Upper Los Angeles River Subregional Plan

Draft

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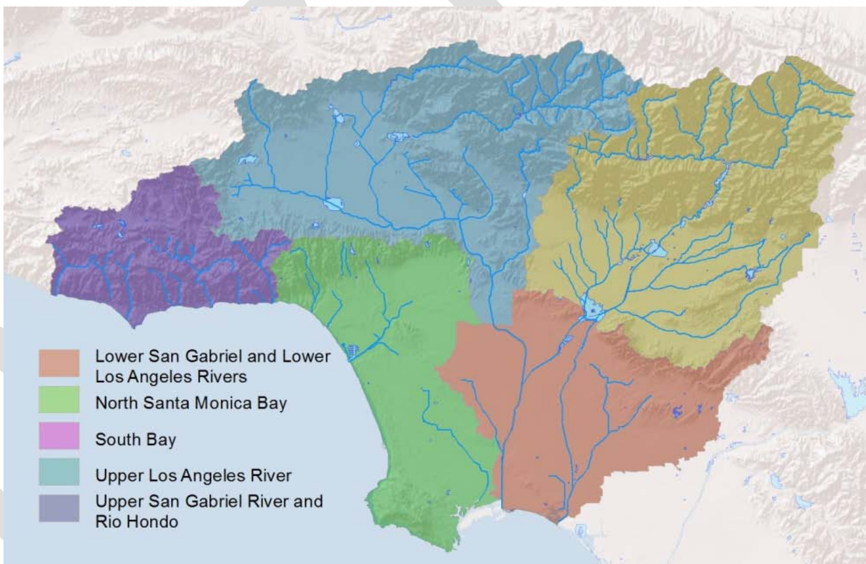
1 Background and Purpose of Subregional Plan

The Upper Los Angeles Subregional plan is one of five Subregional plans that make up the Greater Los Angeles County (GLAC) Integrated Regional Water Management (IRWM) Plan. This Subregional plan outlines Upper Los Angeles'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 Subregional Plan is to outline its expected contribution to meeting the GLAC regional planning goals, objective, and targets.

2 Upper Los Angeles Description

2.1 Physical Setting

Figure 1: GLAC Subregional and Watershed Boundaries



The Upper Los Angeles River Subregion of the GLAC Region is located in the northwest portion of the Los Angeles County urbanized area. The Upper Los Angeles River Watershed begins in the surrounding mountains (San Gabriel Mountains, Santa Susana Mountains, Simi Hills and Santa Monica Mountains) and runs through the San Fernando Valley on its way south to the Pacific Ocean. Development is concentrated in the interior valleys and the surrounding foothills. Groundwater basins and runoff from the surrounding mountains provide local water supplies, although groundwater contamination from industrial sources and prior land uses poses a significant challenge in some locations. The large expanses of urban and suburban development on the valley floors are home to approximately 2.3 million residents, with projections estimating population increasing to 2.6 million residents by 2035 (SCAG, 2010). Most of the major river and stream channels on the valley floors have been subject to channelization due to flood issues in the past, which prevents percolation.

Political Boundaries

The Subregion consists of 8 cities and unincorporated areas of Los Angeles County. **Figure 2** depicts the county and city boundaries of the Upper Los Angeles River Subregion.

Climate, Temperature, and Rainfall

The Upper Los Angeles River Subregion is within a Mediterranean climate zone. 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. Precipitation in the Upper Los Angeles River Subregion averages 19 inches per year, though the foothills and mountains receive considerably more rain than valleys, causing considerable runoff and flooding potential.

Geography and Geomorphology

The geography of the Upper Los Angeles River Subregion can generally be divided into three distinct types: inland valleys, foothills that generally surround the valley, and the surrounding mountains. The San Gabriel Mountains, Santa Susana Mountains, Simi Hills and Santa Monica Mountains are part of the Transverse Ranges, which extend 350 miles east to west from the Eagle Mountains in San Bernardino County to the Pacific Ocean. The San Gabriel Mountains (in the northeastern portion of the Subregion) elevation ranges from sea level to over 10,000 feet and separates the Los Angeles basin from the Mojave Desert. The Santa Susana Mountains are located in the northwestern portion of the Subregion, reaching a height of 3,747 feet, and separates the San Fernando and Santa Clarita Valleys. The Santa Monica Mountains lie to the south of the Subregion and separate the San Fernando Valley and the Los Angeles Basin. The Simi Hills form the western border of the Subregion. The foothills reach 3,000 to 4,000 feet before rising rapidly into the surrounding mountains. Below these elevations are the valley areas.

The San Gabriel, Santa Monica and Santa Susana Mountains, as well as Simi Hills are young mountains, geologically speaking, and continue to rise at a rate of one-quarter to three-quarters of an inch per year. Because of this instability, they are also eroding at a rapid rate. Alluvial deposits of sand, gravel, clay and silt in the coastal plain are thousands of feet thick in some areas, due in part to the erosive nature of the surrounding mountains. The Subregion is extensively faulted, with the San Andreas Fault bordering the north side and the Sierra Madre–Cucamonga fault zone on the south side of the San Gabriel Mountains and Santa Susana Mountains. The Santa Monica Mountains Thrust Fault runs through the Santa Monica Mountains.

Petroleum source rock found within the Subregion is a well-known source of potential water quality concerns. The Modelo Formation forms parts of the northern, western and southern slopes of the San Fernando Valley. The Modelo Formation is a depositionally distinct subset of the Monterey Formation, California’s primary petroleum source rock. The Los Angeles River cuts through the Puente Formation, also a petroleum source rock, by Elysian Park. Both of these formations contribute high concentrations of solutes to runoff, includes metals, sulfates, chloride, phosphorus and selenium.[1]

[1] U.S. Geological Survey, 2002. Hazardous trace elements in petroleum source rock: The Monterey Formation. http://geomaps.wr.usgs.gov/env/monterey.html

Figure 2: Cities in the ULAR Subregion

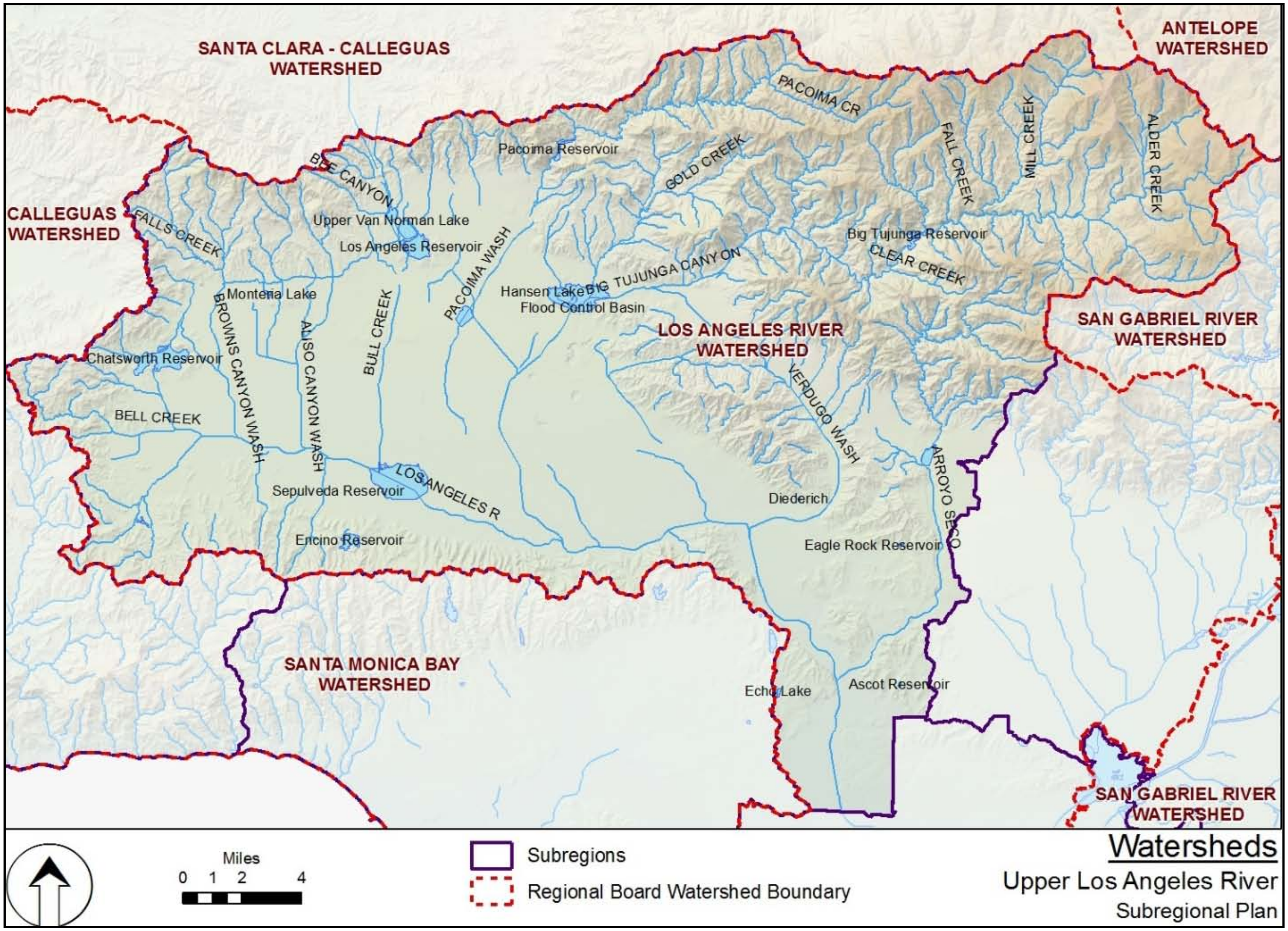
2.2 Watersheds and Water Systems

Watersheds

The Upper Los Angeles River Subregion consists of the Upper Los Angeles River watershed (Figure 3). The watershed begins in the surrounding mountains, and stretches across the San Fernando Valley, then down to the Pacific Ocean. The portion of the watershed which this Subregional plan is concerned with is the upper watershed, upstream of the coastal plain, at the Glendale Narrows. The Upper Los Angeles River watershed is made up of a number of tributaries in addition to the main Los Angeles River channel, including: Arroyo Calabasas, Bell Creek, Aliso Creek, Pacoima Wash, Tujunga Wash, Big Tujunga Creek, Verdugo Wash, and the Arroyo Seco. The main Los Angeles River begins at the confluence of Bell Creek and Calabasas Creek in Canoga Park in the City of Los Angeles, with its tributaries running south to meet it. There is very little natural flow within the Los Angeles River throughout most of the year. The tertiary treated recycled wastewater of the wastewater treatment plants in the Subregion provide the baseflow seen during most of the year. During storm events, a large amount of runoff can be conveyed through the flood control infrastructure discussed in the next section.

In addition, though Rio Hondo isn't a part of the Subregion, it is typically included as a part of the Upper Los Angeles River watershed. The Rio Hondo lies to the east of the subregion and captures runoff from the San Gabriel Valley, running southwest through the Whittier narrows then through urban areas to its confluence with the Los Angeles River.

Figure 3: Watersheds of the ULAR Subregion



Flood Management and Infrastructure

Flood management is important to protect human lives and property, particularly in the surrounding mountain regions where, historically, flooding and debris flows have been an issue due to wildfires and changes to the natural landscape. The Los Angeles County Flood Control District, with the Army Corps of Engineers, constructed, manages and maintains the Subregion's flood infrastructure, such as debris basins, storm drains, culverts, dams, reservoirs, spreading basins, and flood control channels.

The Subregion's dams and reservoirs often operate secondarily as water conservation facilities. The major flood control reservoirs within the Subregion include the Hansen, Lopez and Sepulveda Reservoirs. Many tributary stream channels to the Los Angeles River have concrete banks and bottoms due to frequent and historical flooding. This added imperviousness has reduced the amount of permeable acreage and recharge to the groundwater basin. A number of in-stream and off-stream groundwater replenishment facilities are in place to attempt to help offset the impact of the flood control features.

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. These suppliers use a combination of imported water, recycled water, and groundwater to serve potable and non-potable demand in their service areas. Each of these major suppliers has written a 2010 Urban Water Management Plan (UWMP) to estimate future water supply demand and availability, and which were utilized in the estimation of supplies described later in this plan. The primary water suppliers in the Subregion are shown in Figure 4.

Figure 4: Wholesale Water Suppliers

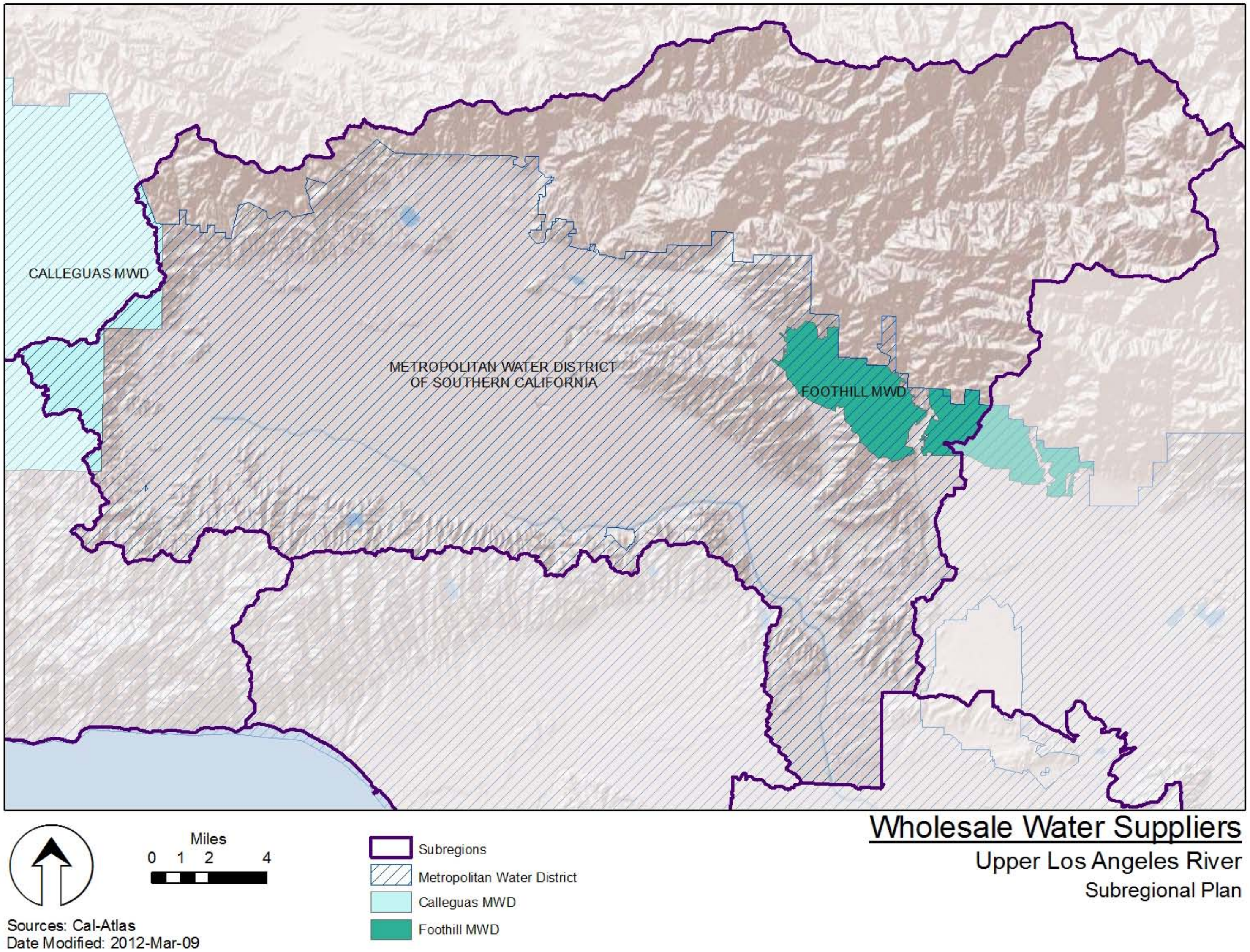
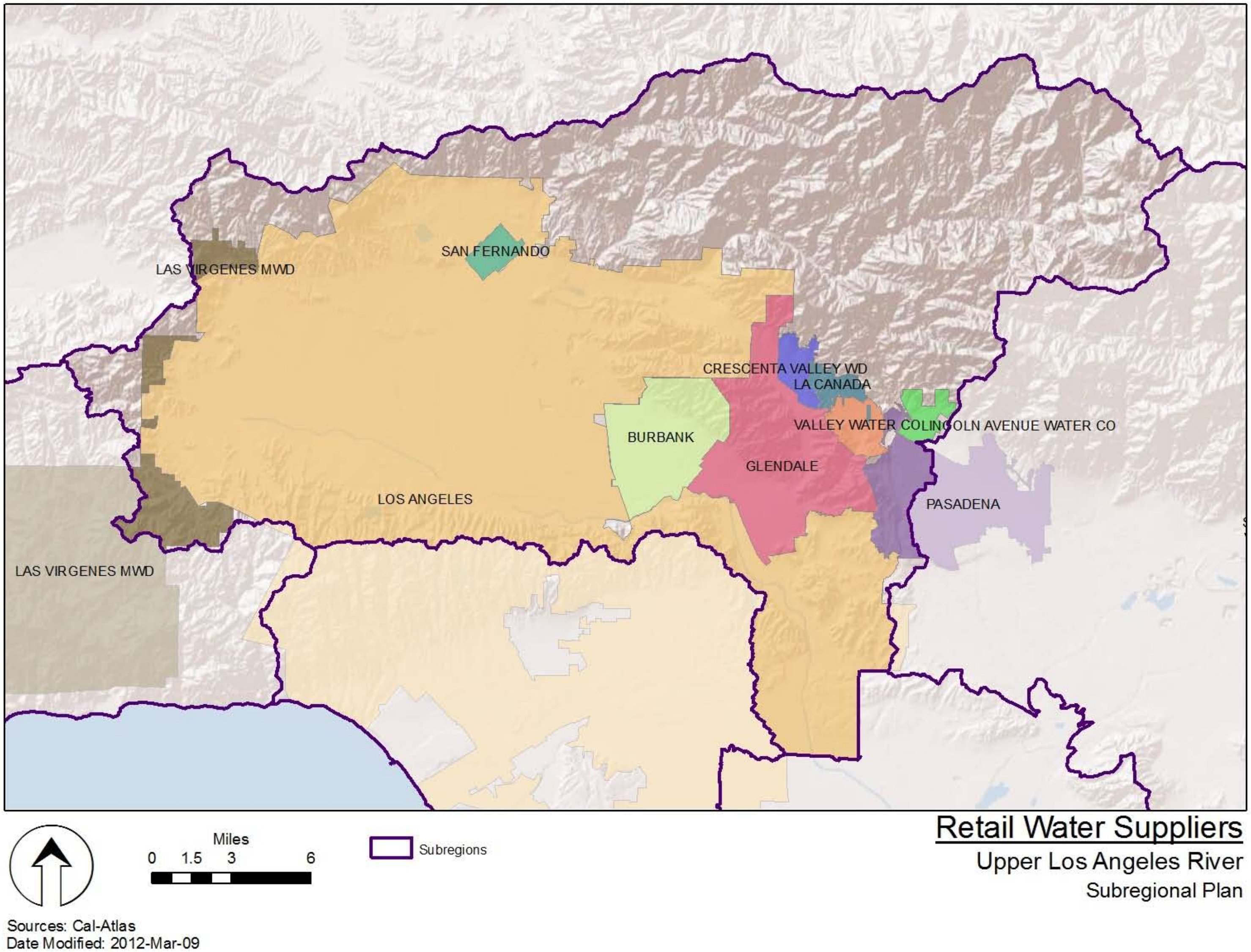


Figure 5: Retail Water Suppliers



2.3 Sources of Water Supply

The Upper Los Angeles River Subregion depends primarily on a combination of groundwater and imported water to meet its water demands. Local water supplies include surface water, recycled water, and groundwater. Imported water is provided by Metropolitan Water District of Southern California (MWDSC) through the California State Water Project (SWP) and the Colorado River Aqueduct, and the City of Los Angeles through the Los Angeles Aqueduct. MWDSC calculates that it can reliably deliver water under not only normal conditions but under multiple dry year conditions. Imported water provided through the Los Angeles Aqueduct has decreased over time due to the need for environmental mitigation in the Owens Valley area, but the City of Los Angeles predicts that deliveries will be sufficient to meet demand in conjunction with Los Angeles's other supplies.

Sources of supply vary throughout the Subregion, as shown in Table 1. These supply and demand estimates are based on numbers reported in the 2010 Urban Water Mangement Plans (UWMPs) for Glendale, Burbank, Pasadena, Los Angeles, Las Virgenes MWD, Calleguas MWD and Foothill MWD. These water suppliers were chosen as their service areas cover a majority of the Subregion.

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 Glendale
- City of Burbank
- City of Pasadena
- Las Virgenes MWD (portion within Subregion)
- Foothill MWD (portion within Subregion)

In addition to retail supply, replenishment supply is needed to refill 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 Retail Supplies (acre-feet per year)

Supply	2010	2015	2020	2025	2030	2035
GW	69,000	50,000	83,000	91,000	91,000	91,000
IW	317,000	339,000	320,000	305,000	308,000	305,000
RW	8,000	18,000	20,000	33,000	39,000	43,000
SurfW	1,000	1,000	1,000	1,000	1,000	1,000
Desal	-	-	-	-	-	-
Conser	5,000	9,000	17,000	25,000	33,000	40,000
SW Reuse	-	1,000	2,000	3,000	5,000	6,000
Water Transf	-	23,000	23,000	23,000	23,000	23,000
Total	**400,000**	**441,000**	**466,000**	**481,000**	**500,000**	**509,000**

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

	2010	2015	2020	2025	2030	2035
Imported Water	-	-	-	-	-	-
Recycled Water	-	-	-	15,000	23,000	30,000
Stormwater	26,000	26,000	30,000	34,000	37,000	41,000
Total	**26,000**	**26,000**	**30,000**	**49,000**	**60,000**	**71,000**

Surface Water

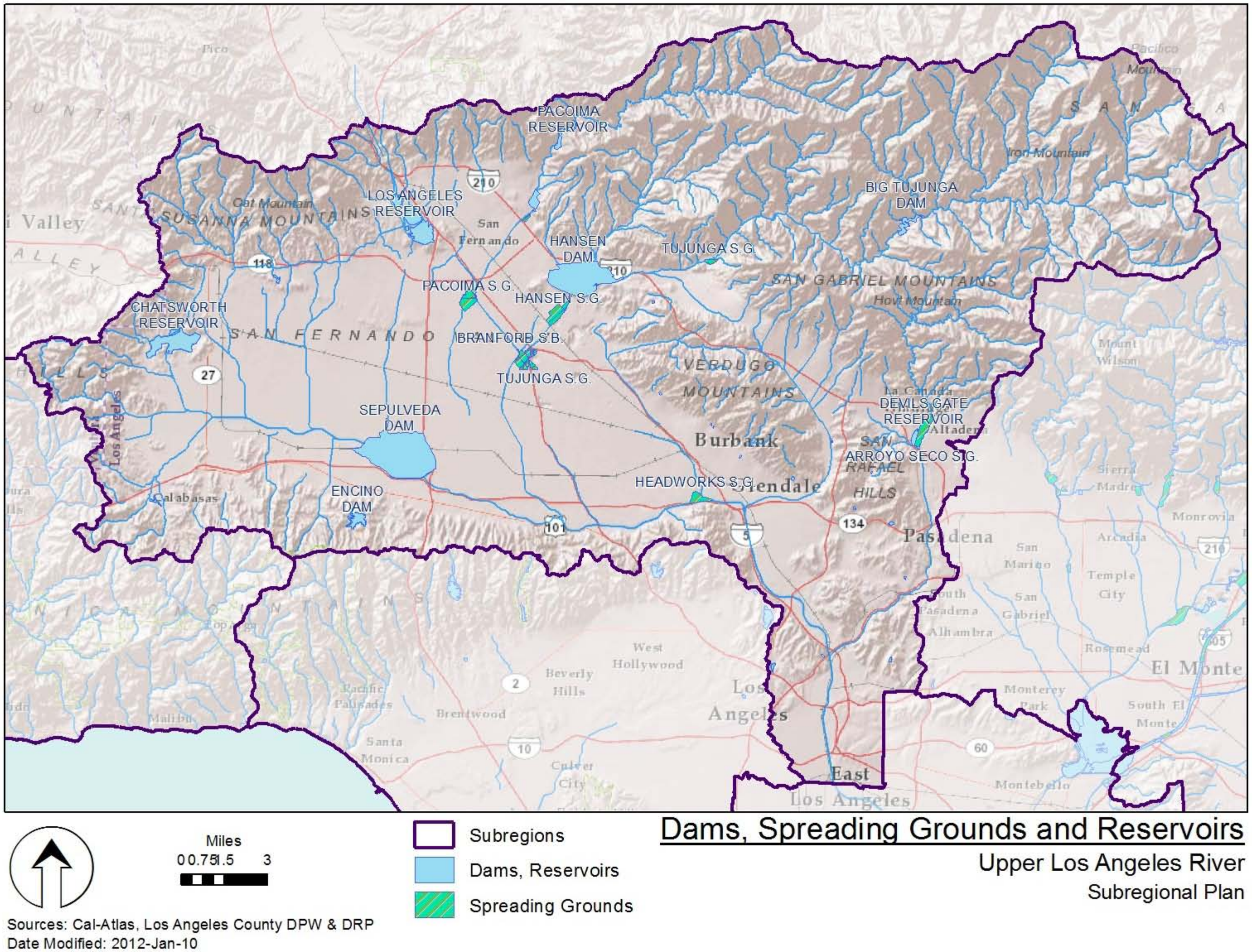
The Subregion has developed a system of dams, flood control channels, and spreading basins for supplying local water and recharging groundwater. Though there are many areas of the Subregion's rivers that are concrete lined, several spreading grounds have been constructed adjacent to them to allow for recharge (Figure 6), including:

- Pacoima Spreading Grounds (adjacent to Pacoima Wash)
- Branford Spreading Basin (adjacent to Pacoima Wash)
- Tujunga Spreading Grounds (adjacent to Tujunga Wash)
- Hansen Spreading Grounds (adjacent to Tujunga Wash)

Water agencies that have water diversion rights within the Subregion include the City of Pasadena and the City of Los Angeles. The City of Pasadena has rights up to 25 cfs of Arroyo Seco runoff, though the yield of the Arroyo Seco is highly variable depending on weather and rain patterns, and uses its diversions for both direct use and groundwater recharge. The City of Los Angeles has full rights to flows in the Los Angeles River, and uses its diversion rights for groundwater recharge.

[2] 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)

Figure 6: Spreading Basins, Dams and Reservoirs



Groundwater

Groundwater represents a significant portion of local supplies in the Subregion. The majority of groundwater yield in the Subregion is naturally recharged through the percolation of direct rainfall, and stream flow from surface runoff, percolation of imported water, and return flow from applied water. Some areas capture surface runoff and release it into spreading basins for additional percolation into the groundwater basin. The Los Angeles County Flood Control District and the City of Los Angeles operate several groundwater recharge facilities along tributaries to the Los Angeles River which recharge the San Fernando Basin. The Pasadena Water and Power Water Services Division also operates recharge facilities which recharge the Raymond Basin as discussed previously under "Surface Water".

Groundwater basins act as underground reservoirs. During wet years, a basin can store excess surface water (imported and local) when available in wet years and then withdraw that water in dry years or during emergency situations when other sources are not available. Some basins, such as the Raymond Basin and Central Basin, have ample storage capacity and are able to store water for other agencies through conjunctive use programs.

The groundwater basins (shown in Figure 7) underlying this Subregion include:

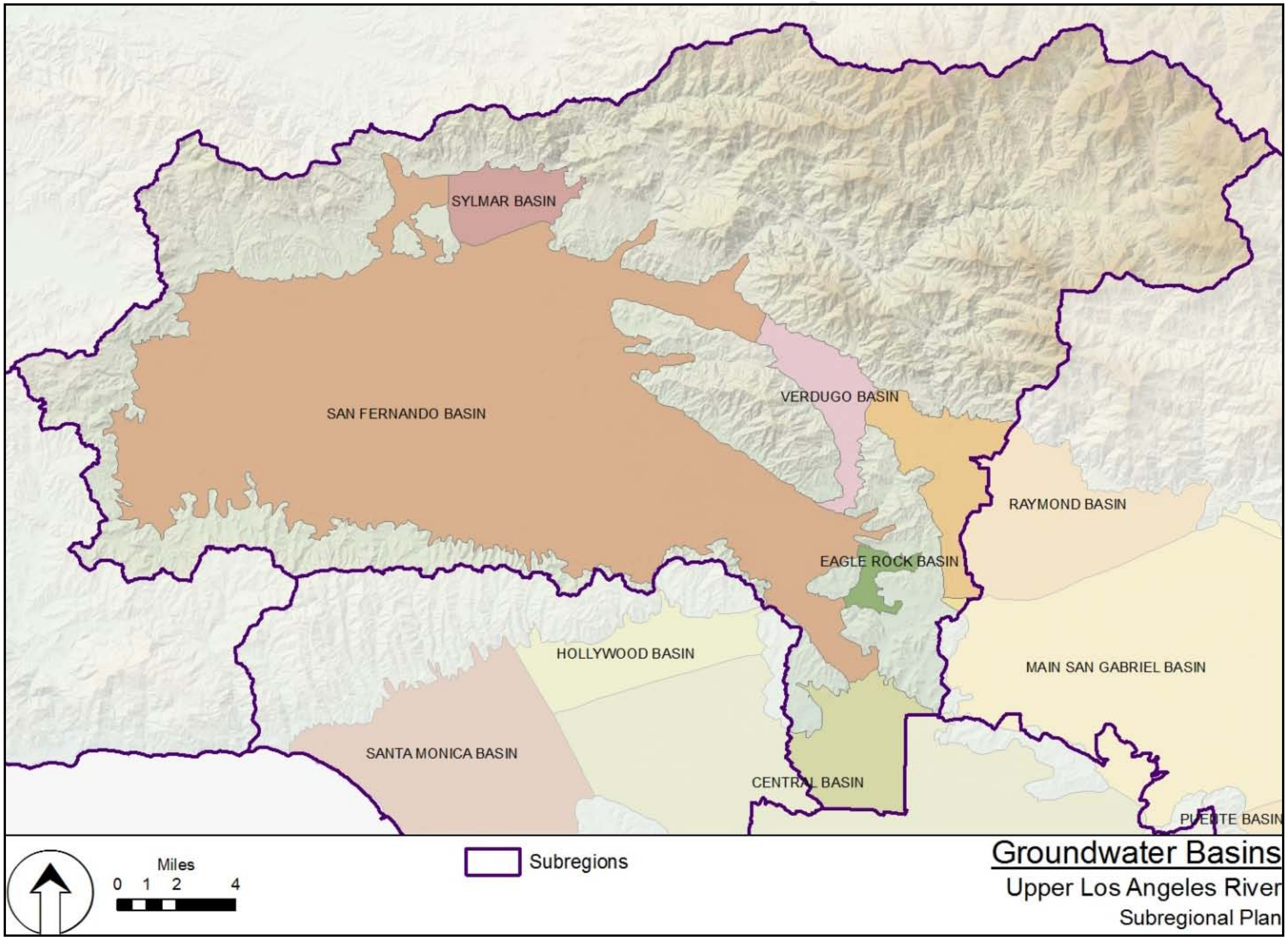
- San Fernando Basin
- Verdugo Basin
- Sylmar Basin
- Eagle Rock Basin
- Raymond Basin
- Central Basin

The San Fernando, Sylmar, Eagle Rock and Verdugo Basin are collectively referred to as the Upper Los Angeles River Area (ULARA) Basins. The ULARA Basins cover a majority of the San Fernando Valley Floor and are bound by the San Gabriel and Santa Susana Mountains to the north, and the Santa Monica Mountains to the south. These basins are managed by the ULARA Watermaster, which tracks groundwater pumpage from 43 parties.

The Raymond Basin is bounded on the north by the San Gabriel Mountains, on the south and east by the San Gabriel Valley and on the west by the San Rafael Hills; only the western portion of the basin underlays the Upper Los Angeles River Subregion. The Raymond Basin Management Board manages the basin, and tracks the groundwater pumpage of the 16 different water purveyors that pump water from the 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 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.

Figure 7: Groundwater Basins



Imported Water

This Subregion significantly depends on imported water as local supply alone is insufficient to meet demand. The imported water wholesaler to the Subregion is the MWDSC. The City of Los Angeles also obtains imported water from the Los Angeles Aqueduct as described in Section 2.3.

Factors that impact reliability of MWDSC deliveries include operational constraints such as court ordered pumping restrictions on imported water from the San Joaquin-Sacramento River Delta (Delta) due to endangered species protection. Water quality concerns such as high salinity levels can require that water from the Colorado River be blended with higher quality SWP water. Invasive species, such as the quagga mussel, can force extensive maintenance of systems reducing operational flexibility. Climate change may impact supply reliability by reducing levels of precipitation impacting the snowpack in the Sierra Nevada Mountains, increasing the intensity and frequency of extreme weather such as droughts, and flooding events that increase the risk of levee failure in the Delta. Agencies, districts and cities taking delivery of imported water receive an average blend of 75% Colorado River water and 25% State Water Project water from MWDSC.

The reliability of Los Angeles Aqueduct supplies also includes operational constraints due to environmental mitigation needs in the Owens Valley and Mono Basin. Additionally, water quality concerns such as disinfection byproducts may require future treatment of Los Angeles Aqueduct water. Climate change is also expected to reduce the amount of water that can be imported from the Sierra Nevada Mountains. (LADWP 2010 UWMP)

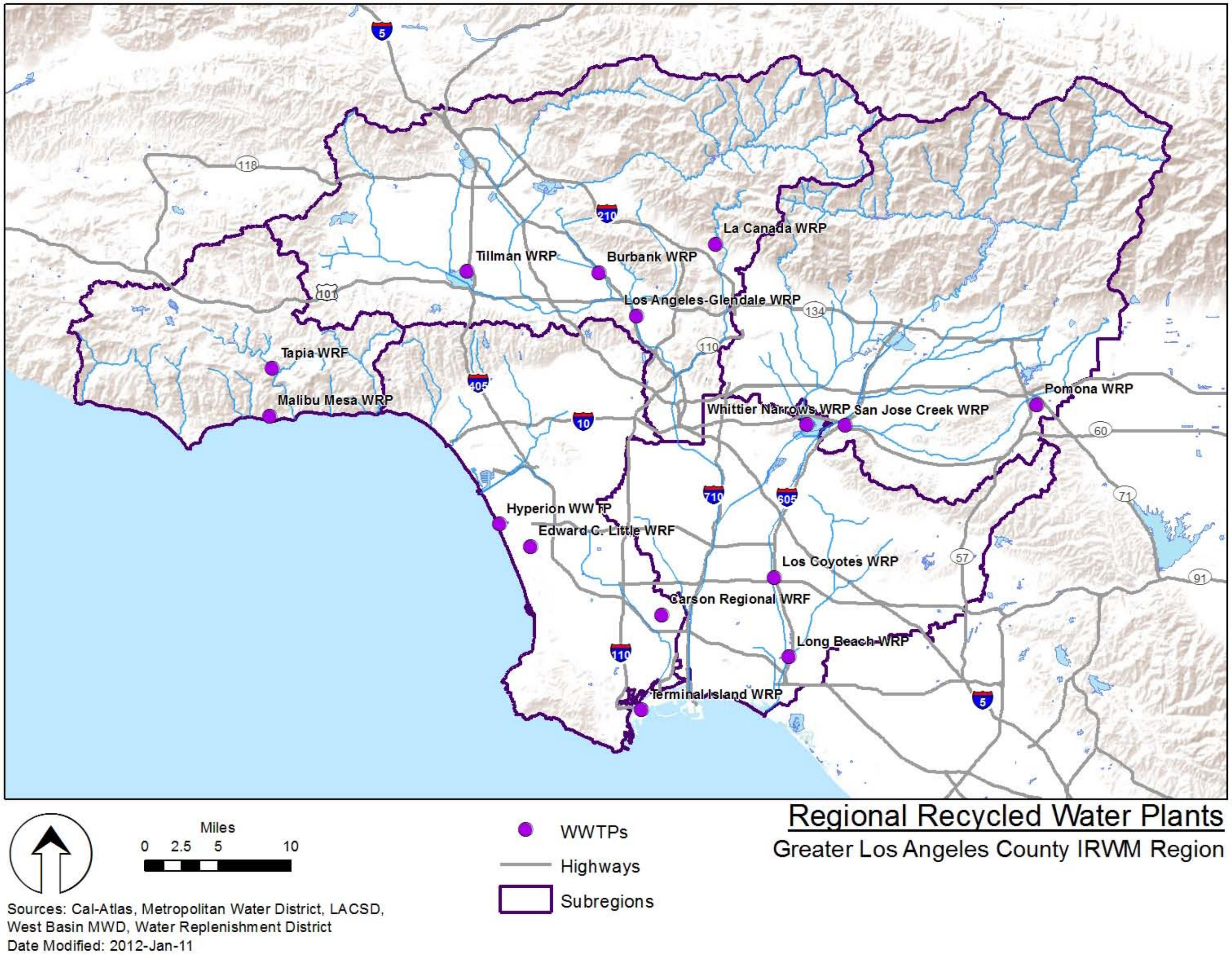
Further discussion on imported water is included in Appendix A.

Recycled Water

Recycled water supplied to the Subregion is treated at the Donald C. Tillman Water Reclamation Plant (DCTWRP), Burbank WRP, Los Angeles-Glendale WRP (LAGWRP) and La Cañada WRP, all shown in Figure 8. DCTWRP and LAGWRP are both owned and operated by the City of Los Angeles. The DCTWRP has been producing recycled water since 1985 and annually produces approximately 23,000 acre-feet of recycled water per year. The LAGWRP began operation in 1976, and produces approximately 5,000 acre-feet of recycled water per year. La Cañada WRP is owned and operated by the Sanitation Districts of Los Angeles County. The La Cañada WRP has been in operation since 1962 and provides approximately 100 acre-feet per year of recycled water for golf course lakes and irrigation. Lastly, the Burbank WRP, owned and operated by Burbank Water and Power, began operation in 1966 and was upgraded in 2000 to meet current regulations. Burbank WRP produces approximately 10,000 acre-feet per year of recycled water.

In addition, there is potential for additional recycled water flows from these facilities, specifically the potential for increased production of recycled water in the Subregion if funding is available for capital improvements. These capital improvements could be at the treatment plants themselves to increase capacity, or by modifications of the upstream sewer collection system to divert more wastewater to the treatment plants.

Figure 8: Water Reclamation Facilities in the GLAC Region



Recycled water projects are being pursued by the water suppliers in the Subregion. Many of those projects are supported by MWDSC's Local Projects rebates program. For some agencies, recycled water provides a significant portion of total water supplies. Recycled water is typically used for irrigation of large landscapes such as golf courses, freeway medians, parks, sports fields, and cemeteries. Existing recycled water projects in the Subregion are shown in Table 3. Additionally, the LADWP Recycled Water Master Plan proposes using recycled water for groundwater replenishment in the future. Those recycled water projects that are under construction, in advanced planning, or in the feasibility study stage include those shown in Table 4. (MWDSC, 2010)

Table 3: Existing Recycled Water Projects

Agency	Project Name	Ultimate capacity (acre-feet)
Burbank Water and Power	Burbank Reclaimed Water System Project Expansion	850
	BWP Power Plant	1,500
	Caltrans	20
Sanitation Districts of Los Angeles County	La Canada-Flintridge Country Club	224
Glendale	Glendale Forest Lawn WRP Expansion	500
	Glendale Grayson Power Plant Project	460
	Glendale Verdugo-Scholl Canyon Brand Park Reclaimed Water Project	2,225
LADWP	Environmental Use	28,000
	Griffith Park	650
	Hansen Area Water Recycling Project, Phase1	2,500
	Los Angeles Greenbelt Project	900
	MCA/Universal	810
	Sepulveda Basin Water Reclamation Project	1,500
	Total Capacity	**40,139**

Table 4: Future Recycled Water Projects

Agency	Project Name	Ultimate capacity (acre-feet)
Burbank Water and Power	Burbank Reclaimed Water System Project Expansion, Phase II	974
Foothill MWD	La Canada-Arroyo Seco Study Area	280
LADWP	Hansen Dam Golf Course Water Recycling Project	500

	LA-Glendale Storage & Distribution System Water Recycling Project	2,600
	Elysian Park Tank and Pumping Station Water Recycling Project	500
	LA Zoo Water Recycling Project	500
	Tillman Groundwater Replenishment System	30,000
	San Fernando Valley/Central City Water Recycling and Reliability Project	1,500
	Satellite Plant and Distribution System	4,500
Pasadena Water and Power	Central Los Angeles County Regional Recycled Water Project: Phase 1	730
	Central Los Angeles County Regional Recycled Water Project: Phase 2	3,110
	Central Los Angeles County Regional Recycled Water Project: Phase 3	3,170
	Total Capacity	**48,364**

Ocean Desalination

Due to the Subregion's lack of proximity to the ocean, ocean desalination projects would not occur within the Subregion. However, there may be opportunities to partner with an agency along the coast and transfer water through either a groundwater basin or through MWDSC in the future as desalination supplies become more cost competitive with imported water.

Stormwater Capture and Direct Use

Stormwater runoff from urban areas is an underutilized resource. Within the Subregion, a majority of stormwater runoff is directed to storm drains and channeled to the ocean. Stormwater reuse 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 to develop a Stormwater Capture Master Plan in place that will investigate potential strategies for advancement of stormwater and watershed management in the City of Los Angeles, including centralized and distributed stormwater capture goals, and recommended projects to meet those goals. The City of Los Angeles has undertaken programs in the Sun Valley watershed to manage runoff and prevent flooding. The various stormwater management methods include installation of catch basins, storm drain inlets, and underground pipes to divert water to retention basins, open space for the storage and percolation of stormwater, and use of stormwater for landscaping.

The City of Burbank is also exploring the promotion of low-impact development (LID) to mitigate stormwater through infiltration and recharge, though it hasn't set numerical goals for stormwater reuse. It is completing a pilot percolation project that improves public right of ways along a street that will allow for the capture and percolation of stormwater.

It should also be mentioned that reservoirs in the Subregion have the capability to conserve some stormwater from the upper watershed, though primary purpose of these reservoirs is generally flood prevention. In addition, the permeable soils of the subregion would allow for stormwater recharge of the groundwater basins.

2.4 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 Subregion was estimated based on review of 2010 Urban Water Management Plans (UWMPs).

Demand projections for the Subregion can be seen in Table 5. Demand was calculated using the 2010 UWMPs for the following water purveyors:

- City of Los Angeles (portion within Subregion)
- City of Glendale
- City of Burbank
- City of Pasadena
- Las Virgenes MWD (portion within Subregion)
- Foothill MWD (portion within Subregion)

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 SBx7-7 (Steinberg, 2009), also known as the 20x2020 Plan. Member agencies of MWDSC assist the Subregion by implementing incentive programs that provide rebates to water conservation and recycled water use projects and programs.

Table 5: Subregion Retail Demand Projections (acre-feet per year)

	2010	2015	2020	2025	2030	2035
Demand	396,000	436,000	460,000	475,000	491,000	497,000
Supply	400,000	441,000	466,000	481,000	500,000	509,000

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 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 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 Upper Los Angeles River and its tributaries serve many beneficial uses including: municipal and domestic supply, groundwater recharge, recreation, warm freshwater habitat, wetland habitat, wildlife habitat, protection of rare and endangered species, and wildlife habitat. Typically, surface water quality is better in the headwaters and upper portions of watershed, and is degraded by urban and stormwater runoff as the rivers move through urban areas. As a result, a number of waters in the Subregion are 303(d) listed for several constituents as shown in Table 6 and Table 7.

The locations of permitted dischargers is shown in Figure 9.

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
- **Lincoln Park Lake TMDLs:** Runoff, supplemental water additions to maintain lake level, parkland irrigation, atmospheric deposition
- **Echo Park Lake TMDLs:** Permitted storm sewer discharges, parkland irrigation, supplemental water additions to maintain lake levels, atmospheric deposition
- **Lake Calabasas TMDLs:** Permitted storm sewer discharges, Caltrans stormwater discharge permit, parkland irrigation, supplemental water additions to maintain lake levels, atmospheric deposition

Table 6: 303(d) Listed Waters with Approved TMDLs

303(d) Listed Waters and Impairments[1]	TMDLs
Aliso Canyon Wash	
Metals: Copper, Selenium	Los Angeles River Metals TMDL
Fecal Coliform	Los Angeles River Bacteria TMDL
Arroyo Seco	
Coliform Bacteria	Los Angeles River Bacteria TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Bell Creek	
Coliform Bacteria	Los Angeles River Bacteria TMDL
Metals: Copper	Los Angeles River Metals TMDL
Burbank Western Channel	
Metals: Copper, Lead, Selenium	Los Angeles River Metals TMDL
Indicator Bacteria	Los Angeles River Bacteria TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Dry Canyon Creek	
Fecal Coliform	Los Angeles River Bacteria TMDL
Metals: Selenium	Los Angeles River Metals 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
McCoy Canyon Creek	
Fecal Coliform	Los Angeles River Bacteria TMDL
Nutrients: Nitrite, Nitrate	Los Angeles River Nutrient TMDL
Selenium	Los Angeles River Metals TMDL
Tujunga Wash	
Coliform Bacteria	Los Angeles River Bacteria TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Nutrients: Ammonia	Los Angeles River Nutrient TMDL
Metals: Copper	Los Angeles River Metals TMDL
Verdugo Wash	
Coliform Bacteria	Los Angeles River Bacteria TMDL
Trash	Trash TMDL for the Los Angeles River Watershed
Metals: Copper	Los Angeles River Metals TMDL
Echo Park Lake	
Nutrients: Algae, Eutrophic, Organic Enrichment/Low Dissolved	Echo Park Lake TMDLs
Ammonia	
Odor	
DDT	
pH	
PCBs	
Trash	
Metals: Copper, Lead	No TMDL necessary as metals determined to be meeting numeric targets
Lake Calabasas	
Nutrients: Ammonia, Eutrophic, Organic Enrichment/Low Dissolved	Lake Calabasas TMDLs

303(d) Listed Waters and Impairments[1]	TMDLs
pH	
Odor	
DDT	
Lincoln Park Lake	
Nutrients: Ammonia, Eutrophic, Organic Enrichment/Low Dissolved Oxygen, Odor	Lincoln Park Lake TMDLs
Trash	
Lead	No TMDL necessary as lead determined to be meeting numeric targets

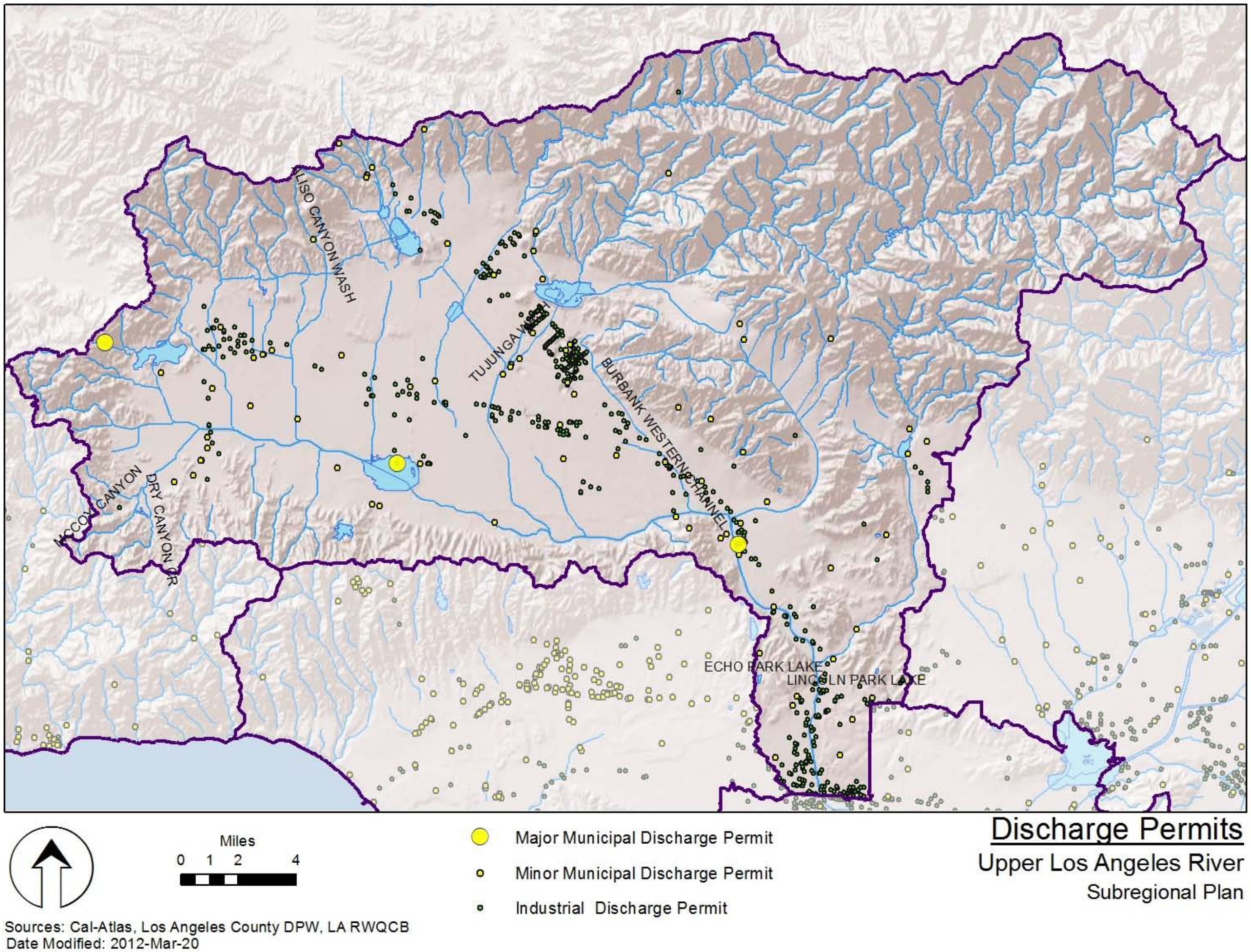
1. According to the US EPA's 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report

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

303(d) Listed Waters and Impairments[1]
Arroyo Seco
Benthic-Macroinvertebrate Bioassessments
Burbank Western Channel
Cyanide
Los Angeles River
Oil

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

Figure 9: Permitted Dischargers as of 2011



Groundwater Quality

Groundwater quality in the ULARA Basins is managed by the ULARA Watermaster which reports on water quality, treatment and remedial investigation activities in its annual report. The overall quality of the ULARA Basins is generally within the recommended limits of drinking water standards, except for those areas of concern listed in Table 8. Groundwater pumped from these areas (for those wells that haven't been shut down) are treated to meet state drinking water standards.

Within the San Fernando Valley, three Operable Units (OUs) have been created as part of long-term groundwater remediation activities in the San Fernando Basin. These OUs include: 1) North Hollywood OU due to VOC contamination, 2) Burbank OU due to VOCs and hexavalent chromium, and 3) Glendale North and South OUs due to VOCs. Various groundwater quality investigations are also taking place throughout the ULARA Basins to determine the cause and extent of the above listed contamination.

Table 8: Groundwater Quality Concerns in the ULARA Basins

Basin Area	Water Quality Concern
San Fernando Basin – eastern portion	TCE, PCE, hexavalent chromium, nitrate
San Fernando Basin – western portion	Sulfate, TDS
Verdugo Basin	MTBE, nitrate
Sylmar Basin	nitrate

Raymond Basin groundwater quality is managed by the Raymond Basin Management Board. This basin provides potable supply, with good to fair groundwater quality in most areas. Constituents of concern include TDS, nitrate, perchlorate, and VOCs. There is one Superfund site located at the Jet Propulsion Laboratory (JPL) due to liquid waste seepage which released perchlorate and VOCs into the groundwater. Water agencies which pump from the Raymond Basin have treatment facilities in place to treat groundwater for VOCs and Perchlorate.

2.6 Environmental Resources

The Subregion contains areas that have been highly urbanized as well as areas in the San Gabriel Mountains that provide a variety of natural resources that serve as habitat for wildlife. Below is a discussion of the existing environmental resources found in the Subregion.

2.6.1 Habitat

A variety of habitats can be found in the Subregion. In terms of water resources, these habitats include both upland and wetland.

Upland habitat provides a buffer to wetland habitat as well as linkages to species through the landscape. Wetland areas provide habitat to innumerable species of flora and fauna. Wetland areas within the Subregion can be seen in Figure 10, and include:

- **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

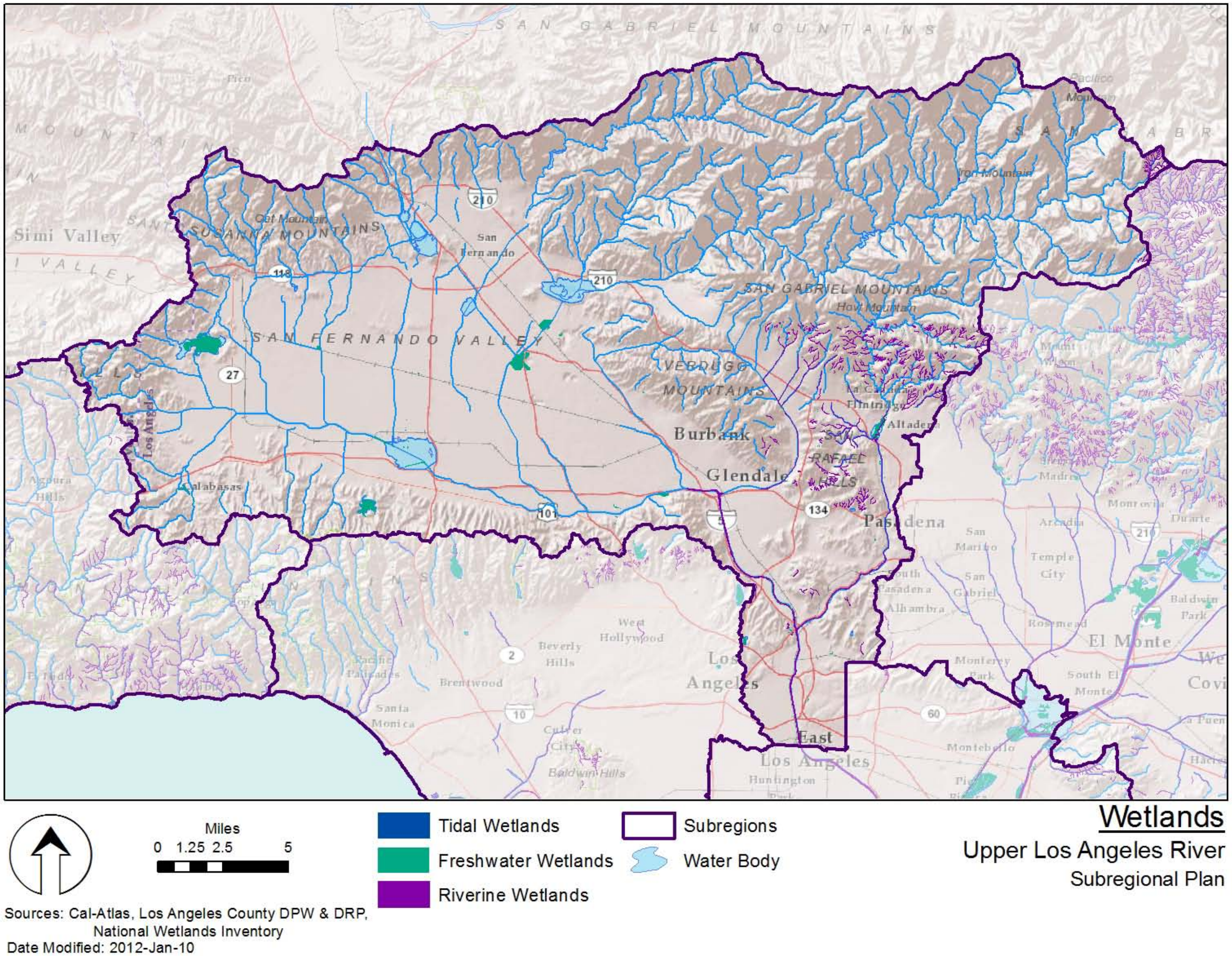
- **Riverine wetlands:** Streambed and wetlands associated with rivers and streams, including upper and lower riverine habitats and dry washes. Man-made habitats considered riverine wetlands include concrete-lined channels and soft-bottomed channels. Note that "riparian" is sometimes used to mean riverine wetlands.

Studies have found that the Subregion contains a number of distinct habitats that fall under the above described upland and wetland habitat:

- **Soft bottom channel with annually flooded riparian growth:** Soft bottom areas which are lined with cobble, sediment and boulders allow growth of willows and other riparian vegetation. This habitat occurs in three areas: Willow Street to Pacific Coast Highway, Glendale Narrows from the Burbank/Western Channel confluence (Victory Boulevard) to just above the Arroyo Seco confluence, and in the Sepulveda Flood Control Basin from the dam to above Balboa Boulevard.
- **River bank:** Earthen river banks can be found around the edges of some flood control basins, especially behind Hansen Dam
- **Freshwater marsh/cienega:** This habitat, which was once common along the river, now occurs only in small areas of teh soft bottom channel
- **Open freshwater reservoirs:** Constructed reservoirs and lakes within the Los Angeles River watershed that offer feeding and resting habitat to migrating birds include Silver Lake, Encino, Los Angeles, Pacoima and Tujunga reservoirs and spreading grounds. These form part of the "habitat system" to which the river belongs.
- **Floodplain forest:** This habitat is characterized by willows and cottonwoods, with dense shrubby undergrowth. Once common along the river, remnants of this habitat now occur only in Whittier Narrows, Sepulveda and Hansen flood control basins.
- **Valley oak savanna:** Once occurred in the western area of the river drainage. Now only disturbed remnants remain near the Chatsworth Reservoir and in Sepulveda Basin.
- **Alluvial scrub:** Occurred on alluvial washes, or bajadas. Big Tujunga Wash contains the only remnant of this habitat.
- **Urban/suburban:** This highly modified habitat type, with mostly exotic tree and shrub species, is typical of the lowland portions of the Los Angeles River. The extensive urbanization of the flood plain and the channelization of the river and its tributaries have provided for the spread of this habitat type. While some native species survive, most native birds and animals do not adapt to this habitat.
- **Aerial:** Animals that eat insects, such as bats, swallows and swifts, are common throughout the Los Angeles River watershed where conditions of vegetation, wind and topography produce ideal conditions for large concentrations of insects, and therefore, the species that feed on them.

It has been determined that seasonal and permanent freshwater wetlands, lowland riparian forests and thickets, and alluvial scrub have been the most heavily impacted by urbanization and flood control programs. *(The Biota of The Los Angeles River)*

Figure 10: Wetlands



2.6.2 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.

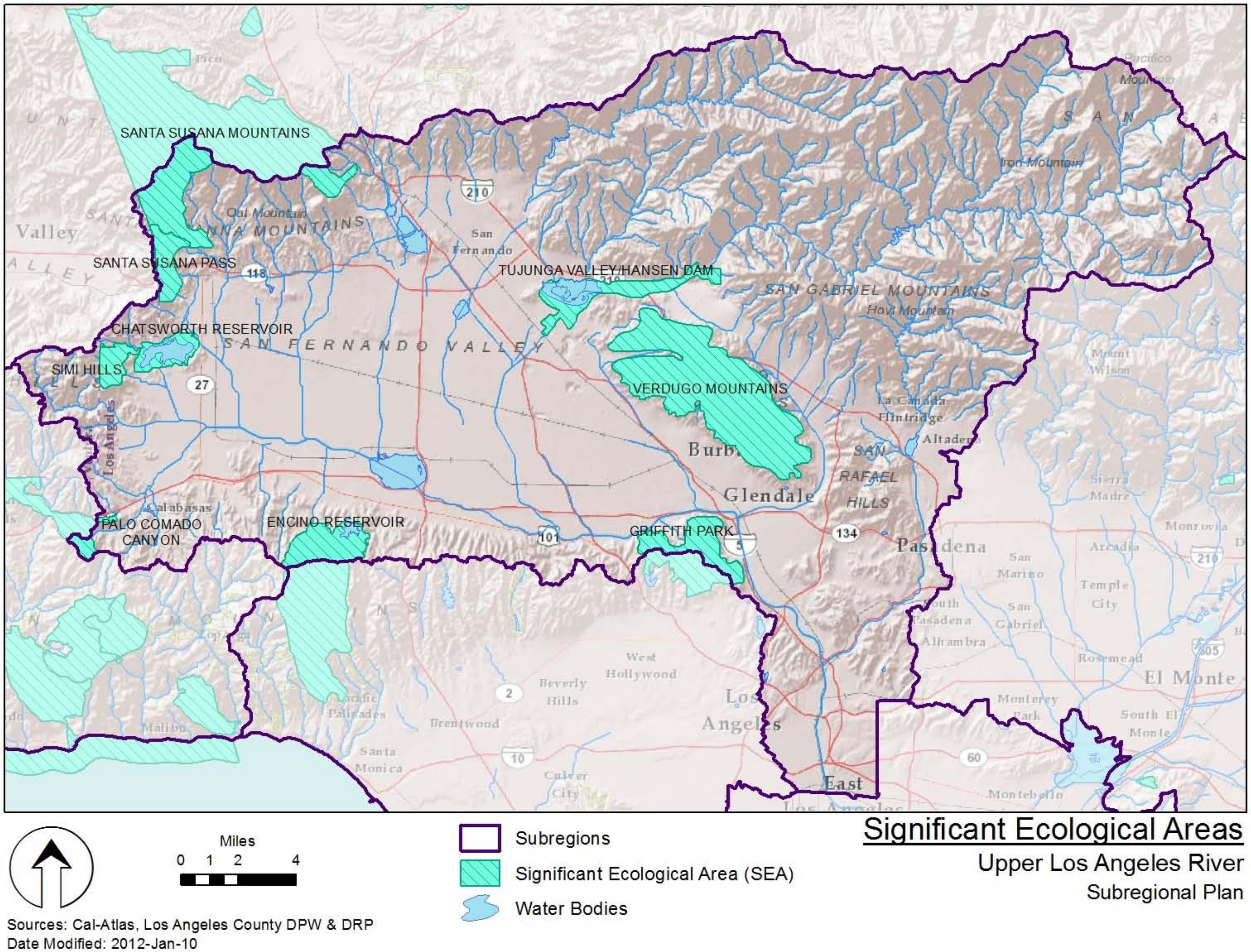
Proposed development is governed by SEA regulations. The regulations, currently under review, do not to preclude development, but to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. The SEA conditional use permit requires development activities 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:

- Santa Susana Mountains
- Santa Susana Pass
- Chatsworth Reservoir
- Simi Hills
- Palo Comado Canyon
- Encino Reservoir
- Tujunga Valley / Hansen Dam
- Verdugo Mountains
- Griffith Park

These SEAs can be seen in Figure 11.

Figure 11: Significant Ecological Areas



2.6.3 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. A 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.

2.6.4 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 11,400 acres of designated critical habitat defined for various endangered and threatened species as shown in Figure 12.

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 Table 9. Acreage of recreation and open space lands within the Subregion is shown in Table 9. In total, of the Subregion's 12,690 acres, approximately 231,000 acres (or 5%) are considered open space or recreation land areas. A majority of the areas are National Forest Land within the San Gabriel Mountains.

Table 9: Existing Recreation and Open Space Land Area

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

Figure 12: Critical Habitat

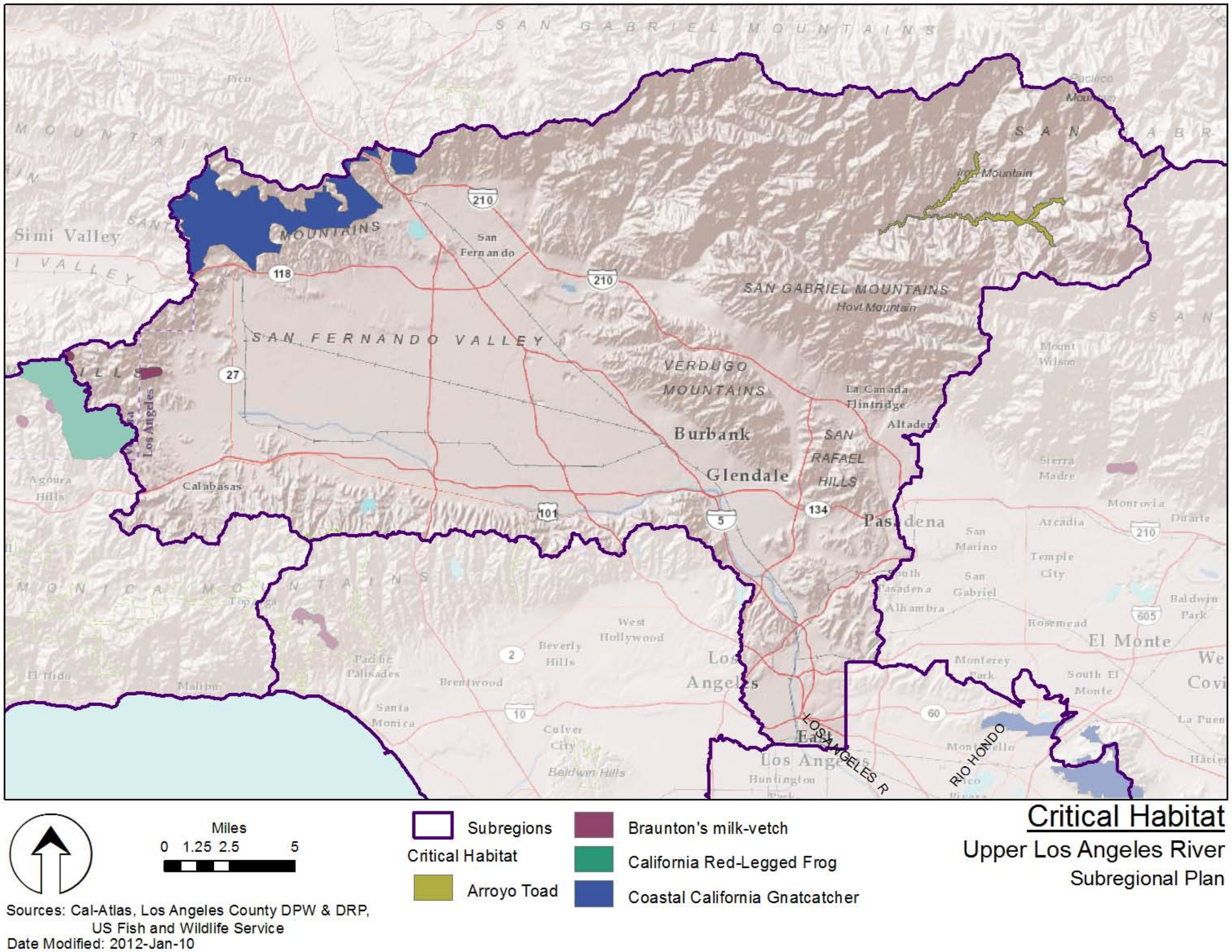
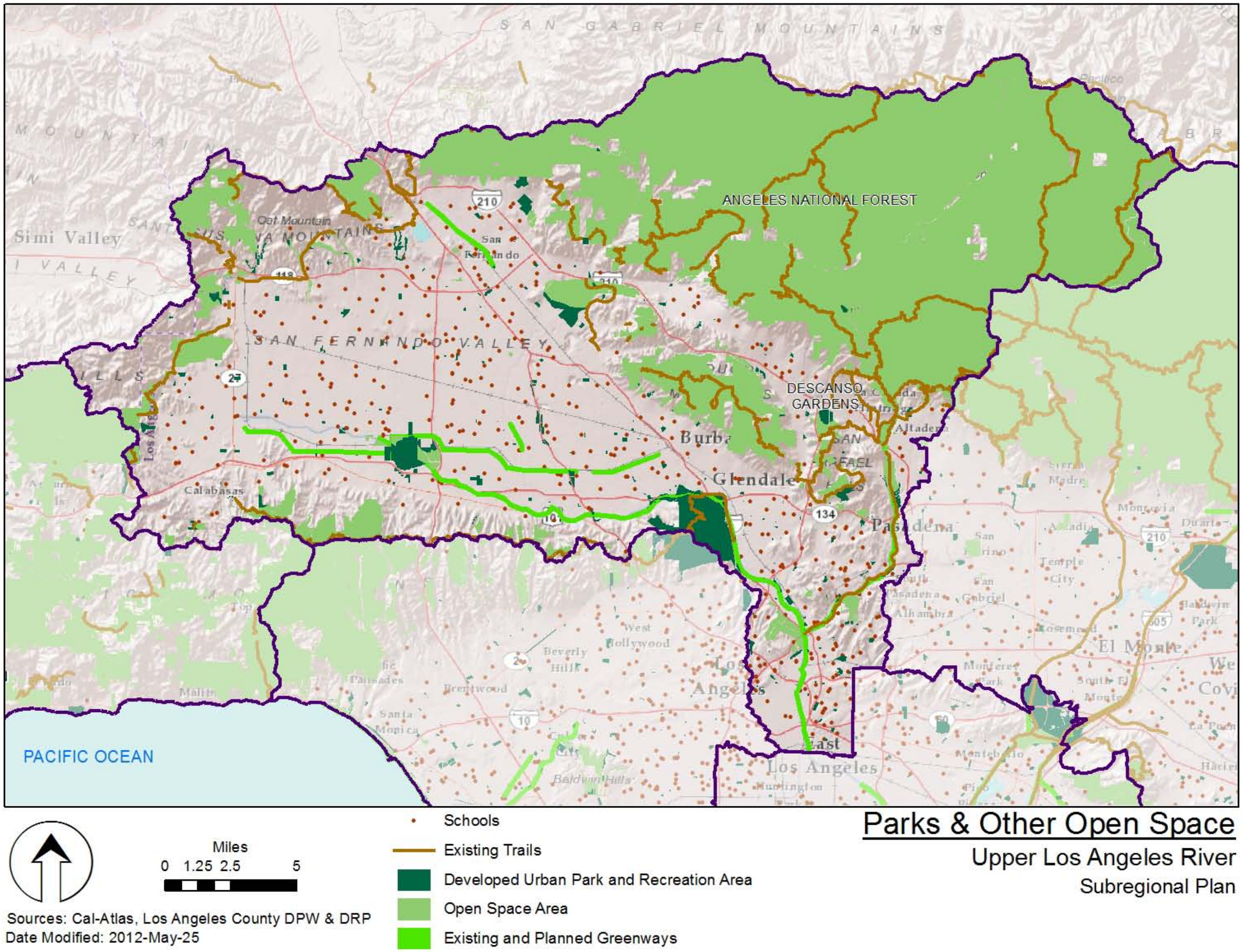


Figure 13: Parks, Recreation and Other Open Space



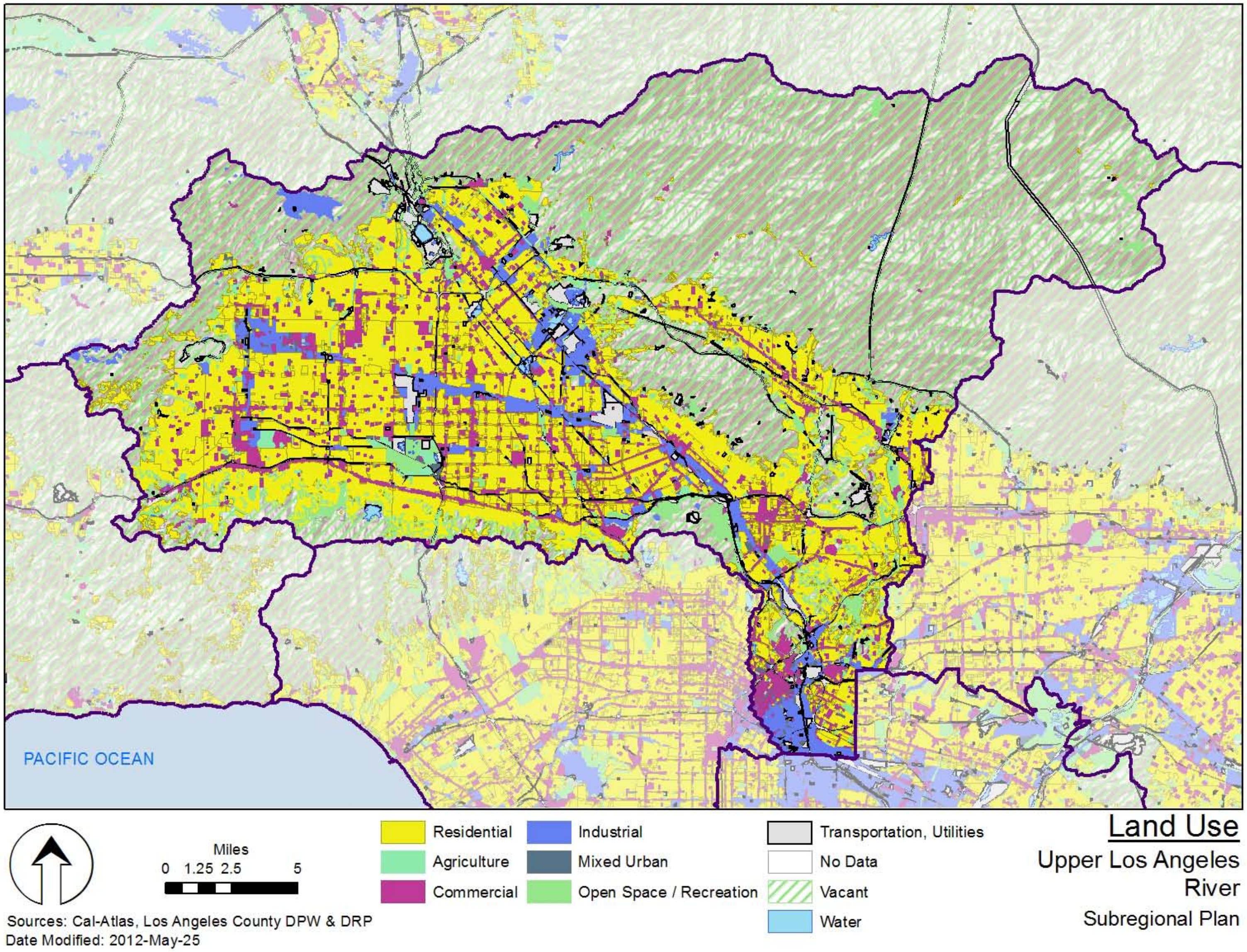
2.8 Land Use

Land use within the Upper Los Angeles Subregion reflects the historic pattern of urbanization as most of the Subregion is occupied with residential, commercial, industrial, and institutional uses while most of the foothills and mountains are principally open space. The overall land use breakdown for the Upper Los Angeles Subregion is as follows: 4 percent commercial and industrial, 13 percent residential, 1 percent open space and recreation, 2 percent transportation, and 80 percent other open space.

Table 10: Land Use in the Upper Los Angeles Subregion

Land Use Type	Acres	Percentage
Vacant	441,133	69%
Residential	124,114	19%
Commercial	21,726	3%
Industrial	15,757	2%
Transportation, Utilities	19,399	3%
Open Space / Recreation	8,382	1%
Agriculture	2,195	<1%
Mixed Urban	1,944	<1%
Water	1,024	<1%
No Data	1,116	<1%
Total	**636,791**	**100%**

Figure 14: Land Use



3 Upper Los Angeles Objectives and Targets

This section identifies the objectives for the Upper Los Angeles 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 GLAC Region IRWM Plan has developed regional goals, objectives, and targets. To assist the GLAC Region in meeting these, the Upper Los Angeles 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 GLAC Region's 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 URWMPs, recycled water master plans, and the MWDSC's Integrated Resources Plan (IRP), and groundwater master plans. A workgroup composed of Stakeholders from within the Subregion 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 GLAC Region's and Upper Los Angeles 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 their 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 Upper Los Angeles Subregion are identified below (and summarized in Table 9) and are presented under the Plan element to which they most closely correspond.

Table 11: Upper Los Angeles 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 38,000 AFY of water by 2035 through water use efficiency and conservation measures.
	Ground Water	Create additional ability to pump 31,000 AFY using a combination of treatment, recharge, and storage access.
	Recycled Water	Increase indirect potable reuse of recycled water by 30,000 AFY. Increase non-potable reuse of recycled water by 12,000 AFY.
	Ocean Desalination	Increase ocean desalination by 0 AFY.
	Stormwater	Increase capture and use of stormwater runoff by 7,000 AFY that is currently lost to the ocean. Increase stormwater infiltration by 37,000 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] 3,400 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 180 acres of wetland habitat Create, develop, or enhance 1,500 acres of wetland habitat. Restore or create 1,100 acres of wetland habitat
	Upland Habitat	Preserve, create or enhance 18,000 acres of upland habitat
Enhance Open Space and Recreation		
Increase watershed friendly recreational space for all communities	Open Space	Preserve, protect, and enhance 25,000 acres of open space
	Recreation Space	Create, develop, or enhance 4,600 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 3,800 acres of flood prone areas by either increasing protection or decreasing needs using integrated flood management approaches. Remove 28 million cubic yards of sediment from debris basins and reservoirs.

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 use 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 88,000 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

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 3,400 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.

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.

The Subregion plans on achieving these objectives by protecting or preserving 180 acres of freshwater wetland and riparian wetland. The Subregion also intends to enhance 1,500 acres of these wetlands, and restore or create 1,100 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 18,000 acres.

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

3.4 Open Space and Recreation Objective and Targets

Open space and parkland has the potential to enhance groundwater resources by preserving or expanding the area available for natural groundwater recharge, improve surface water quality to the extent that these open spaces filter, retain, or detain stormwater runoff, and provide opportunities to reuse treated runoff for irrigation. Additionally, open space and recreation is necessary to provide space for native vegetation to create habitat and passive recreational opportunities for the community.

The Subregion plans on achieving these objectives by creating/developing/enhancing 4,600 acres of recreation space, and 25,000 acres of open space. The assumptions and calculation used to determine these are attached as Appendix D.

3.5 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 3,800 acres of local unmet drainage needs, and remove 28 million cubic yards of sediment from debris basins and reservoirs. 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. The sediment removal target was established using historical records to estimate sediment inflow, and estimate the sediment trapped within a 20-year period. 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 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 when 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 enable 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.

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