3.8 Hydrology and Water Quality

This section describes the existing hydrology and water quality conditions within the project area and evaluates whether the proposed program would result in significant hydrology or water quality impacts.

3.8.1 Environmental Setting

Surface Water

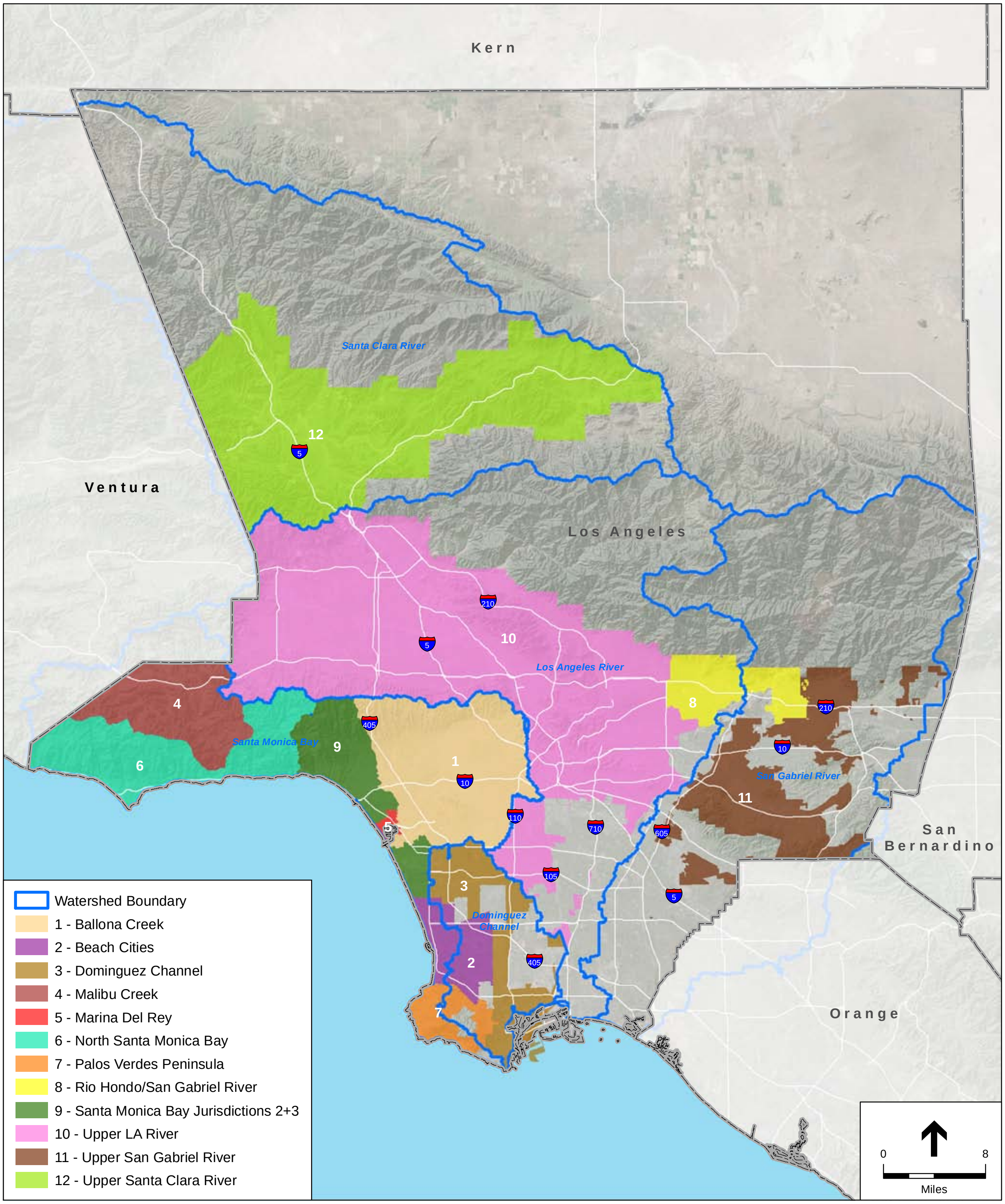
Climate and Precipitation

The 12 Enhanced Watershed Management Program (EWMP) Areas are located within Los Angeles County (County). The coastal mountains and plains within this region have a mediterranean climate with mild rainy winters and warm dry summers, while the inland slopes and basins tend to experience more extreme temperatures and less precipitation. These variations of climate within the region can be attributed to variable topography. Higher elevations generally receive more precipitation than nearby areas at lower elevations. Prevailing winds from the west and northwest carry moist air from the Pacific Ocean inland until it is forced upward by the Santa Monica, San Gabriel, or Santa Susanna Mountains. The resulting rainfall occurs mostly during discrete, episodic events between November and March.

Annual precipitation can vary significantly between drought and flood conditions; periodic and occasionally severe droughts and floods within the area are well-documented (LARWQCB, 1994), and the potential for extreme precipitation (maximum intensity of precipitation for periods of 12 hours or longer which might be expected at intervals of ten to 100 years) is greater in portions of the San Gabriel Mountains than practically anywhere else in the continental United States (WERC, 2014). Average annual rainfall within the Los Angeles Basin is approximately 14.5 inches, though local averages can vary considerably depending on location within the basin (WERC, 2012).

Los Angeles County Watersheds

As shown in **Figure 3.8-1**, the portion of Los Angeles County covered in this Program Environmental Impact Report (PEIR) is divided into distinct watersheds, including: the Los Angeles River, San Gabriel River, Rio Hondo, Santa Clara River north of the Santa Susana Mountains, Dominguez Channel, and coastal drainages stretching from Malibu to Palos Verdes, including Ballona Creek. The 12 EWMP areas were identified as portions of these greater watersheds that contain impaired water bodies needing structural Best Management Practices (BMPs) to comply with stormwater discharge permit requirements.



SOURCE: ESRI.

LA County PEIR EWMP . 140474

Figure 3.8-1

Watersheds and EWMP Groups

Los Angeles River

The 51-mile Los Angeles River stretches from its headwaters in the upper San Fernando Valley to its mouth in San Pedro Bay, draining the Santa Susana and San Gabriel Mountains and San Fernando Valley. Following several catastrophic and deadly floods in the early 1900s, the U.S. Army Corps of Engineers channelized and armored the river levees and numerous tributaries with concrete to mitigate future flooding concerns. The channelization of this stream, completed in the 1960s, ended ongoing flooding concerns and provided land for the construction of homes and businesses within the previous floodplain.

San Gabriel River

The San Gabriel River is bound by the San Gabriel Mountains to the north, San Bernardino to the east, Los Angeles River to the west, and Pacific Ocean to the south. The San Gabriel River flows 58 miles south until its confluence with the Pacific Ocean. Major tributaries to the San Gabriel River include Walnut Creek, San Jose Creek, Coyote Creek, and numerous storm drains entering from the 19 cities that the San Gabriel River passes through. Much of the channel above the Whitter Narrows is unlined. Storm flows are diverted from the riverbed into four different spreading grounds by dams for ground water recharge. The 10-mile segment below Whittier Narrows is a concrete-lined channel.

Rio Hondo

The Rio Hondo watershed is a subwatershed of the Los Angeles River watershed and is also linked to the adjacent San Gabriel River watershed. This link reflects both natural hydrologic processes and human intervention. Historically, the Los Angeles and San Gabriel Rivers were wide, shallow rivers consisting of a braided series of channels that would periodically intermingle following large storm events. Today, the rivers have been engineered into three channels created to bring water from the San Gabriel to the Rio Hondo, making the Rio Hondo serve as an outlet for the San Gabriel River.

Dominguez Channel

Named for the Juan Jose Dominguez family who owned a tract of 75,000 acres of land (Rancho San Pedro) from the Los Angeles River west to the Pacific Ocean in the late 1700s, the channel is a 15.7-mile-long waterway that drains a 110 square miles. The headwaters begin in Hawthorne and eventually empty into the East Basin of the Port of Los Angeles. Today, the Dominguez Channel watershed is 96 percent developed.

Santa Clara River

The Santa Clara River watershed encompasses approximately 1,030 square miles. The Upper Santa Clara River watershed is located primarily within both Ventura (243 square miles) and Los Angeles County (786 square miles), as well as a very small portion of Kern County. The Santa Clara River is one of the few natural river systems remaining in Southern California originating in the Angeles National Forest and flowing westward for approximately 84 miles to the Pacific Ocean. Throughout its length, the river crosses through farmland, undeveloped lands, and urban areas. The lower Santa Clara River watershed is located primarily within Ventura County and out of the study area for this project.

Coastal Drainages

All along the Los Angeles County coastline, distinct drainages flow from uplands to the ocean. In Malibu, these drainages within the Santa Monica Mountains are generally short, steep, and relatively natural channels. Malibu Creek drains a wide area that includes areas within and north of the Santa Monica Mountains. In the urbanized areas along Santa Monica Bay, the streams have been channelized.

Ballona Creek is a 9-mile-long waterway that drains the Santa Monica Mountains on the north and the Baldwin Hills on the south. Ballona Creek flows through Culver City until emptying into Santa Monica Bay between Marina del Rey and Playa del Rey. Following damaging flooding events, the Los Angeles County Flood Control District (LACFCD) concreted Ballona Creek and its tributaries during the 1930s. The Ballona Wetlands at the mouth of the creek are one of the last significant coastal wetland areas in Los Angeles County.

EWMP Groups

The proposed program has been divided into 12 EWMP Areas that have been organized by watershed groups that share comparable conditions. The key linkages that were used to distinguish the various EWMP groups were percentage of open space and urbanization, similar focus on the types and percentage of BMPs, and common hydrologic conditions. The following summaries are the general characteristics of the watersheds within the EWMP groups and the overall strategies for BMP implementation that reflect these characteristics. The 12 EWMPs are consolidated into six watershed areas that are grouped by similar watershed characteristics. This summary provides additional detail on the hydrologic features and strategies for the distribution and locations of potential and priority BMPs. Figures are referenced and provided for each of the six consolidated watershed areas and also provide hydrologic features and the locations and distribution of planned and priority regional/centralized BMPs. The priority BMPs are a subset of the planned BMPs and have been selected as priority projects based on a screening assessment of the planned projects. Priority projects will be implemented before additional planned projects. Distributed BMPs are planned to be implemented throughout the urbanized areas of the EWMPs. The following summaries of the six watershed areas also highlight the linkage between the BMP strategies with hydrologic conditions in these watersheds that provide a basis to assess potential environmental impacts presented in the assessment section.

1. **South Santa Monica Bay EWMP Watersheds (Figure 3.8-2)** (Marina del Rey, Ballona Creek, Beach Cites, South Santa Monica Bay Jurisdictional Group 2 and 3, and Peninsula Cities EWMP groups) – These watersheds are dominated by urbanized beach communities with high-density residential and commercial land uses throughout the watershed. Key BMP strategies in these watersheds are to address dry- and wet-weather flows that may impact beach water quality through bacteria loading. Other water quality priorities include trash, marine debris, metals, and toxics. The BMP strategy includes low-flow diversions (LFDs) to comply with dry-weather metals and bacteria Total Maximum Daily Loads (TMDLs). Although large regional and centralized retention and infiltration BMPs will be part of the pollutant load reduction strategy, the predominate structural BMP will be smaller distributed BMPs such as bioinfiltration, media filtration and flow-through BMPs located in street rights-of-way, parking lots, landscaped areas,

and as part of green streets and buildings. Due to the high ground water near the shore, capture and reuse regional projects or treatment BMP opportunities will be preferred. The receiving waters for the South Santa Monica Bay include the Pacific Ocean, the Ballona Creek, and the Marina del Rey Harbor. The Ballona Creek is channelized through the urbanized area of the Ballona Watershed. The Ballona Wetlands received muted tidal flow from Ballona Creek that is tidally influenced (see the photograph below).

Channelized Ballona Creek and Ballona Wetland

Marina del Rey EWMP – Because of the tidal influence of the marina to most of the watershed, regional projects will be located near the upstream end of the watershed, where groundwater depths are favorable. The tidally influenced areas will consist of mostly treatment distributed BMPs including bioinfiltration or tree wells.

Ballona Creek EWMP – Regional infiltration BMPs will be well distributed throughout the watershed and will be incorporated with distributed BMPs consisting mostly of treatment BMPs such as green streets. LFDs may also be pursued to comply with dry-weather TMDL requirements.

Beach Cities EWMP – The watershed includes a portion of the Beach Cities EWMP that drains to the Pacific Ocean. The Beach Cities will focus their efforts on regional projects near the outlet on the Beach similar to the Hermosa Beach Infiltration Trench or the Torrance infiltration basins. Where regional projects are infeasible, distributed projects such as green streets will be implemented.

Santa Monica Bay J2/3 – Many efforts have already been completed for the Santa Monica Bay J2/J3 watershed, including LFDs and reuse facilities. The group will investigate the possibility of more regional projects that are able to capture and reuse the flow. Remaining areas will be subject to distributed BMPs.

Peninsula Cities – The Peninsula Cities area (SMB J7) is mostly anti-degradation sites, so there will not be many control measures in this subwatershed.

2. **Northern Coastal EWMP Watersheds (Figure 3.8-3)** (Malibu Creek and North Santa Monica Bay Coastal Watershed EWMP groups) – These watersheds are characterized by lower-density development along the coast and the larger creeks with greater open space and park areas inland. There is increased development in the upper areas of the Malibu Creek watershed. Receiving waters in these watersheds are largely unlined and riparian corridors remain.

   Water quality priorities include bacteria, toxics, trash, and nutrients as well as benthic community impairments. Key BMP strategies are to address bacteria loading to the beaches and inland waters, but because of the lower development and largely decentralized infrastructure, LFDs are not the only strategy to address this priority issue. In addition to LFDs, larger centralized BMPs that include detention and infiltration and detention and filtration will be used for Municipal Separate Storm Sewer System (MS4) outfalls that are in close proximity to the receiving waters. Smaller distributed BMPs that include biofiltration, media filtration, green streets, and flow-through BMPs will be used in greater percentage than larger centralized BMPs and would be located in developed areas as retrofit BMPs.

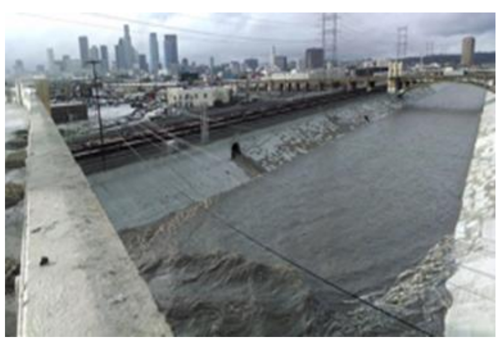
Marie Canyon Low-Flow Diversion – Malibu Creek

3. **Upper San Gabriel Watershed (Figure 3.8-4) –** This watershed is characterized by higher-density development in the lower watershed area and lower-density development and open space in the upper watersheds where the foothills to the San Gabriel Mountains begin. The priority pollutants in these watersheds include selenium in dry-weather flows and metals in storm flows in Coyote Creek. These watersheds are further differentiated by the importance of groundwater recharge basins that are supplied by a series of reservoirs further upstream in the mountains. The San Gabriel River is unlined in the upper watershed and conveys controlled non-storm and storm flows to recharge basins and downstream sections of the river.

Upper San Gabriel River

The BMP strategy in these watersheds focus more on regional and centralized retention and infiltration BMPs that take advantage of the favorable groundwater recharge characteristics of this area. These BMPs are located near or adjacent to the river. This watershed includes stream restoration that uses natural unlined tributaries and centralized bioinfiltration BMPs in parks and open spaces with favorable subsurface soils that promote higher infiltration rates. Distributed smaller BMPs are located in urbanized areas as retrofits in existing developments and streets.

4. **Upper Los Angeles River Watershed and Rio Hondo/San Gabriel Watershed (Figure 3.8-5)** – These watersheds traverse a large diverse area of the Los Angeles Basin with characteristics of Upper San Gabriel in the farthest upper reaches near the foothills, but, for most part, these watersheds are characterized by greater urbanization similar to the Ballona Creek watershed. The greater urbanization also results in additional priority pollutants compared to the Upper San Gabriel watershed and includes nutrients, trash, metals, bacteria, and sediment impacted by metals and organic compounds (DDT, PCBs, PAHs). The Rio Hondo/San Gabriel EWMP is characterized by increasing urbanization south of the foothills and industrial and commercial development along the I-210 corridor. The strategy for the locations and types of BMP is to use remaining available sites for retention and infiltration that takes advantage of the favorable infiltration rates of this area, including the existing groundwater recharge basins near the San Gabriel River.



Los Angeles River

The Los Angeles River is approximately 51 miles long, and five of six reaches lie within the Upper Los Angeles River EWMP. The natural hydrology of the Los Angeles River watershed has been altered by channelization and the construction of dams and flood control reservoirs. The Los Angeles River and many of its tributaries are lined with concrete for most or all of their length. Soft-bottom segments of the Los Angeles River occur where groundwater upwelling prevents armoring of the river bottom. Because of the greater extent and number of pollutant priorities, the BMP strategy in the Upper Los Angeles River watershed and Rio Hondo watershed includes well over a hundred planned regional and centralized retention and infiltration BMPs that take advantage of the favorable groundwater recharge characteristics in defined areas of the watershed. Also planned are centralized treatment wetlands and bioinfiltration BMPs in parks and open spaces with favorable subsurface soils that promote higher infiltration rates. The BMP strategy also includes distributed smaller BMPs located throughout the urbanized areas of the watershed as retrofits in existing developments and streets. LFDs to comply with dry-weather bacteria TMDLs will also be included.

5. **<u>Dominguez Channel Watersheds (Figure 3.8-6)</u>** (Dominguez Channel EWMP and Beach Cities EWMP– This watershed includes the Dominquez Channel EWMP and a portion of the Beach Cities EWMP that drains to Dominquez Channel. This watershed is differentiated by a larger area of industrial land use. Because of the high density of development and industrial land uses, large regional and centralized infiltration-type BMPs will be limited. The structural BMP strategy will be more LFDs, both large (centralized) and small (distributed), located at MS4 outfalls near the channelized Dominguez Chanel. The other BMP strategy is the use of smaller distributed BMPs that include the low-impact development (LID) type of BMPs, such as green streets and biofiltration BMPs. These distributed BMPs will be retrofit type BMPs that treat runoff from already developed properties and are located in street rights-of-way, parking lots, and limited open areas on public and private parcels. Distributed flow-through treatment BMPs will also be the other predominant BMP that will be retrofitted to the existing MS4 systems.

Dominquez Channel

6. **Upper Santa Clara River Watershed (Figure 3.8-7) –** The Santa Clara River watershed is distinctive in that it is predominantly open space—nearly 90 percent of the watershed is open space with approximately 88 percent being undeveloped. The watershed contains one of the last remaining natural rivers in Southern California. In years of significant rainfall, ephemeral springs and year-round flows exist in some tributaries and natural upstream areas. Flows in Santa Clara River reaches that pass through the EWMP area are predominantly stormwater runoff during wet-weather months and water reclamation plant effluent discharges in the drier months.

Upper Santa Clara River

Priority pollutants in this watershed are bacteria, nutrients, and chloride. In the source assessments for the nutrients TMDL and the chloride TMDL for the Santa Clara River, the storm drain system is not considered the primary source of these pollutants. Lake Elizabeth is also subject to a trash TMDL. The EWMP will evaluate potential MS4 nutrients and chlorides contributions and serve as the implementation plan for the bacteria TMDL. BMP strategies for this watershed are likely to include a focus more on regional and centralized detention and infiltration BMPs and less on filtration-type BMPs, which are not as effective at addressing bacteria.

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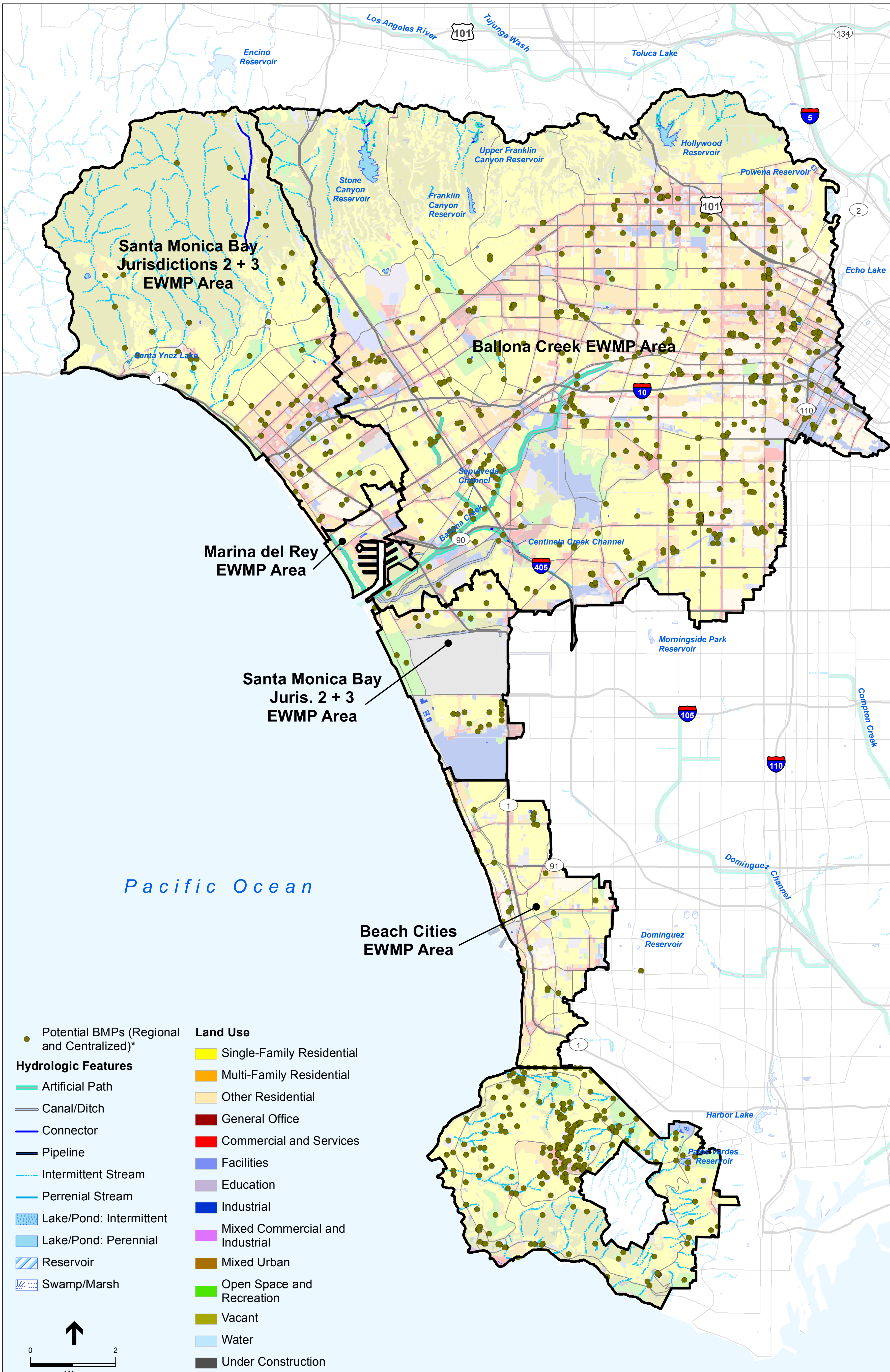


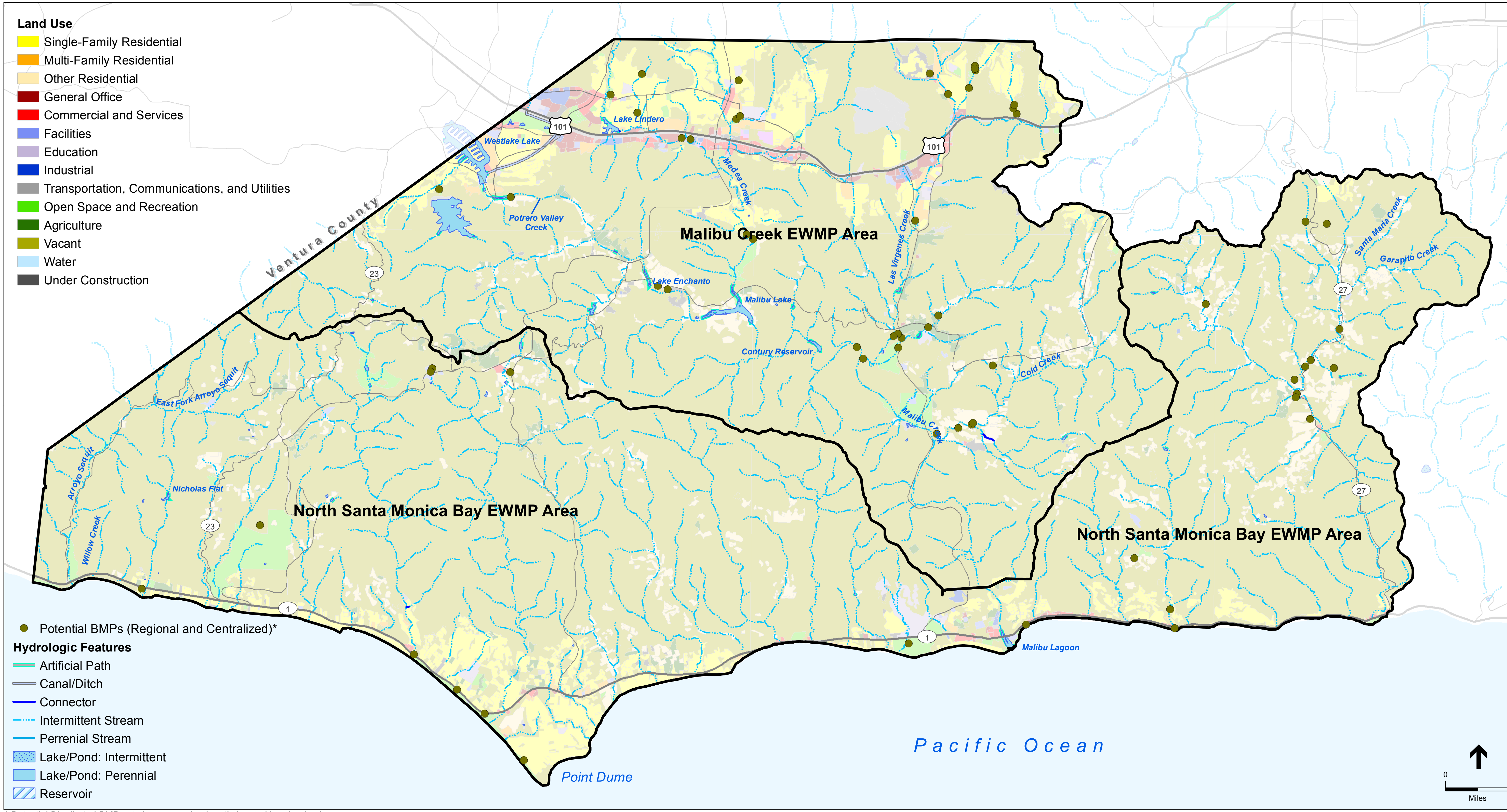
** Potential Distributed BMP not shown - predominantly located in urbanized areas*

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

LADPW EWMP PEIR . 140474

Figure 3.8-2

South Santa Monica Watershed Area – Hydrologic Features and Potential BMP Locations



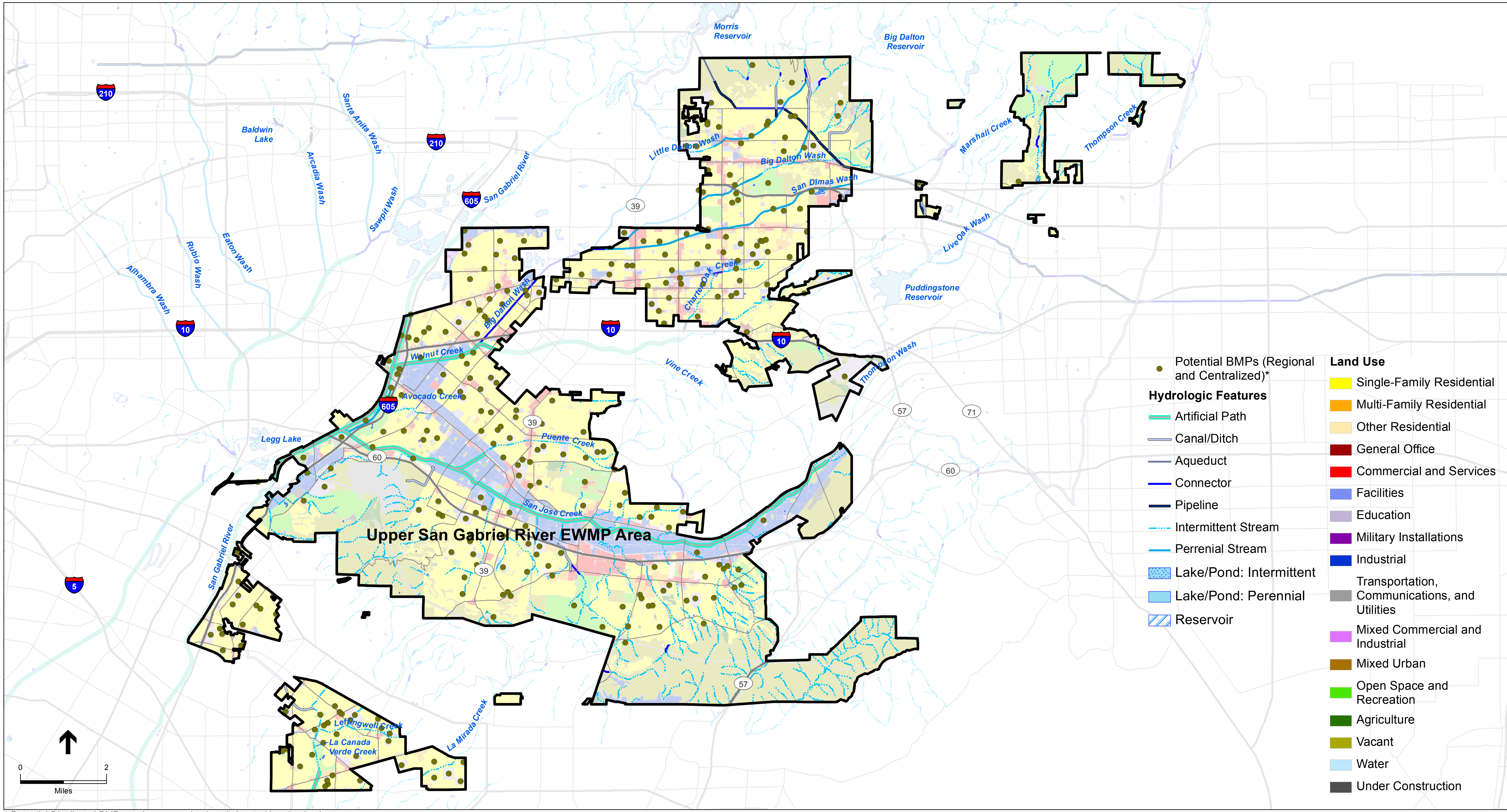
* Potential Distributed BMP not shown - predominantly located in urbanized areas

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

LADPW EWMP PEIR . 140474

Figure 3.8-3

Northern Coastal Watershed Area – Hydrologic Features and Potential BMP Locations



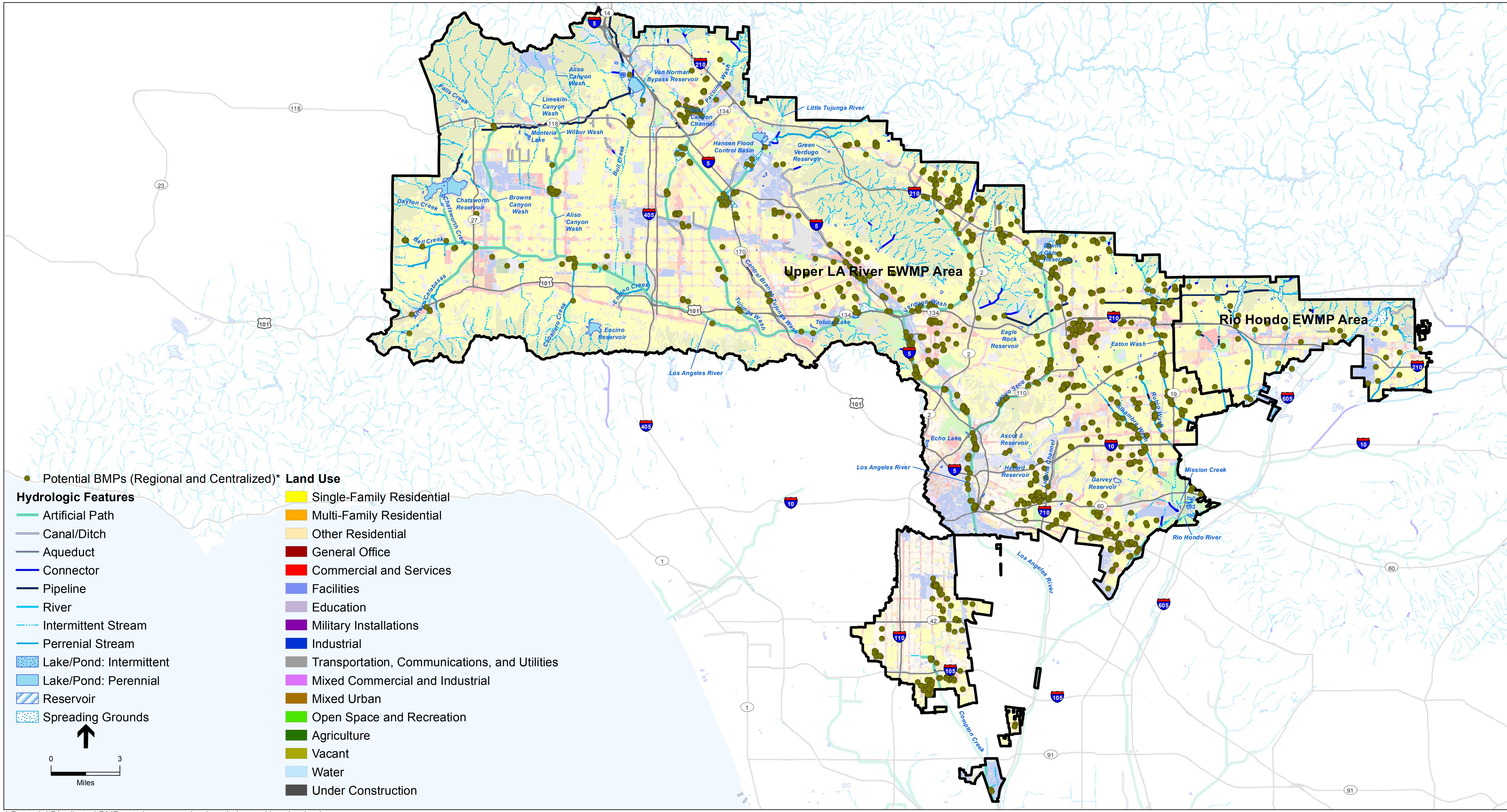
** Potential Distributed BMP not shown - predominantly located in urbanized areas*

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

LADPW EWMP PEIR . 140474

Figure 3.8-4

Upper San Gabriel Watershed Area – Hydrologic Features and Potential BMP Locations



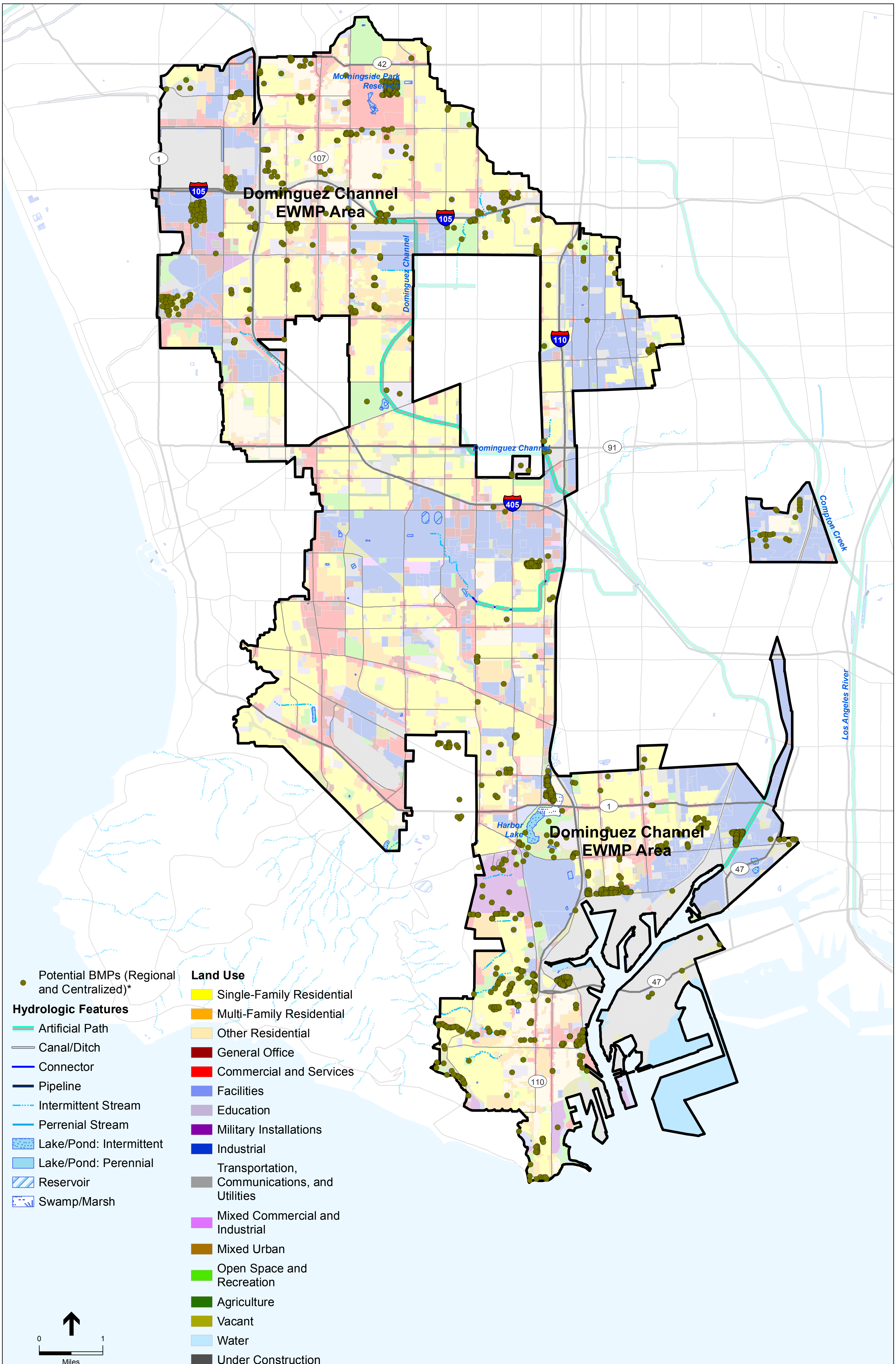
* Potential Distributed BMP not shown - predominantly located in urbanized areas

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

LADPW EWMP PEIR . 140474

Figure 3.8-5

Upper Los Angeles and Rio Hondo/San Gabriel Watershed Area – Hydrologic Features and Potential BMP

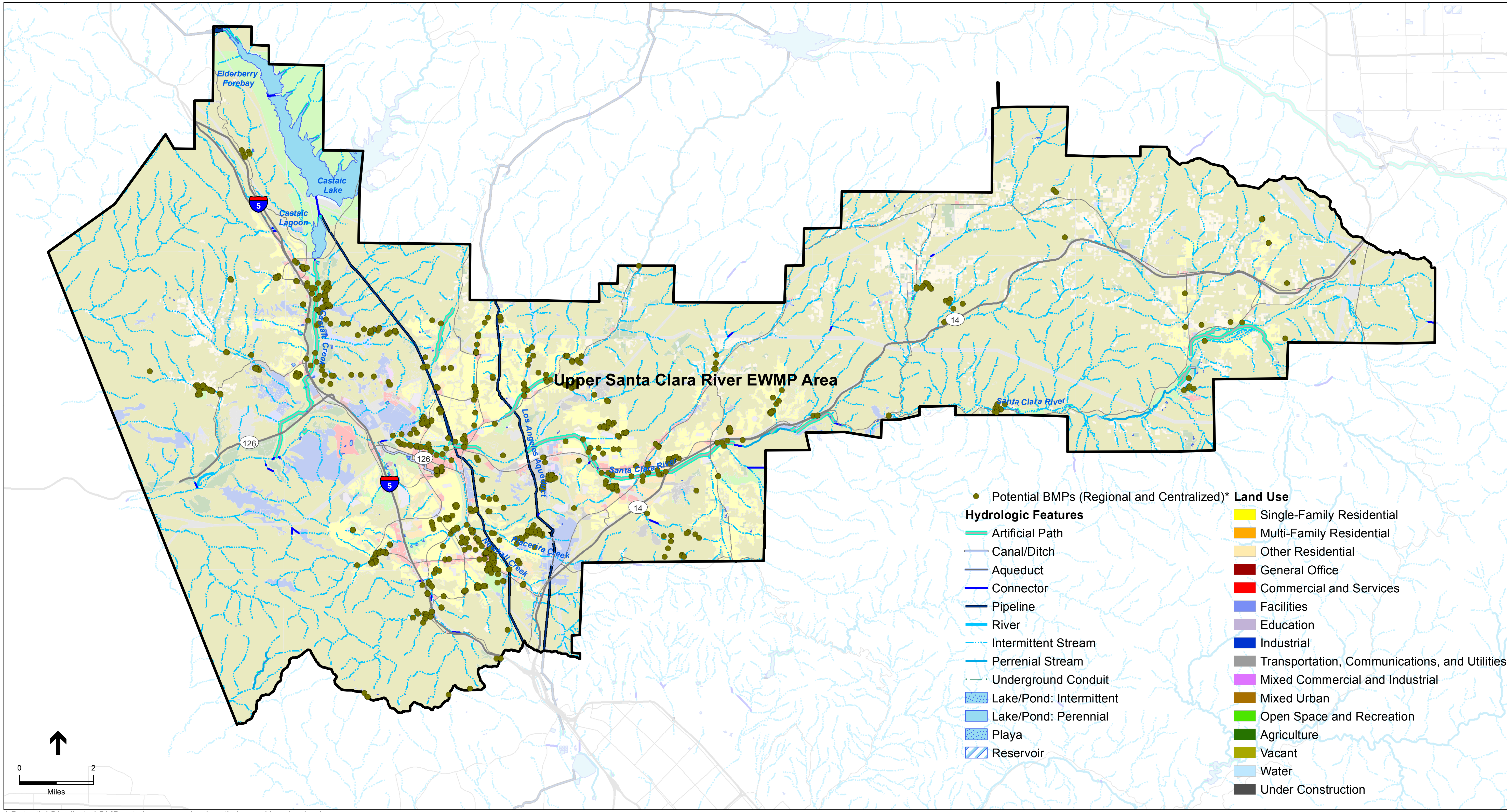


* Potential Distributed BMP not shown - predominantly located in urbanized areas

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

LADPW EWMP PEIR . 140474

Figure 3.8-6
Dominquez Channel Watershed Area – Hydrologic Features and Potential BMP Locations



** Potential Distributed BMP not shown - predominantly located in urbanized areas*

SOURCE: NHD 2014 (hydro data); County of LA 2005 (land use)

Figure 3.8-7
Upper Santa Clara Watershed Area – Hydrologic Features and Potential BMP Locations

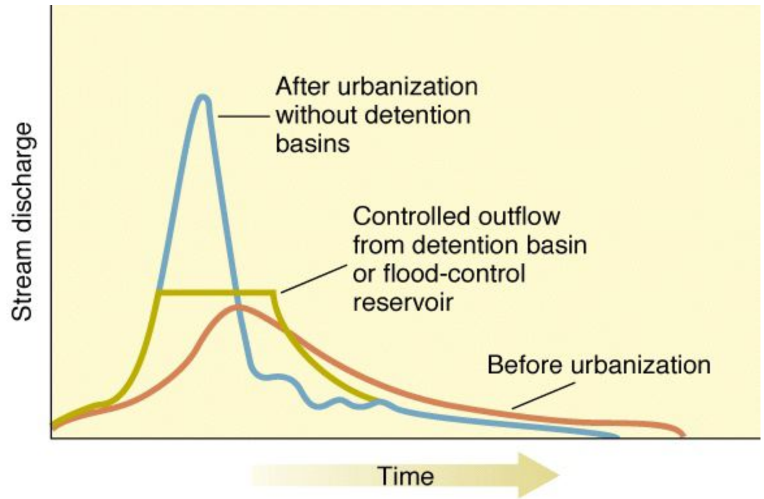
Effects of Urbanization on Streamflows

Prior to urbanization in the mid to late 1800s, surface water hydrology within the Los Angeles Basin was dominated by natural processes of watershed runoff and recharge. During the winter rainy season, runoff from the watershed would feed stream flows and recharge groundwater aquifers in the lower alluvial portions of the basin. As the intensity, frequency, and duration of winter rains decreased, stream flows would recede in response to decreased watershed runoff. In many locations, especially smaller streams, portions of streambeds would seasonally go dry (ephemeral), with surface flows only reestablished by the return of winter rains. In other streams, near-surface groundwater would maintain base flows throughout the summer, supporting wetland and floodplain habitats. During the summer, coastal streams would typically form freshwater-brackish lagoons at creek mouths behind sand berms built by summer wave action; these lagoons also supported seasonal aquatic habitats.

Pre-Development Hydrology is characterized by dry-weather flows fed by groundwater seepage fed by recharge during the rainy season. Some creeks and rivers are ephemeral and dry up in the dry season.

Most of the historic hydrologic processes have been fundamentally changed throughout the Los Angeles Basin due to urbanization. The replacement of native soils with largely impermeable surfaces such as concrete and asphalt has dramatically altered storm hydrographs (graph showing the flow rate in a stream or channel over the storm event) as shown in Figure 3.8-8, increasing runoff rates and flood volumes that have to be safely routed away from people, homes, businesses, and infrastructure. Floodplain and wetland habitats that formerly provided water quality treatment and groundwater recharge functions have been largely eliminated from the landscape, accelerating the transport of flows from higher to lower areas of the watersheds.

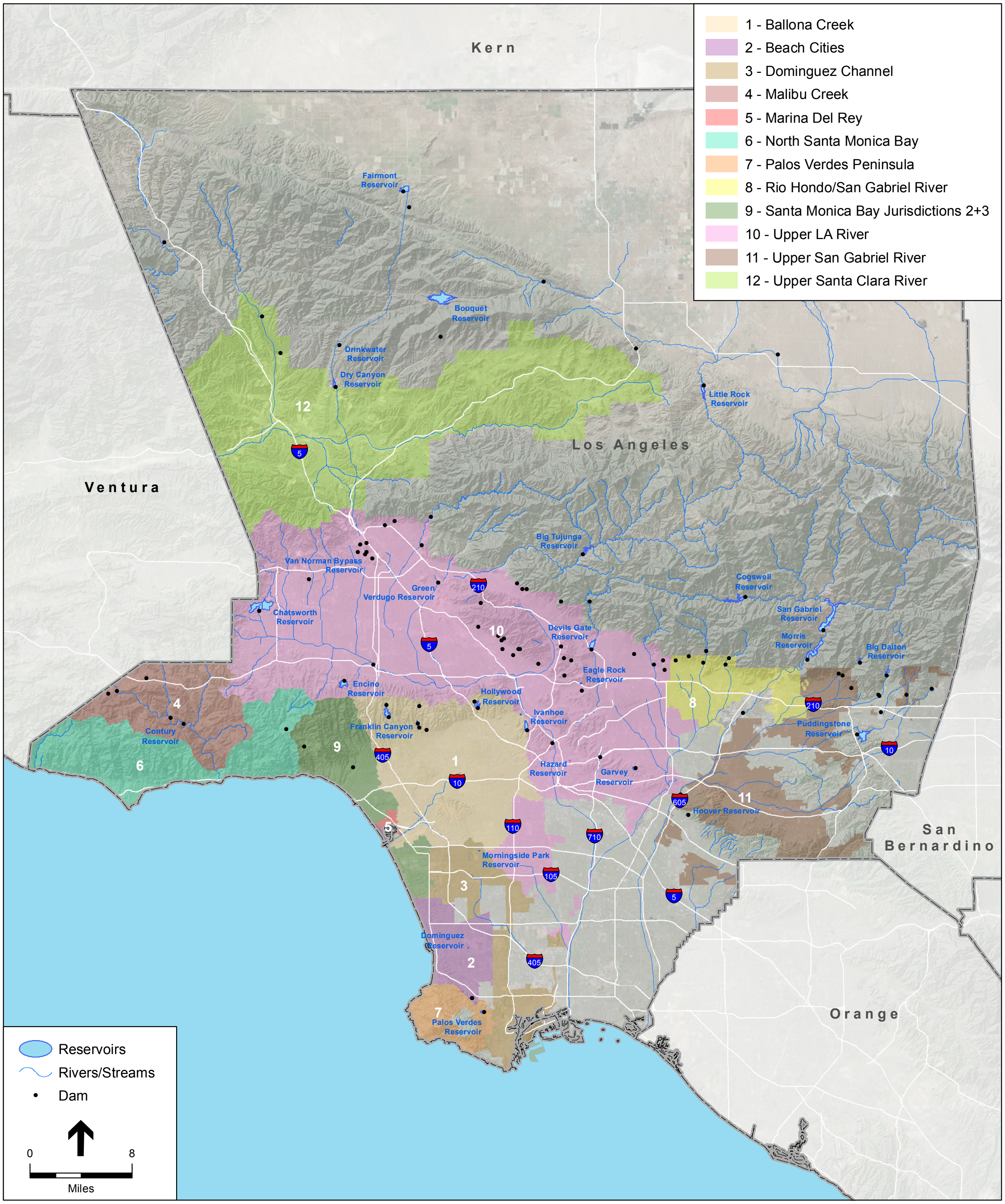
Figure 3.8-8 presents a comparison of the predevelopment and development conditions and impacts to hydrology. The effect that is shown in Figure 3.8-8 to the hydrograph from urbanization is called hydromodification. Hydromodification reduces base-flow (groundwater flow into streams) and increases peak discharge rates into streams and rivers. Figure 3.8-8 also shows the effect of the hydrograph when BMPs such as retention basin are implemented that capture urbanized storm flows and release these flows under reduced flows to return the hydrograph close to predevelopment conditions.



LA County PEIR EWMP . 140474
Figure 3.8-8
Effect of Urbanization on an Example Stream Hydrograph and Hydrograph after Implementation of Retention-Type BMP

In addition, urbanization can increase dry-weather flows in local streams that were historically ephemeral as a result of irrigation runoff and wastewater treatment plant discharges. Naturally occurring dry-weather flows in the San Gabriel River and Los Angeles River are also influenced by the management of upstream dams and reservoirs that impound flows from winter storm events and then distribute these flows to recharge basins and to treatment facilities as part of the water supply system. These flows are managed through periodic dam releases and downstream intake systems. **Figure 3.8-9** provides the locations of dams and reservoirs in the Los Angeles region.

Urban dry-weather flows from causes such as over-irrigation result in dry-weather flows in creeks and streams that historically are ephemeral.



SOURCE: ESRI; Los Angeles County GIS

LA County PEIR EWMP . 140474

Figure 3.8-9
System of Dams and Reservoirs in LA Basin

In the late 1990s, some Permittees along the Santa Monica Bay coast began to implement LFDs, which divert dry season flows from storm drains into the sanitary sewer system for treatment and disposal or reuse. Over 20 LFDs are currently in use within Los Angeles County; though most are along the SMB shorelineThe location of existing low flow diversions along the Santa Monica Bay coastline are shown on Figure 3.8-10. . Collectively, these LFDs divert a large volume of polluted urban runoff during each dry season, and they have proven to be one of the most effective tools for improving coastal water quality (LA Stormwater, 2014). The EWMPs include a suite of new LFDs and improvements to existing LFDs that will further increase the volume of dry-weather (and, in some cases, year-round) flows diverted for treatment. The installation/upgrades of these LFDs could potentially increase the amount of water available for recycling, reuse, and groundwater recharge.

Surface Water Quality

Surface water quality in Los Angeles is largely influenced by the intensive urban land uses of the region. Key sources of surface water contamination include landscape irrigation runoff conveying sediment, nutrients, pesticides, metals, oil and grease, and pathogens to receiving waters. Other dry-weather runoff from industrial activities can add organic compounds and petroleum hydrocarbons. The State Water Resources Control Board (SWRCB) has identified stream segments in each of the EWMP Areas that are considered impaired under the Clean Water Act (CWA) in the State Section 303d list. **Table 3.8-1** lists the major streams on the Section 303d list within the EWMP areas. A water body is placed on the State §303d list when the receiving water does not meet applicable water quality standards listed in the Basin Plan and determined not to be supporting the beneficial uses associated with the applicable water quality standard. Once placed on the State §303d list, the water body or segment is then subject to the development of a TMDL. Appendix F provides a list of the current TMDLs and the references to existing TMDL Implementation Plans.

TABLE 3.8-1
MAJOR IMPAIRED WATER BODIES IN THE STUDY AREA

Water Body/Reach Name	Pollutant/Stressor	Potential Source
Ballona Creek	Cadmium, Coliform Bacteria, Copper (dissolved), Cyanide, Lead, Selenium, Toxicity, Trash, Viruses (enteric), and Zinc	Unspecified or unknown point and nonpoint sources.
Dominguez Channel (lined portion above Vermont Avenue)	Ammonia, Copper, Diazinon, Indicator Bacteria, Lead, Toxicity, and Zinc	Unspecified or unknown point and nonpoint sources.
Dominguez Channel (unlined portion below Vermont Avenue)	Ammonia, Benthic Community Effects, Benzo(a)pyrene (3,4-Benzopyrene -7-d), Benzo[a]anthracene, Chlordane (tissue), Chrysene (C1-C4),Coliform Bacteria, DDT (tissue & sediment), Dieldrin (tissue), Lead (tissue), PCBs (Polychlorinated biphenyls), Phenanthrene, Pyrene, Sediment Toxicity, Zinc (sediment)	Unspecified or unknown point and nonpoint sources.
Los Angeles River (Reaches 1-6)	Ammonia, Cadmium, Coliform Bacteria, Copper (dissolved), Cyanide, Diazinon, Lead, Nutrients (algae), Oil, Trash, Zinc (dissolved), pH, and Selenium.	Urban Runoff, Unspecified or unknown point and nonpoint sources.

Water Body/Reach Name	Pollutant/Stressor	Potential Source
Malibu Creek	Benthic-Macroinvertabrate Bioassessments, Coliform Bacteria, Fish Barriers, Invasive Species, Nutrients (algae),Scum/Foam-unnatural, Sedimentation/Siltation, Selenium, Sulfates, Trash.	Urban Runoff, Unspecified or unknown point and nonpoint sources, Hydromodification, Waste Storage And Disposal, Recreation Areas And Activities, Groundwater Related, Atmospheric Deposition, Municipal Wastewater, and Agriculture
Rio Hondo (Reaches 1 and 2)	Coliform Bacteria, Copper, Lead, Toxicity, Trash, Zinc, pH, Cyanide	Urban Runoff, Unspecified or unknown point and nonpoint sources.
San Gabriel River (Reaches 1-3 and East Fork)	Coliform Bacteria, pH, Cyanide, Lead, Indicator Bacteria, Trash	Urban Runoff, Unspecified or unknown point and nonpoint sources
Santa Clara River (Reaches 1, 3, 5, 6, 7, and 11)	Toxicity, Ammonia, Chloride, Total Dissolved Solids (TDS), Coliform Bacteria, Iron, Chlorpyrifos, Copper, Diazinon, Boron, Specific Conductance, Sulfates.	

SOURCE: RWQCB, 2014. Available online at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

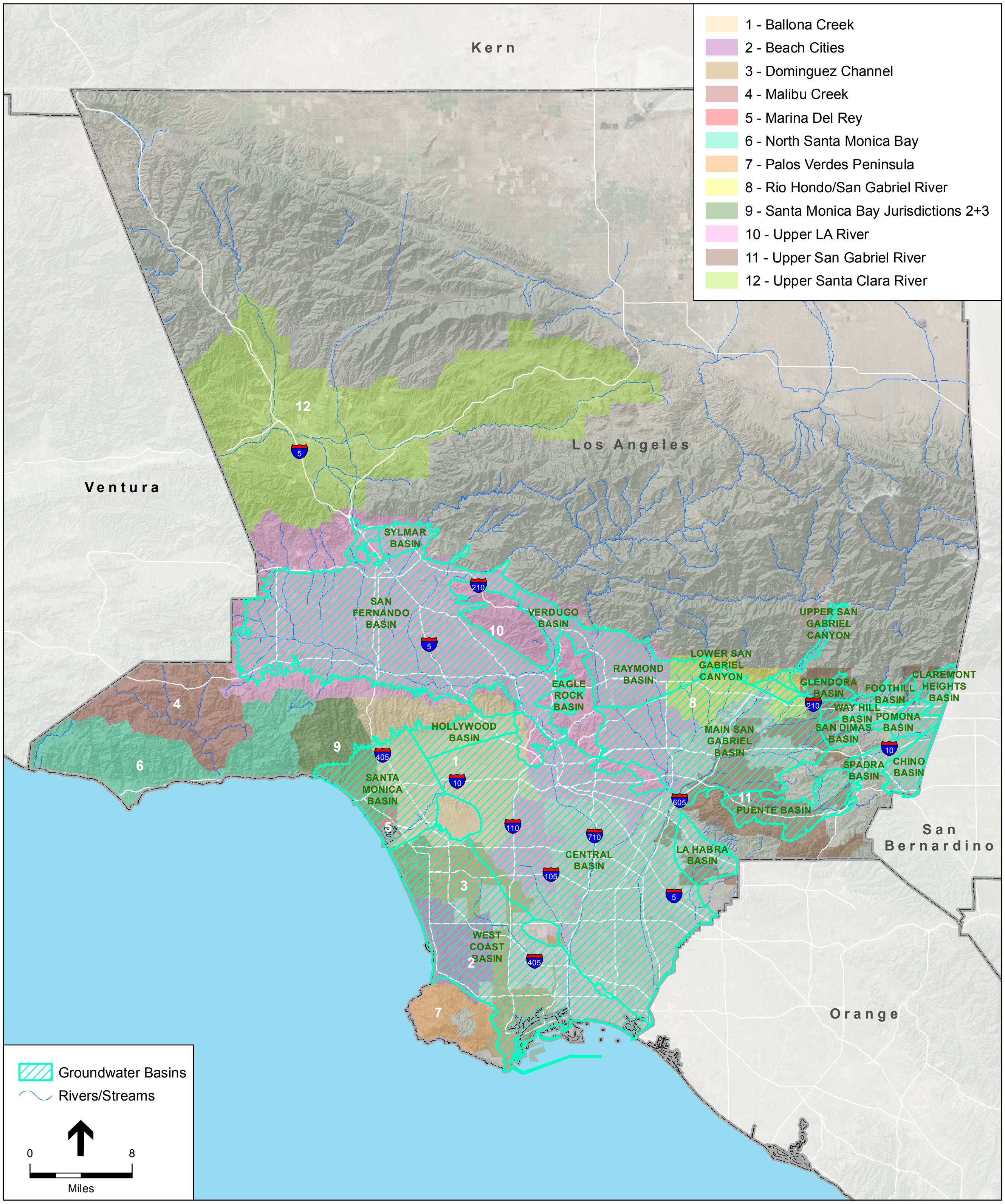
Existing Stormwater Recharge

In Southern California's arid climate, stormwater is increasingly viewed as a critical component of the region's water supply. The nexus between stormwater and groundwater has been recognized since the early 20th century, when groundwater recharge facilities began to be constructed along the San Gabriel River and other basins (see Groundwater, below). According to the Metropolitan Water District, approximately 55 percent of water supplies in Southern California are imported; 45 percent are supplied by local groundwater basins that are recharged naturally from rainfall and through constructed recharge facilities (MWD, 2010). As described further in this section, stormwater recharge facilities currently augment local groundwater supplies in the region by an estimated 477,000 acre-feet per year (MWD, 2014). One of the primary goals of the EWMP program is to increase the amount of stormwater that is recharged into groundwater, particularly in portions of the Central Basin that experience a high degree of hydraulic connectivity between surface water and groundwater. Infiltration BMPs proposed within the EWMPs are expected to increase the rates and amounts of groundwater recharge—the degree to which these increase is dependent upon project-specific attributes such as size, location, and the size of the contributing watershed.

Groundwater

Groundwater Basins

Los Angeles County is located in the South Coast Hydrologic Region (HR), as described by the Department of Water Resources Groundwater Bulletin 118 (2003). The South Coast HR is divided into numerous smaller groundwater basins and subbasins; the two largest and most critical among them are the Central Basin and the West Coast Basin. **Figure 3.8-10** displays the boundaries of these basins.



SOURCE: ESRI; Los Angeles County GIS

LA County PEIR EWMP . 140474

Figure 3.8-10
Groundwater Basins within the EWMP Areas

The 140-square-mile West Coast Basin underlies much of the Beach Cities, Dominguez Channel, and Marina del Rey EWMP Areas. The 270-square-mile Central Basin underlies portions of the Los Angeles River, Upper San Gabriel, and SGR/Rio Hondo EWMP areas. The Central and West Coast Basins are characterized by aquifers that are generally confined by relatively impermeable clay layers over most of the area (DWR, 1961), with the exception of the Montebello and Los Angeles Forebays in the Central Basin.

Groundwater generally flows from east to west across the Main San Gabriel Basin, then southward into the Central Basin through the Montebello Forebay. Within all groundwater basins, groundwater flow directions are generally controlled by engineered recharge operations and groundwater pumping from the hundreds of wells distributed across the area (Shelton et al., 2001; Dawson et al., 2003). Stormwater recharge facilities currently augment local groundwater supplies in the region by an estimated 477,000 acre-feet per year (MWD, 2014). Due to the pumping depressions that exist in the Central and West Coast Basins, very little groundwater discharges or leaves the basins as subsurface outflow.

Recharge to the Central Basin occurs primarily by engineered recharge of stormwater, imported water, and reclaimed water along the upper reaches of the San Gabriel River and the Rio Hondo via the San Gabriel River Water Conservation System. This system is a series of dams, spreading grounds and instream recharge systems that facilitate groundwater recharge into the Main San Gabriel Basin and Montebello Forebay of the Central Basin. The system is comprised of four dams (Cogswell, San Gabriel, Morris, and Santa Fe) and three spreading grounds (San Gabriel Canyon, Sante Fe, and San Gabriel) on the San Gabriel River, as well as inflatable dams meant to pond water along the river's unlined stretch of the river. The system also includes one dam (Whittier Narrows) – and one spreading ground (Rio Hondo) along the Rio Hondo. Collectively, the Rio Hondo and San Gabriel River spreading grounds are referred to as the Montebello Forebay Spreading Grounds, or MFSG. Recycled water has been also delivered for recharge in the Montebello Forebay since 1962. Finally, the Central Basin includes one seawater intrusion barrier, the Alamitos Gap Seawater Intrusion Barrier (AGB), fed by treated imported water along with advanced water treatment recycled water.

Recharge to the West Coast Basin occurs primarily by injection of imported water and reclaimed water into wells of the seawater intrusion barrier and by underflow from the Central Basin. The Dominguez Channel Spreading Grounds (DGSG) are located along the Los Angeles River near the boundary between the West Coast and Central Basins. The sources of water for the spreading grounds are controlled flows from the Los Angeles River low-flow channel and uncontrolled flows from storm drains. The West Coast Basin includes two seawater intrusion barriers, the West Coast Basin Seawater Intrusion Barrier (WCBB) and Dominguez Gap Seawater Intrusion Barrier, also fed by treated imported water and advanced water treatment recycled water.

The EWMP areas overlie various groundwater basins as summarized in **Table 3.8-2**, most of which are adjudicated and managed by court-stipulated Watermasters. The Watermasters monitor groundwater production and participate in groundwater remediation programs.

TABLE 3.8-2
GROUNDWATER BASINS WITHIN THE EWMP AREAS

EWMP	Groundwater Basin	Adjudicated?	Watermaster
Ballona Creek	Santa Monica Basin Hollywood Basin Central Basin	No No Yes	None None CB
Beach Cities	West Coast Basin	Yes	WCB
Dominguez Channel	West Coast Basin	Yes	WCB
Malibu Creek	None	No	None
Marina Del Rey	Santa Monica Basin	No	None
North Santa Monica Bay	None	No	None
Palos Verdes Peninsula	None	No	None
San Gabriel and Rio Hondo	Main San Gabriel Basin	Yes	MSGB
Santa Monica Bay	Santa Monica Basin West Coast Basin	No Yes	None WCB
Upper Los Angeles River	San Fernando Basin Main San Gabriel Basin Central Basin	Yes Yes Yes	ULARA MSGB CB
Upper San Gabriel	Upper San Gabriel	Yes	MSGB
Upper Santa Clara River	East Subbasin	No	None

WCB – West Coast Basin Watermaster
CB – Central Basin Watermaster
MSGB – Main San Gabriel Basin Watermaster
ULARA – Upper Los Angeles River Area Watermaster

SOURCE: DWR, Bulletin 118

Groundwater Quality

In general, groundwater in the main producing aquifers of the West Coast and Central basins is of good quality. Localized areas of marginal to poor quality water exist, primarily at the basin margins where seawater intrusion occurred in the past and also in mostly shallow groundwater near environmental release sites. Groundwater has also been impacted by industrial activities that have introduced highly mobile man-made organic compounds such as solvents and fuel additives. These contaminated groundwater plumes are well documented. Areas of these contaminant plumes are designated to restrict recharge activities that may create an increased driver for contaminant migration.

Between the 1900s and 1950s, groundwater was an important factor in urbanization of the West Coast and Central basins. Excessive overpumping in the basins caused severe overdraft (i.e., lowered groundwater levels) and created a hydraulic gradient that resulted in seawater intrusion, which contaminated the coastal groundwater aquifers. To address this problem and halt the intrusion, three seawater intrusion barriers were constructed (discussed previously). While the water injection activities at the barriers were successful in halting further seawater intrusion, these efforts could not address the seawater that had already intruded into the Central and West Coast Basins before the barriers were constructed. These large plumes of saline water, referred to as “saline plumes,” are trapped inland of the injection wells, thereby degrading significant volumes of groundwater with high concentrations of chloride and total dissolved solids (TDS) and decreasing the ability of affected aquifers to provide groundwater storage.

Groundwater quality in the Central and West Coast Basins also reflects current and historical land uses. As a highly urban area, commercial and industrial activities have resulted in contamination due to leaking aboveground and underground storage tanks, leaking sewer and oil pipelines, spills, and illegal discharges. Many groundwater contamination plumes consist of priority contaminants such as petroleum fuels and additives (e.g., methyl tert-butyl ether), solvents (e.g., trichloroethylene and perchloroethylene), herbicides (e.g., atrazine, simazine, prometon), and other hazardous/toxic substances (e.g., arsenic, perchlorate). Groundwater contamination within the central, West Coast, and adjacent basins is discussed in depth in the California Groundwater Ambient Monitoring and Assessment's 2012 summary report (USGS and SWRCB, 2012). In general, contaminated plumes are typically found in shallow groundwater. However, as the aquifers and confining layers in these alluvial basins are typically interfingered,[1] the quality of groundwater in the deeper production aquifers is threatened by the migration of pollutants from the upper aquifers.

3.8.2 Regulatory Setting

Federal

Clean Water Act

The Federal Water Pollution Control Act (33 U.S.C. 1251 et. sec.) as amended by the Federal Water Pollution Control Act Amendments of 1972, also known as the CWA, states that the discharge of pollutants to waters of the United States from any point source is unlawful, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Amendments to the CWA added a section that established a framework for regulating municipal and industrial (M&I) stormwater discharges under the NPDES program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations, under the 1987 CWA Amendments, that establish application requirements for stormwater permits.

Clean Water Act Section 402

CWA Section 402 regulates discharges to surface waters of the United States through the NPDES program. In California, the USEPA authorizes the SWRCB to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCBs). In September 2004, the RWQCB adopted Time Schedule Order No. R8-2004-0067, which requires the Sanitation District to achieve full secondary treatment by December 31, 2012. The Sanitation District has since carried out improvement projects of existing facilities and constructed new facilities to achieve secondary treatment standards by the year 2012 (RWQCB, 2004).

Stormwater discharges are also regulated under CWA Section 402.Construction activities disturbing one acre of land or greater must be covered under the SWRCB General Construction Activity Stormwater Permit. The permit requires preparation of a Stormwater Pollution

1 Interfinger means to grade or pass from one material (typically fine-grained) into another (typically coarse-grained) through a series of interpenetrating wedge-shaped layers. This can result in hydraulic connection between fine and coarse grounded layers.

Prevention Plan (SWPPP) for construction activities. A SWPPP prepared in compliance with the General Permit describes the site, erosion and sediment controls, runoff water quality monitoring, means of waste disposal, implementation of approved local plans, control of post-construction sediment and erosion control measures and maintenance responsibilities, and non-stormwater management controls. Dischargers are also required to inspect construction sites before and after storms to identify stormwater discharge from construction activity, and to identify and implement controls where necessary.

Clean Water Act Section 303(d)

Section 303(d) of the CWA requires that each state identify water bodies or segments of water bodies that are "impaired" (i.e., do not meet one or more of the water quality standards established by the state). These waters are identified in the Section 303(d) list as waters that are polluted and need further attention to support their beneficial uses. Once the water body or segment is listed, the state is required to establish TMDL for the pollutant. A TMDL is the maximum amount of a pollutant that a water body can receive and still meet the water quality standards. Typically, TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. On October 11, 2011, the USEPA approved a revised list of water quality limited segments (herein referred to as the 303(d) list) prepared by the RWQCB for California's 2008 through 2010. Table 3.8-1 summarizes the main impaired water bodies within the study area that are included on the RWQCB 2008 CWA Section 303(d) list that was revised on July 7, 2009.

Clean Water Act Section 401

Section 401 of the federal CWA requires that any activity, including the crossing of rivers or streams during road, pipeline, or transmission line construction, that might result in discharges of dredged or fill material into a state water body, be certified by the RWQCB. This certification ensures that the proposed activity does not violate state or federal water quality standards.

Clean Water Act Section 404

Wetlands are generally considered to be areas that are periodically or permanently inundated by surface water or groundwater, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their high inherent value to fish and wildlife, use as storage areas for storm and floodwaters, and water recharge, filtration, and purification functions. Technical standards for delineating wetlands have been developed by the ACOE which generally defines wetlands through consideration of three criteria: hydrology, soils, and vegetation. Under Section 404 of the CWA, the ACOE is responsible for regulating the discharge of dredged or fill material into waters of the United States. The term "waters of the United States" includes wetlands and non-wetland bodies of water that meet specific criteria as defined in the Code of Federal Regulations.

State

Porter-Cologne Water Quality Act

The Porter-Cologne Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California and defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The SWRCB administers water rights, water pollution control, and water quality functions throughout the State, while the RWQCB conducts planning, permitting, and enforcement activities. The Porter-Cologne Act requires the RWQCB to establish water quality objectives, while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Beneficial uses, together with the corresponding water quality objectives, are defined as standards, per Federal regulations. Therefore, the regional plans form the regulatory standards for meeting State and federal requirements for water quality control. Changes in water quality are only allowed if the change is consistent with the maximum beneficial use designated by the State, does not unreasonably affect the present or anticipated beneficial uses, and does not result in water quality less than that prescribed in the water quality control plans.

California Ocean Plan

The SWRCB regulates water quality in the Pacific Ocean through regulatory standards and objectives outlined in the *Water Quality Control Plan, Ocean Waters of California* (commonly referred to the Ocean Plan) (SWRCB, 2012). The Ocean Plan identifies beneficial uses of ocean waters and provides water quality objectives that are protective of these uses. The plan provides objectives for bacteriological, physical, chemical, biological, and radioactive characteristics, as well as general requirements for the management of waste discharges to the Pacific Ocean. The USEPA relies upon the water quality objectives of the Ocean Plan for the purposes of regulating discharges from point sources that discharge into the Pacific (e.g. WWTP ocean outfalls) as well as the water quality of streams and channels that flow into the ocean.

In 1974, the SWRCB designated 34 regions along the coast of California as Areas of Special Biological Significance (ASBS) under Resolution Number 74-28 (SWRCB, 1974a). These ASBS are “areas designated by the SWRCB as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable” (SWRCB, 2012b). A portion of the Pacific off of the North Santa Monica Bay coastline from Laguna Point to Latigo Point offshore is designated as ASBS 24.

In March 2012, the SWRCB adopted the General Exception (SWRCB, 2012b), which exempts certain listed dischargers. The conditions in the General Exception are designed to protect beneficial uses of the receiving water, yet allow continuation of essential public services, such as flood control, slope stability, erosion prevention, maintenance of the natural hydrologic relationship between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security) (SWRCB, 2012b).

The General Exception designates the LACFCD, the City of Malibu and the California Department of Transportation (Caltrans) as dischargers to ASBS 24, and the California The General Exception authorizes these dischargers to discharge into ASBS 24, provided that it:

- Complies with the NPDES MS4 Permit.

- Includes an ASBS Compliance Plan that shall be included as part of the Permittees' primary policy, planning, and implementation documents for municipal NPDES Stormwater Permit compliance.

Proposed Trash Amendments to California Ocean Plan

The SWRCB has proposed to amend the California Ocean Plan and the forthcoming Inland Surface Waters, Enclosed Bays, and Estuaries Plan to address trash in waterways, including waterways regulated by the Los Angeles County MS4 (SWRCB, 2014). The proposed Trash Amendments would be incorporated into the MS4 Permit and:

- Establish a narrative water quality objective for trash.
- Establish a prohibition of discharge of trash.
- Provide implementation requirements for permitted stormwater dischargers and other discharges.
- Set a time schedule for compliance.
- Provide a framework for monitoring and reporting requirements.

A central element of the proposed Trash Amendments is a compliance approach that utilizes land use to target high trash generating areas (priority land uses), such as high-density residential, industrial, and commercial, mixed urban, and public transportation land uses. Within this land use- based approach, the SWRCB proposes two alternative compliance tracks (i.e., the Permittee must choose to comply with one of the tracks). Under Track 1, a Permittee could elect to install a network of full capture systems in the storm drains located in priority land uses for MS4s and the entire facility for IGP/CGP. Under Track 2, a Permittee could use any combination of controls (structural and/or institutional), as long as they can demonstrate that the combination of controls performs as well as Track 1. The SWRCB can extend this deadline by up to three years if Permittees implement regulatory source controls, such as product bans.

National Pollutant Discharge Elimination Program

The NPDES permit program is administered in the State of California by the RWQCBs, and was first established under the authority of the CWA to control water pollution by regulating point sources that discharge pollutants into waters of the United States. If discharges from industrial, municipal, and other facilities go directly to surface waters, those project applicants must obtain permits. An individual NPDES permit is specifically tailored to a facility. A general NPDES permit covers multiple facilities within a specific activity category such as construction activities. A general permit applies with same or similar conditions to all dischargers covered under the general permit.

General Dewatering Permit

The SWRCB also has issued General Waste Discharge Requirements (WDRs) under Order No. R8-2003-0061, NPDES No. CAG 998001 (Dewatering General Permit) governing non-stormwater construction-related discharges from activities such as dewatering, water line testing, and sprinkler system testing. The discharge requirements include provisions mandating notification, testing, and reporting of dewatering and testing-related discharges. The General

WDRs authorize such construction-related discharges so long as all conditions of the permit are fulfilled.

Construction General Permit

The Construction General Permit (CGP) requires the development and implementation of an SWPPP that includes specific BMPs designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving off-site into receiving waters. The SWPPP BMPs are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the CGP. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for nonvisible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

In the project area, the CGP is implemented and enforced by the Los Angeles Regional Water Quality Control Board (LARWQCB), which administers the stormwater permitting program. Dischargers are required to electronically submit a Notice of Intent (NOI) and permit registration documents (PRDs) to obtain coverage under this CGP. Dischargers are responsible for notifying the LARWQCB of violations or incidents of noncompliance, as well as for submitting annual reports identifying deficiencies of the BMPs and how the deficiencies were corrected.

Municipal Stormwater Permitting (MS4)

The State's Municipal Stormwater Permitting Program regulates stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s). MS4 Permits were issued in two phases. Phase I was initiated in 1990, under which the RWQCBs adopted NPDES stormwater permits for medium (serving between 100,000 and 250,000 people) and large (serving more than 250,000 people) municipalities. As part of the Phase II, the SWRCB adopted a General Permit for small MS4s (serving less than 100,000 people) and non-traditional small MS4s including governmental facilities such as military bases, public campuses, and hospital complexes.

The Permittees' 2012 MS4 Permit (Order No. R4-2012-0175; NPDES Permit No. CAS004001) requires Permittees to develop Enhanced Watershed Management Plans to ensure they are not causing or contributing to exceedances of water quality objectives or impairments of beneficial uses in the receiving waters of the Los Angeles region. The EWMPs are the subject of this PEIR.

Local Regulations

Los Angeles Regional Water Quality Control Plan

The preparation and adoption of water quality control plans (Basin Plans) is required by the California Water Code (Section 13240) and supported by the CWA. Section 303 of the CWA requires states to adopt water quality standards which "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses." According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per Federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the State and Federal requirements for water quality control. Beneficial uses for water bodies in the EWMP Areas are summarized in Appendix F.

County of Los Angeles Stormwater Pollution Control Requirements for Construction Activities

To comply with the Phase II General Construction Permit, the County of LA has established a set of BMPs with which all permitted construction activities on unincorporated county lands must comply. The BMPs, which are based on the state's Stormwater Best Management Practices Handbook (2003), are as follows:

- Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheetflow, swales, area drains, natural drainage courses or wind.
- Stockpiles of earth and other construction related materials must be protected from being transported from the site by the forces of wind or water.
- Fuels, oils, solvents and other toxic materials must be stored in accordance with their listing and are not to contaminate the soil and surface waters. All approved storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.
- Non-stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site.
- Excess or waste concrete may not be washed into the public way or any other drainage system. Provisions shall be made to retain concrete wastes on site until they can be disposed of as solid waste.
- Trash and construction related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.
- Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public way. Accidental depositions must be swept up immediately and may not be washed down by rain or other means.
- Any slopes with disturbed soils or denuded of vegetation must be stabilized so as to inhibit erosion by wind and water.

The Los Angeles County Department of Public Works may identify and require additional BMPs, as appropriate.

City of Los Angeles Development Construction Model Program

The City of LA's Development Construction Model Program addresses NPDES Phase II requirements on construction sites within incorporated City lands. BMPs for construction (as well as source control and treatment) are detailed in the City's Reference Guide for Stormwater Best Practices (LADPW, 2000). The BMPs are consistent with those developed by the state and county, and include erosion and sedimentation control measures, site management practices, materials and waste management, and general preventive maintenance and inspection.

Stormwater Pollution Control Requirements for Other Cities in the County of Los Angeles

Other cities within the County also have stormwater pollution control requirements and associated BMPs; their content is similar to those described in this section for the County and City of Los Angeles.

County of Los Angeles Low Impact Development Manual

The County of Los Angeles (County) prepared the 2014 Low Impact Development Standards Manual (LID Standards Manual, County of Los Angeles, 2014b) to comply with the requirements of the 2012 MS4 Permit. The LID Standards Manual provides guidance for the implementation of stormwater quality control measures in new development and redevelopment projects in unincorporated areas of the County with the intention of improving water quality and mitigating potential water quality impacts from stormwater and non-stormwater discharges.

The LID Standards Manual addresses the following objectives and goals:

- Lessen the adverse impacts of stormwater runoff from development and urban runoff on natural drainage systems, receiving waters, and other water bodies.
- Minimize pollutant loadings from impervious surfaces by requiring development projects to incorporate properly-designed, technically-appropriate BMPs and other LID strategies.
- Minimize erosion and other hydrologic impacts on natural drainage systems by requiring development projects to incorporate properly-designed, technically appropriate hydromodification control development principles and technologies.

City of Los Angeles Low Impact Development Manual

In November 2011, the City of Los Angeles adopted the Stormwater Low Impact Development Ordinance #181899 with the stated purpose of:

- Requiring the use of LID standards and practices in future developments and redevelopments to encourage the beneficial use of rainwater and urban runoff
- Reducing stormwater/urban runoff while improving water quality
- Promoting rainwater harvesting
- Reducing off-site runoff and providing increased groundwater recharge
- Reducing erosion and hydrologic impacts downstream
- Enhancing the recreational and aesthetic values in our communities

The City of Los Angeles institutionalized the use of LID techniques for development and redevelopment projects. Subsequent to the adoption of the Stormwater LID Ordinance, the City prepared the *Development Best Management Practices Handbook, Low Impact Development Manual,* dated June 2011, to describes the required BMPs (City of Los Angeles, 2011).

Low Impact Development Manuals for Other Cities in the County of Los Angeles

Some of the other cities within the County also have LID ordinances and manuals. Their content is similar to the LID manuals described in this section for the County and City of Los Angeles.

City General Plans

The numerous cities encompassed by the EWMP project area all have their own respective city General Plans, some of which may contain policies that address water quality and hydrology. As implementation of the individual structural BMP projects proceed, specific policies and objectives pertaining to water quality and hydrology from applicable city General Plans will be identified and evaluated on a project-by-project basis during subsequent California Environmental Quality Act (CEQA) environmental processes.

3.8.3 Impact Analysis

The proposed project's potential impacts were assessed using the California Environmental Quality Act (CEQA) Guidelines Appendix G Checklist. The following sections discuss the key issue areas identified in the CEQA Guidelines with respect to the project's potential hydrology and water quality impacts.

Thresholds of Significance

For the purposes of this PEIR and consistency with Appendix G of the CEQA Guidelines, applicable local plans, and agency and professional standards, the project would have a significant impact on aesthetic resources if it would:

- Violate any water quality standards or waste discharge requirements.
- Otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river or, by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

Program Impact Discussion

Water Quality Standards, Waste Discharge Requirements, and Further Degradation of Water Quality

Impact 3.8-1: The proposed project would violate water quality standards or waste discharge requirements or further degrade water quality.

Structural (Regional, Centralized, and Distributed) BMPs

Construction

Construction, demolition, and renovation activities associated with the installation of some BMPs, particularly larger centralized and regional BMPs, could lead to ground disturbance and polluted runoff. However, as described above, the NPDES CGP requires that any actions that disturb an acre or more of ground must develop an SWPPP to prevent the transport of polluted runoff. SWPPPs will most likely be necessary for the construction of regional and centralized BMPs, particularly those that are larger, multi-benefit projects such as greenway redevelopments. Projects under an acre in size, which will include most distributed BMPs, must comply with NPDES Phase II requirements and incorporate construction BMPs mandated by the jurisdiction within which the project falls. Compliance with the CGP would ensure that the construction of BMPs would have no temporary or permanent impact to water quality.

Operation

The structural BMPs are designed to reduce the transport of pollutants in stormwater, thereby helping Permittees improve water quality. The EWMP structural BMPs that have stormwater retention and infiltration as a function are designed to reverse the impacts from urbanization on the natural hydrograph and water quality. The widespread implementation of distributed BMPs with these functions in urban areas of all the EWMP groups will significantly reduce stormwater flow volumes and pollutant loading to creeks and rivers. The increased infiltration of stormwater from the widespread implementation of these projects will have the effect of increasing recharge to the groundwater, reducing peak storm flows and altering the hydrograph toward more natural conditions. By retaining stormwater flows and either infiltrating or releasing these flows closer to the natural conditions, the stream hydrographs will be less impacted by the urbanization. The increase in infiltration of stormwater from these BMPs will also raise groundwater levels and increase groundwater seepage to creeks and rivers following storm events. Runoff reduction measures and LFDs under the EWMP will significantly reduce dry-weather “nuisance” flows that have altered formerly ephemeral systems to perennial creeks and streams.

Distributed BMPs, although on a smaller parcel or site scale, would also be designed to collect and treat stormwater to reduce the loading of the smaller amounts of contaminants transported by their relatively smaller receiving areas. This would reduce contaminant loading to receiving waters compared with existing conditions while capturing contaminants in filter media. The vegetation and microbial activity in soil would work to biodegrade the typical fuels, oil, and grease in local urban runoff.

As discussed in the Project Description (Section 2.0), the identification of water quality priorities is required in Section VI.C.5.a of the MS4 permit as part of EWMP development. Appendix F provides a listing of the water quality priorities for each EWMP. As highlighted in this prioritization process, pollutants under a TMDL have higher priority and will be addressed under the timelines defined in the TMDLs. This highlights that the EWMP is a continuation of water quality improvement efforts by the Permittees under existing TMDLs through adopted TMDL Implementation Plans. BMP types that are assessed in this PEIR therefore include BMPs under various stages of implementation and planning to meet TMDL waste load allocations.

Once constructed, the structural BMPs would provide source control treatment of stormwater runoff prior to discharge to receiving waters whether on a site-specific (distributed structural BMPs), local (centralized structural BMPs), or regional (regional structural BMPs) basis. These structural BMPs would provide improved water quality through infiltration and treatment (e.g., filtration, settling, sedimentation, sorption, straining, and biological or chemical transformations) that would minimize the off-site transport of typical urban runoff pollutants. Implementation of the proposed BMPs would have no adverse impacts to surface water quality.

Mitigation Measures: None required

Significance Determination: Less than significant impact

Non-Structural (Institutional) BMPs

Non-structural BMPs policies, actions, and activities intended to prevent pollutants from entering stormwater runoff, thus eliminating the source of the pollutants. These BMPs would not involve any earthwork disturbance or construction activities, and similar to the Structural BMPs, once implemented, would aid in minimizing off-site discharge of urban runoff pollutants. As a result, they would have no adverse impact on water quality standards or waste discharge requirements.

Mitigation Measures: None required

Significance Determination: No impact

Groundwater

Impact 3.8-2: The proposed project would result in higher groundwater levels and could potentially affect groundwater quality.

Structural (Regional, Centralized, and Distributed) BMPs

Water Levels

Regional BMPs would recharge stormwater into the groundwater basin and could raise local groundwater levels following major storm events. Distributed infiltration BMPs would typically be too small to have a measureable effect on local groundwater levels. Groundwater basins in southern Los Angeles County are adjudicated and managed for beneficial uses. Increased capture of stormwater is a key element to integrated water supply planning in Southern California. The increased water supplies captured by the infiltration basins through the EWMP areas would be a beneficial impact of the projects.

In areas with shallow groundwater tables or impermeable soils, recharge could result in mounding that affects subsurface infrastructure such as building or bridge foundations. This would be a potential impact of regional BMPs that recharge large volumes of captured stormwater, but could also occur for distributed BMPs in areas with limited permeability. For example, the EWMP Areas of Malibu Creek, Northern Santa Monica Bay, and Palos Verdes are located in areas where no significant groundwater basin occurs. In addition, the West Coast Basin consists of a series of aquitards near the surface that prevent surface water percolation into the productive aquifers. Infiltration BMPs in these areas would result in shallow infiltration followed by lateral movement and seepage to nearby areas that could include creek cuts, areas of lower elevation, or basements and underground vaults. **Mitigation Measure HYDRO-1** requires Permittees to evaluate the suitability of BMP locations for groundwater recharge. Infiltration BMPs would not be suitable in areas of low permeability where subsurface structures could be adversely affected by groundwater mounding.

Groundwater Quality

Infiltration of stormwater runoff could increase contaminant loading in shallow soils and groundwater. Some contaminants found in stormwater runoff (e.g., oil, grease, metals) adsorb onto surficial soils and remain within a few feet of the surface, while other more soluble contaminants (e.g., fuels, nitrate, phosphate) may be entrained to deeper soils or migrate all the way to the groundwater. Over a long period of time, concentrations of these contaminants could increase resulting in contaminated soils and groundwater. Pre-treatment of source water in areas with the potential for heavy contaminant loading would be implemented as a required design feature for regional and centralized BMPs to assist in reducing long-term loading. In addition, non-structural source control BMPs would help reduce contaminant loading over time. The LID standards for the County of Los Angeles and the various cities participating in the EWMP provide protocols for designing regional and centralized BMPs that minimize the potential for contaminant loading. Compliance with these protocols and implementation of **Mitigation Measure HYDRO-2** which would require the implementing agencies to evaluate the need for pretreatment at each infiltration BMP, impacts to groundwater quality would be less than significant.

Proposed projects that recharge the shallow aquifers have the potential to mobilize shallow contamination and alter groundwater flow directions. Within the urbanized areas of the County, legacy groundwater contamination is prevalent resulting from overlying uses such as industrial operations and underground storage of fuels. A few major contamination areas have rendered the groundwater basins unusable for potable uses. In particular, groundwater contamination plumes exist in the southeast corner of the San Fernando Groundwater Basin, the Main San Gabriel Basin, and the East Subbasin in Santa Clarita. Each of these areas are undergoing remedial actions to improve groundwater quality.

The infiltration of large volumes of water in certain areas could modify these existing contaminant plumes. If these infiltration facilities were located over contaminated groundwater plumes, groundwater flow patterns could be modified such that contaminated groundwater migrates into areas that are not currently contaminated or pushed away from existing treatment systems. **Mitigation Measure HYDRO-3** would require that infiltration BMPs would be required to evaluate site conditions and the existence of contaminated groundwater plumes during planning stages prior to construction of infiltration galleries, trenches, and basins.

Mitigation Measures:

HYDRO-1: Prior to approving an infiltration BMP, the Permittee shall conduct an evaluation of the suitability of the BMP location. Appropriate infiltration BMP sites should avoid areas with low permeability where recharge could adversely affect neighboring subsurface infrastructure.

HYDRO-2: Prior to approving an infiltration BMP, the Permittee shall identify pretreatment technologies, type, and depth of filtration media; depth to groundwater; and other design considerations necessary to prevent contaminants from impacting groundwater quality. The design shall consider stormwater quality data within the BMP's collection area to assess the need and type of treatment and filtration controls. Local design manuals and ordinances requiring minimum separation distance to groundwater shall also be met as part of the design.

HYDRO-3: Prior to the installation of an infiltration BMP, the Permittee shall conduct a database review for contaminated groundwater sites within a quarter mile of the proposed infiltration facility. The Permittee shall identify whether any contaminated groundwater plumes are present and whether coordination with the local and state environmental protection overseeing agency and responsible party is warranted prior to final design of infiltration facility.

Significance Determination: Less than significant with mitigation (The application of these mitigation measures to specific BMP types and categories are identified in Table 3.8-3.)

Non-Structural (Institutional) BMPs

Non-structural BMPs policies, actions, and activities are primarily intended to prevent pollutants from entering stormwater runoff, thus eliminating the source of the pollutants. However, within Planning and Land Use Programs, there would be encouragement for implementation of LID strategies which not only improve water quality but also include on-site infiltration which can increase groundwater levels. Most non-structural institutional BMPs are implemented to meet

Minimum Control Measure (MCM) requirements in the MS4 permit. As discussed above, increased infiltration from local LID drainage features are not as likely to result in substantive increases in groundwater levels and therefore would have a less than significant impact on groundwater supplies.

Mitigation Measures: None required

Significance Determination: Less than significant

Drainage Pattern Alteration Resulting in Erosion or Siltation

Impact 3.8-3: The proposed project could substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site.

Structural (Regional, Centralized, and Distributed) BMPs

The proposed structural BMPs would be designed to minimize off-site discharge of urban runoff pollutants including siltation and sedimentation. Many of the structural BMPs would include on-site infiltration of stormwater runoff which would also be effective in minimizing erosion or transport of sedimentation into receiving waters. Through increased infiltration prior to discharge into receiving waters, flows within existing streams or rivers would receive reduced stormwater flow volumes thereby decreasing flow energies. As a result, the potential for erosion or siltation within existing streams or rivers would be reduced and the potential impact less than significant.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

Non-structural BMPs policies, actions, and activities are primarily intended to prevent pollutants from entering stormwater runoff largely through the use of drainage features that either infiltrate or detain stormwater runoff on-site. Drainage patterns would change through implementation of these non-structural institutional BMPs that are implemented to meet Minimum Control Measure (MCM) requirements in the MS4 permit. MCMs are considered a subset of institutional BMPs. These BMPs are not constructed, but within Planning and Land Use policies there would be encouragement for implementation of LID strategies which include on-site infiltration and/or detaining peak flows that would minimize off-site flows as well as the potential for erosion and off-site siltation. As discussed previously, increased infiltration from local LID drainage features minimize the potential for erosion and therefore there would be a less than significant impact related to erosion and siltation.

Mitigation Measures: None required

Significance Determination: Less than significant

Drainage Pattern Alteration Resulting in Flooding

Impact 3.8-4: The project could substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river or, by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.

Structural (Regional, Centralized, and Distributed) BMPs

The proposed structural BMPs include features that would increase stormwater retention and encourage on-site infiltration to reverse the impacts from urbanization on the natural hydrograph. The widespread implementation of distributed BMPs with these functions in urban areas of all the EWMP groups will significantly reduce stormwater flow volumes especially during peak storm flow events as indicated by the figure shown in Impact 3.8-3. Larger retention and infiltration regional and centralized BMPs will also have a beneficial effect on regional hydrology through delayed discharge to avoid the spike in peak flows currently experienced. By retaining stormwater flows and either infiltrating or releasing these flows closer to the natural hydrograph, the change in drainage patterns would result in reduced peak flows and as a result a reduced potential for flooding on- or off-site. Therefore, the potential impact would be less than significant.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

Non-structural BMPs policies, actions, and activities are primarily intended to prevent pollutants from entering stormwater runoff and include drainage features that infiltrate or detain stormwater runoff on-site. Drainage patterns would change through implementation of these non-structural institutional BMPs, however implementation of LID strategies which include on-site infiltration that would minimize off-site flows as well as the potential for erosion and off-site siltation. As discussed above, increased infiltration from local LID drainage features are minimize the potential for erosion and therefore would be a *less than significant impact*.

Mitigation Measures: None required

Significance Determination: Less than significant

Stormwater Drainage Systems

Impact 3.8-5: The proposed project could create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

Structural (Regional, Centralized, and Distributed) BMPs

The proposed structural BMPs whether regional, centralized or distributed would have an overall effect of reducing off-site stormwater flows through on-site infiltration and detention. As a result of having a net effect of reducing stormwater runoff volumes, there would be a less-than-significant effect on the capacity of existing or planned stormwater drainage systems. The structural BMPs would also provide improvements to water quality of receiving waters as that is the primary purpose of these BMPs and have proven effective in reducing potential sources of polluted runoff for a less than significant impact.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

The non-structural BMPs would similarly provide the policies, actions, and activities to encourage the use of drainage features that either infiltrate or detain stormwater runoff on-site. Drainage patterns would change through implementation of these non-structural institutional BMPs but would be designed to improve water quality and reduce stormwater flow volumes. Therefore, the potential impact to the capacity of drainage systems would be less than significant as well as the potential to provide additional sources of polluted runoff.

Mitigation Measures: None required

Significance Determination: Less than significant

Flood Hazards: Housing

Impact 3.8-6: The project could place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map.

Structural (Regional, Centralized, and Distributed) BMPs

The proposed structural BMPs would not include the construction of any housing and therefore there would be no impact related to placement of housing in a flood hazard area.

Mitigation Measures: None required

Significance Determination: No impact

Non-Structural (Institutional) BMPs

Similar to above, the non-structural BMPs would not include the construction of any housing and therefore there would be no impact related to placement of housing in a flood hazard area.

Mitigation Measures: None required

Significance Determination: No impact

Flood Hazards: Structures

Impact 3.8-7: The project could place within a 100-year flood hazard area structures that would impede or redirect flood flows.

Structural (Regional, Centralized, and Distributed) BMPs

In general, the majority of the structural BMPs would consist of either features with a very low profile in terms of having any effect on flood flows (e.g., drainage swales, infiltration trenches, galleries, ponds, planter boxes and pervious pavement) or features that are subterranean (e.g., cisterns, detention basins, dry wells). However, structural BMPs could include above ground detention basins. Above ground detention basins would be required to adhere to any local flood zone construction permitting requirements such that they would not be impede or redirect flood flows. As a result, the impact of structural BMPs would *be less than significant*.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

Non-structural BMPs would not include the construction of any structures and therefore there would be no impact related to impeding or redirecting flood flows.

Mitigation Measures: None required

Significance Determination: No impact

Flood Hazards: Levee or Dam Failure

Impact 3.8-8: The proposed project could expose structures to a significant risk of loss, including flooding as a result of the failure of a levee or dam.

Structural (Regional, Centralized, and Distributed) BMPs

The majority of the structural BMPs would consist of features with a very low profile and would be designed to aid in the conveyance of runoff and high flows. Structural BMPs could also include above ground detention basins. Above ground detention basins would not be staffed and not likely to be susceptible to substantive damage in the event of a catastrophic failure of a levee or dam based on the general characteristics of how above ground detention basins are constructed. As a result, the impact of structural BMPs would be less than significant.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

Non-structural BMPs would not include the construction of any structures and therefore there would be no impact related to failure of a levee or dam.

Mitigation Measures: None required

Significance Determination: No Impact

Tsunami, Seiche or Mudflow

Impact 3.8-9: The proposed project could place structures in areas subject to inundation by seiche, tsunami, or mudflow.

Structural (Regional, Centralized, and Distributed) BMPs

The project area includes coastal areas and areas that are adjacent to enclosed bodies of water that could be subject to seiche, tsunami, or mudflow. As described above the majority of these BMP facilities consist of either subterranean improvements or low profile features that are generally not considered susceptible to substantive damage from these hazards. Larger above ground improvements such as centralized or regional detention basins, could be located in areas that are within seiche, tsunami, or mudflow hazard areas. However, these structures would not be staffed and any potential damage that they might incur would likely be relatively easily repaired. As a result, the potential impact to structures subject to inundation by seiche, tsunami, or mudflow would be less than significant.

Mitigation Measures: None required

Significance Determination: Less than significant

Non-Structural (Institutional) BMPs

Non-structural BMPs would not include the construction of any structures and therefore there would be no impact related to inundation by seiche, tsunami, or mudflow.

Mitigation Measures: None required

Significance Determination: No impact

Cumulative Impact Discussion

Structural (Regional, Centralized, and Distributed) BMPs

The EWMPs span numerous watersheds within Los Angeles County. Implementation of the proposed structural BMPs, together with past, present, and other reasonably foreseeable future projects across the different watersheds of the region would result in improved stormwater quality and reduced non storm flows. As BMPs are incrementally installed, the Los Angeles region will experience reduced dry-weather runoff, a more natural hydrology, and improved receiving water quality. In addition, new infiltration projects will incrementally augment groundwater drinking water supplies. Although the increased infiltration projects may increase pollutant loads to groundwater aquifers, pretreatment systems coupled with regional groundwater management lead by the local Watermasters will ensure that the beneficial uses of groundwater basins are not significantly impaired. Implementation of the EWMPs will beneficially impact local surface water quality and groundwater supplies.

Mitigation Measures: None required

Significance Determination: Less than significant

3.8.4 Summary of Impact Assessment

Table 3.8-3 on the following page shows a summary of the structural BMPs requiring mitigation.

TABLE 3.8-3
SUMMARY OF HYDROLOGICAL RESOURCE IMPACTS REQUIRING MITIGATION MEASURES

	Thresholds of Significance						
Structural BMPs	**Surface Water Quality**	**Groundwater**	**Erosion**	**Storm Drain System**	**Flood Hazards**	**Tsunami, Seiche, Mudflows**	**Cumulative Impacts**
Applicable Mitigation Measures:	**None Required**	**HYDRO-1; HYDRO-2; HYDRO-3**	**None Required**	**None Required**	**None Required**	**None Required**	**None Required**
Regional BMPs							
Regional Detention and Infiltration	No	Yes	No	No	No	No	No
Regional Capture, Detention and Use	No	Yes	No	No	No	No	No
Centralized BMP							
Bioinfiltration	No	Yes	No	No	No	No	No
Constructed Wetlands	No	Yes	No	No	No	No	No
Treatment/LFDs	No	Yes	No	No	No	No	No
Creek, River, Estuary Restoration	No	Yes	No	No	No	No	No
Distributed BMPs							
Site Scale Detention	No	Yes	No	No	No	No	No
LID – Infiltration/Filtration BMPs – Porous Pavement, Green Streets, Bioswale/Filter Strips, downspout disconnects	No	Yes	No	No	No	No	No
LID – Green Infrastructure – Capture and Use – Cisterns, Rain Barrels, Green roofs, Planter Boxes	No	No	No	No	No	No	No
Flow-through Treatment BMPs	No	No	No	No	No	No	No
Source Control Treatment BMPs (catch basin inserts/screens, hydrodynamic separators, gross solids removal devices)	No	No	No	No	No	No	No
Low-Flow Diversions	No	No	No	No	No	No	No

NOTE: These conclusions are based on typical size and locations of BMPs.