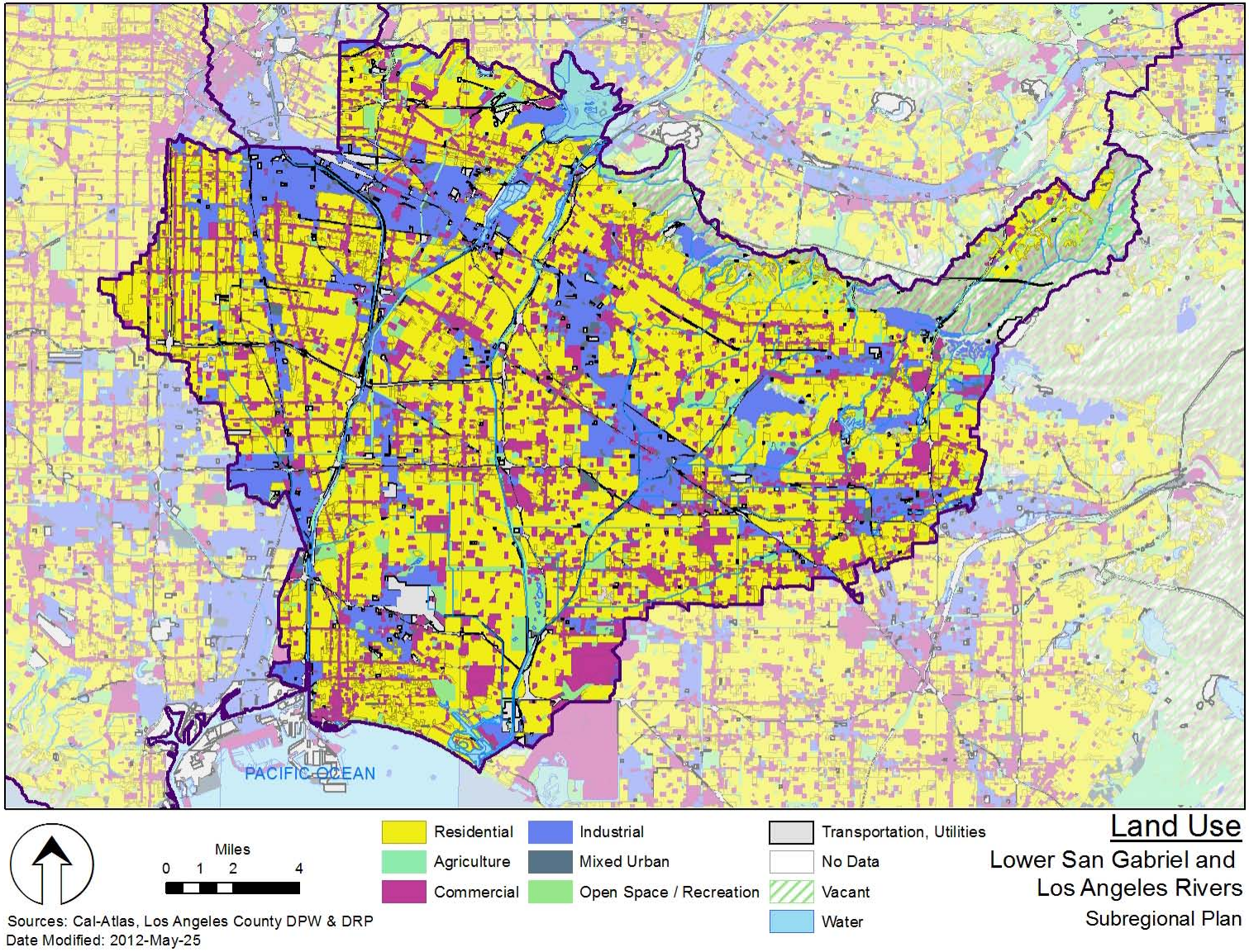


Figure 13: Land Use



3 Lower Los Angeles & San Gabriel Objectives and Targets

This section identifies the objectives for the Lower Los Angeles and San Gabriel 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, the Lower San Gabriel and Los Angeles River Subregion has developed its own objectives and targets. These objectives and targets are intended to help guide improvements to water supply, water quality, habitat, open space, and flood management to meet the regions objectives and targets through Subregional planning.

Five objectives have been articulated, based on recent water supply, resource management, and watershed plans. These plans include various UWMPs, recycled water master plans, the MWD IRP, and groundwater basin master plans. A workgroup composed of Stakeholders from within the region were involved in establishing the Plan's objectives and targets. All the objectives remained the same since the last Plan with the exception of flood management. To establish quantifiable benchmarks for implementation of the plan, planning targets were defined based on much discussion within the regional workgroup.

Although the IRWMP is intended to address the regions and Lower San Gabriel and Los Angeles River Subregion's water resource management needs, this document also identifies several open space and habitat targets, as the implementation of water supply and water quality projects have the potential to contribute towards these other regional needs. In addition, habitat, open space and recreation projects have the potential to generate water supply and water quality benefits.

The five objectives and planning targets for the Lower San Gabriel and Los Angeles River Subregion are identified below (and summarized in Table 8) and are presented under the Plan element to which they most closely correspond.

Table 8: Lower San Gabriel and Los Angeles River Subregion Objectives and Planning Targets

Objectives		Regional Planning Targets
Improve Water Supply		
Optimize local water resources to reduce the Subregion's reliance on imported water.	Water Use Efficiency	Conserve 15,000 AFY of water by 2035 through water use efficiency and conservation measures.
	Ground Water	Create additional ability to pump 17,000 AFY using a combination of treatment, recharge, and storage access.
	Recycled Water	Increase indirect potable reuse of recycled water by 25,000 AFY. Increase non-potable reuse of recycled water by 14,000 AFY.
	Ocean Desalination	Increase ocean desalination by 5,000 AFY.
	Stormwater	Increase capture and use of stormwater runoff by 7,000 AFY that is currently lost to the ocean. Increase stormwater infiltration by 21,000 AFY.
Improve Water Quality		

Comply with water quality regulations (including TMDLs) by improving the quality of urban runoff, stormwater and wastewater. Protect and improve groundwater and drinking water quality	Runoff (Wet Weather Flows)	Develop[3] 4,600 AF of new stormwater capture capacity (or equivalent) spatially dispersed to reduce region-wide pollutant loads, emphasizing higher priority areas[4].
	Dry Weather Flows	Eliminate non-natural dry weather flows originating from irrigation excess and other dry weather urban runoff processes[5].
Enhance Habitat		
Protect, restore, and enhance natural processes and habitats.	Wetland/Marsh	Preserve or protect 690 acres of wetland habitat Create, develop, or enhance 1,100 acres of wetland habitat. Restore or create 950 acres of wetland habitat
	Upland Habitat	Preserve, create or enhance 950 acres of upland habitat
Enhance Open Space and Recreation		
Increase watershed friendly recreational space for all communities	Open Space	Preserve, protect, and enhance 17,000 acres of open space
	Recreation Space	Create, develop, or enhance 3,100 acres of recreational park lands
Improve Flood Management		
Implement integrated flood management systems to decrease flood risks and increase flood protection.	Sediment Management and Integrated Flood Planning	Reduce flood risk in 3,200 acres of flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches.

3.2 Water Supply Objective and Targets

Optimizing local water supply resources is vital for the Lower San Gabriel and Los Angeles River 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 production of indirect potable reuse and non-potable reuse of recycled water, increasing ocean desalination, and increasing the infiltration, capture, and use of stormwater. In total, water supply targets will yield at additional 58,000 AFY of local supply. The assumptions and calculations used to determine the planning targets are attached as Appendix B.

[3] 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).

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

[5] Targeted dry weather flows are exclusive of permitted wastewater treatment plant discharges, permitted dewatering discharges, and other similar permitted activities.

3.3 Water Quality Objective and Targets

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 4,600 AF of new stormwater capture capacity (or equivalent). 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 prioritization are attached as Appendix C.

3.4 Habitat Objective and Targets

Protecting, restoring, and enhancing the Lower San Gabriel and Los Angeles River 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.

The Subregion plans on achieving these objectives by protecting or preserving 690 acres of tidal wetland, freshwater wetland and riparian wetland. The Subregion also intends to enhance 1,100 acres of these wetlands, and restore or create 950 acres of wetlands. The wetland (including riparian) planning targets were determined using inventories of currently existing wetlands (National Wetlands Inventory) as well as historical wetlands extent (Rairdan, 1998).

Upland habitat provides buffers and linkages between ecosystems. Given this, the Subregion's target for upland habitat is 11,000 acres.

The assumptions and calculations used to determine these habitat targets are attached as Appendix D.

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.

The Lower Los Angeles and San Gabriel Subregion plans on achieving these objectives by creating/developing/enhancing 3,100 acres of recreation space, and 17,000 acres of open space. The assumptions and calculation used to determine these are attached as Appendix D.

3.6 Flood Management Objective and Targets

Improved integrated flood management systems can help reduce the risk of flooding, protect lives and property. The Subregion plans on meeting this objective by reducing 3,200 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 determine these are attached as Appendix E.

4 Partnership and Multi-benefit Opportunities

<Note to stakeholders: This section will be developed once projects have been approved by subregions and analyzed for potential partnership and multi-benefit opportunities>

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Appendix 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 stored move 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 when possible through 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 the numeric baseline to measure conservation and transfer water programs (such as the lining of existing earthen canals) thus enabling the shifting of 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.

Appendix B - Water Supply Targets TM

Appendix C - Water Quality Targets TM

Appendix D - Open Space for Habitat and Recreation Plan

Appendix E - Flood Targets TM