2.8 Hydrology and Water Quality

The section of the EIR describes existing groundwater, surface water, water quality, stormwater, and flooding conditions within the County and evaluates potential impacts to hydrology and water quality that could result from the implementation of the proposed County General Plan Update. This section is based on information provided in the County of San Diego Guidelines for Determining Significance, Groundwater Resources (DPLU 2007l), County of San Diego Guidelines for Determining Significance, Surface Water Quality (DPLU 2007o); County of San Diego Guidelines for Determining Significance, Hydrology (DPLU 2007n); County of San Diego General Plan Conservation and Open Space Background Report (DPLU 2007b), the 2006-2007 Urban Runoff Monitoring Report for the San Diego County Municipal Copermittees (Weston 2007), the County General Plan Update Groundwater Study (DPLU 2009f), the Water Quality Control Plan for the San Diego Basin (SDRWQCB 1994), the Colorado River Basin-Region 7, Water Quality Control Plan (CRBRWQCB 2005), and additional resources as cited throughout the section.

A summary of the hydrology and water quality impacts identified in Section 2.8.3 is provided below.

Hydrology and Water Quality Summary of Impacts

Issue Number	Issue Topic	Project Direct Impact	Project Cumulative Impact	Impact After Mitigation
1	Water Quality Standards and Requirements	Potentially Significant	Potentially Significant	Significant and Unavoidable
2	Groundwater Supplies and Recharge	Potentially Significant	Potentially Significant	Significant and Unavoidable
3	Erosion or Siltation	Potentially Significant	Less Than Significant	Less Than Significant
4	Flooding	Potentially Significant	Less Than Significant	Less Than Significant
5	Exceed Capacity of Stormwater Systems	Potentially Significant	Less Than Significant	Less Than Significant
6	Housing within a 100-year Flood Hazard Area	Potentially Significant	Less Than Significant	Less Than Significant
7	Impeding or Redirecting Flood Flows	Potentially Significant	Less Than Significant	Less than Significant
8	Dam Inundation and Flood Hazards	Potentially Significant	Less Than Significant	Less Than Significant
9	Seiche, Tsunami and Mudflow Hazards	Potentially Significant	Less Than Significant	Less Than Significant

2.8.1 Existing Conditions

The following section examines existing groundwater resources, surface water resources, stormwater drainage systems, groundwater quality, surface water quality, and flooding and dam inundation areas within the unincorporated County.

2.8.1.1 Groundwater Hydrology

San Diego County overlies a complex groundwater resource that varies greatly throughout the region. The County has three general categories of aquifers that include fractured rock aquifers, alluvial and sedimentary aquifers, and desert basin aquifers. Figure 2.8-1 shows the distribution of these aquifer types throughout the County. The characteristics of these aquifers are discussed below in addition to a discussion of groundwater hydrology issues that currently exist in the County.

The coastal zone of San Diego County is mostly supplied with imported water from member agencies of the San Diego County Water Authority (SDCWA). The remaining portion of the County (approximately 65 percent by area) is completely dependent on groundwater resources, which provides the only source of water for approximately 41,000 residents. Analysis regarding the proposed General Plan Update and the potential for imported and groundwater resources to experience associated environmental impacts is also discussed in Issue 4: Adequate Water Supply, within Section 2.16, Utilities and Service Systems of this EIR.

Aquifer Characteristics

Fractured Rock

Fractured rock underlies approximately 73 percent of the unincorporated area of the County. Fractured rock aquifers are present in the foothills and mountainous regions of the County where precipitation is higher than in regions with lower elevations. As a result, recharge rates to fractured rock aquifers can be greater than in the lower elevation areas. Additionally, due to the low storage capacity, recharge to fractured rock aquifers can cause relatively fast rises to the water table, which conversely can have relatively fast declines to the water table from groundwater pumping in years without significant recharge. In some areas of the County with particularly low storage, the static groundwater levels have risen or declined in excess of 100 feet in particularly rainy seasons or dry seasons, respectively. Fractured rock aquifers typically have much less storage capacity than alluvial or sedimentary aquifers. As a result, pumping from wells completed in fractured rock typically produces a greater decline in water levels than a similar pumping rate for wells located in alluvium or sediments. Likewise, because less water is typically stored in fractured rock, seasonal variations in precipitation and drought conditions result in greater variations in water levels than in similar conditions in alluvial or sedimentary aquifers. In many cases, fractured rock aquifers are overlain by a layer of weathered bedrock (residuum) and/or a layer of alluvium. The presence of residuum or alluvium may provide additional storage capacity if the water table extends up into these layers. Water stored in these layers may drain into the fractured rock beneath them as water is pumped from the fractured rock. The additional storage in these surficial units may significantly enhance the usability of groundwater resources in some areas relying on groundwater from fractured rock.

Alluvial and Sedimentary

Alluvial and sedimentary aquifers are found in approximately 13 percent of the unincorporated area of the County. These aquifers are typically found in river and stream valleys, around lagoons, near the coastline, and in the intermountain valleys. Sediments in these aquifers are composed of mostly consolidated (defined as sedimentary rock) or unconsolidated (defined as alluvium or colluvium) gravel, sand, silt, and clay. Most of these aquifers have relatively high

hydraulic conductivity, porosity, and storage and in general would be considered good aquifers on the basis of their hydrogeologic characteristics. However, some alluvial and sedimentary aquifers in the County have relatively thin saturated thickness and limited storage. Alluvial and sedimentary aquifers can be underlain by fractured rock aquifers, which potentially provide additional storage. Surface water bodies within an alluvial or sedimentary aquifer may increase the recharge of the aquifer due to leakage from the water body into the subsurface area. Because alluvial basins generally occur in low-lying areas of a watershed, surface water runoff may accumulate in streams, lakes, or other surface depressions within alluvial basins and provide an additional recharge source to these basins.

Desert Basins

Desert basin aquifers are found in approximately 14 percent of the unincorporated area of the County, in the extreme eastern area. In general, desert basin aquifers are characterized by extremely limited groundwater recharge, but typically have large storage capacities. Desert basin aquifers within the County are composed of unconsolidated sediments that typically have storage capacities ranging from five to 30 percent of the total aquifer volume. The storage of an individual basin is a function of the size of the basin, depth of the saturated sediments, and the type of sediments comprising the basin. Precipitation in this area is typically only a few inches per year in the valley of the basins. Runoff and stream flow from the highlands typically recharges along the margins of the basins. Desert basin aquifers are generally characterized by extremely limited recharge and large storage capacities.

Groundwater Hydrology Issues

Aquifers with limited groundwater in storage (e.g., fractured rock aquifers) and/or limited groundwater recharge (e.g., desert areas) may experience shortages from large groundwater users, such as water companies or districts, agriculture, or other large operations. Areas with large quantity groundwater uses underlain by fractured rock aquifers with little to no residuum are particularly susceptible to localized groundwater problems. In 1991, the County adopted the San Diego County Groundwater Ordinance which contains residential density controls with minimum parcel sizes based on mean annual precipitation. Areas that were developed prior to the implementation of the Groundwater Ordinance may have been developed at densities higher than would be currently allowed which in some cases has lead to localized groundwater problems. Areas where projects are not subject to County regulations, such as the Barona golf course and casino on the Barona reservation, may also result in development that is not supplied with adequate groundwater resources. In all of these cases, it is possible that groundwater shortages occur because the groundwater demand in these areas could exceed the natural recharge of the aquifers, especially in drought years. The following section summarizes the existing groundwater hydrology issues facing the groundwater dependent portion of the unincorporated County, by examining three categories: 1) well yield; 2) large quantity/clustered groundwater users; and 3) Borrego Valley.

Well Yield

Areas within the unincorporated County with the potential for low well yield are shown in Figure 2.8-2. Wells in a fractured rock aquifer typically yield relatively low volumes of water. In some instances, wells may derive water from only a few water-bearing fractures. Additionally, it is difficult to estimate potential production rates for any new wells drilled in fractured rock aquifers, and wells drilled close together may have significantly different water production rates. This is

because water-producing fracture locations are difficult to identify and predict, and fractures intersected by one well may not be intersected by nearby wells. There are a number of factors that determine the long-term yield for a well in fractured rock aquifers, including the number of fractures intersected, aperture (fracture opening sizes), spacing, orientation, and interconnectivity of fractures, the amount of recharge, the amount of groundwater in storage in the surrounding aquifer, other nearby groundwater extraction, and the installation techniques for a well. Additionally, while low well yields are possible anywhere within fractured rock aquifer areas, steep slope areas above the valley floor are particularly prone to having lower well yield. This is largely due to storage values in steep slope areas often being substantially lower than valley areas, and having a smaller tributary watershed than wells located in valley areas. The General Plan Update Groundwater Study (DPLU 2009f) reports that the median well yield in fractured rock aquifers was approximately 15 gallons per minute (gpm). However, actual data varied substantially. For example, in 86 wells (approximately 11 percent of wells reviewed), well yield was reported as less than three gpm. These wells may struggle to meet the demands of a single-family residence. Several wells also reported a well yield greater than 100 gpm.

Wells in an alluvial or sedimentary aquifer typically yield relatively high volumes of water. Coarse-grained sediments such as sand or gravel typically produce higher volumes of water than finer-grained sediments such as silts or clays. In coarse-grained sediments, well yields may be hundreds of gpm and limited by inefficiencies in the well itself, rather than by limitations in the aquifer's ability to produce water. The General Plan Update Groundwater Study (DPLU 2009f) reported that the median well yield for alluvial and sedimentary aquifers was approximately 36 gpm. The highest well yields were reported in Warner Valley, Jacumba Valley, and the Pala-Pauma Valley Subregion. Several wells averaged greater than 500 gpm and one well in Warner Valley reported averaging 1,500 gpm.

Desert basin wells typically yield relatively high volumes of water due to the coarse-grained nature of the alluvial sediments. Because desert basin wells may be capable of yields in excess of 1,000 gpm, and recharge rates can be extremely low, it is easy to pump more water from the basin than will be naturally recharged. Excessive pumping that exceeds the rate of recharge results in a groundwater overdraft situation, which is not sustainable for long-term groundwater use. Such a condition currently exists in the Borrego Valley area of the unincorporated County.

The General Plan Update Groundwater Study (DPLU 2009f) reported that all steep slope areas in the backcountry have the potential for low well yield, which could result in a rapid decline of the water table and groundwater availability. This is largely due to storage values in steep slope areas often being substantially lower than valley areas, and having a smaller tributary watershed than wells located in valley areas. Ramona Trails Drive in the Ramona CPA is a good example of a steep slope area with low yielding wells. In addition, the General Plan Update Groundwater Study identified three specific areas in Lakeside (Old Barona Road, State Route (SR) 67, and Wildcat Canyon Road) and Morena Village as having a high frequency of wells with low well yield. Well networks in Lakeside have examples of wells with extreme variations of water levels, with declines of 500 feet recorded and recovery of the water table by as much as 450 feet in a single wet season. Periodic trucking of imported water may be needed in these areas to meet the needs of a typical single-family residence.

Large Quantity/Clustered Groundwater Users

Due to the fact that production wells for residential and agricultural water uses are not metered or regulated for water quantity by the County, future localized groundwater problems are

possible anywhere in the County from large quantity groundwater users. In addition, areas that were developed prior to the implementation of the Groundwater Ordinance may have been developed at densities higher than would be currently allowed. This has resulted in the clustering of groundwater demand from dense development, making these areas susceptible to localized groundwater problems. Areas of potential impact from large quantity and clustered groundwater users are shown on Figure 2.8-3.

Private residential users of groundwater are estimated to have a consumptive use of approximately 0.5 acre-feet per year (AF/yr) per residence. However, there have been isolated reports of single-family homes that use far greater quantities. Additionally, due to the low storage capacity of fractured rock aquifers, excessive use of groundwater by a single user in a fractured rock aquifer can cause localized impacts to neighboring properties.

In addition, several unincorporated communities and areas were developed with lot sizes smaller than four acres, which has resulted in clustering of groundwater users in these areas. These areas are also potentially susceptible to localized groundwater problems, especially if underlain by fractured rock aquifers with little to no residuum or alluvium. As shown on Figure 2.8-3, the following areas have been identified as having the highest potential for localized groundwater problems (especially during extended drought periods) from the existing pumpage of large amounts of groundwater relative to what the given aquifer can support.

Ballena Valley (Ramona CPA)

This valley has historically pumped up to 800 AF/yr of groundwater principally for agricultural uses. The County has records indicating water level declines of up to 500 feet in a single summer.

Guatay (Central Mountain Subregion)

Guatay has been identified as having the potential for rapid declines in the water table due to 81 residences and other uses pumping groundwater. Groundwater in Guatay is extracted from a relatively small area at the top of a watershed divide and underlain by fractured rock with low storage capacity. Water levels in a well monitored by the County in 2002 and 2004 were recorded as dry. However, the water table declines noted from 2002 to 2004 recovered during the above average rainfall of 2004-2005.

Julian Town Center (Julian CPA)

Two water districts pump groundwater in Julian to serve nearly 800 residential and commercial customers. As compared to wells in other areas of the County, the water table in Julian showed a relatively poor recovery response to the above average rainfall that occurred in 2004-2005. Although the water table in Julian recovered by as much as 70 feet from the 2004-2005 rainfall, as of 2006, the water table was depleted again to near historic lows.

Morena Village (Mountain Empire Subregion)

Two water companies pump groundwater from the Morena Village area to serve over 300 residences with an average parcel size just over one acre. Rapid declines in the water table have been recorded in two wells in this area. The water level of one well declined by approximately 200 feet during a two-year period. It should be noted that rapid groundwater declines were not noted in other wells monitored within Morena Village area, which may indicate that rapid declines in groundwater that have occurred are localized impacts. Also, the water

companies have reportedly periodically struggled with providing adequate water supplies during extended drought periods.

Borrego Valley (Desert Subregion)

Borrego Valley is located in the northeast portion of the unincorporated County and is a groundwater dependent basin without an imported water supply. The Borrego Valley Basin holds a large amount of groundwater in storage, estimated to be approximately 1.6 million AF of useable groundwater. The basin is characterized by limited recharge due to an annual rainfall of approximately six inches. Groundwater recharge for the Borrego Valley is estimated to average approximately 5,000 AF/yr. Groundwater demand in the Valley is in excess of 20,000 AF/yr. Groundwater demand has increased over the past 20 years due to water uses from over 4,000 acres of agricultural land, golf courses, and residential areas. This high groundwater demand has resulted in an overdraft condition where groundwater extraction exceeds long-term groundwater recharge. Water levels have been declining in the basin for decades as a result of the overdraft condition. Over 500,000 acre-feet (AF) of groundwater has been removed from the aquifer over the past 50 years, and groundwater production at current rates is not sustainable. Water level declines in Borrego Valley are most significant in the agricultural area in the northern portion of the basin which has experienced over 50 feet of water level decline since the County began collecting water level data in the 1980s. Groundwater has and is continuing to be extracted at rates that exceed recharge, which has caused an apparent long-term overdraft condition, also known as groundwater mining. In the past 20 years, rates of decline have increased sharply which is likely in response to new development and additional groundwater extraction.

Based on information provided in the General Plan Update Groundwater Study (DPLU 2009f), the majority of readily available water to existing well users in the Borrego Valley exists in the upper and middle aquifer. The amount of groundwater within these two aquifers was estimated to be approximately 2,131,000 AF in 1945 and 1,900,500 AF in 1979. The remaining water located within the lower aquifer is more difficult and costly to extract due to its low specific yield (estimated to be approximately three percent), its depth, and low specific capacity (estimated to be five gallons per minute/foot of drawdown or less). The Borrego Water District estimated in 1999 that the water remaining in the upper and middle aquifers was approximately 1,685,000 AF.

The U.S. Geologic Survey (USGS) is conducting a new phase of groundwater investigative work in Borrego Valley that is projected to be completed in 2012. The objective is to refine the 1980s USGS groundwater flow model to take advantage of flow modeling tools not available in their 1988 numerical model. The model will be used as a predictive tool to estimate the amount of time left before the groundwater table drops below the pump intake in production wells currently being used in Borrego Valley. Completion of the USGS work should provide a more specific estimation of future groundwater impacts than the estimations in previous studies.

2.8.1.2 Surface Water Hydrology

San Diego County's surface waters are characterized by estuaries, lagoons, bays, lakes, reservoirs, rivers and creeks. These water bodies capture the flow of the region's surface water runoff and become a blend of natural runoff and imported water. Many of these water bodies support natural habitat and recreational areas in addition to acting as storage reservoirs for the

County's water supply. Figure 2.8-4 shows the location of lakes and reservoirs within the County. An inventory of these surface water resources is provided below.

The Laguna Mountains divide San Diego County into two hydrologic regions that can be used to further evaluate surface water characteristics in the County. These include: 1) Colorado Hydrologic Region (CHR); and 2) San Diego Hydrologic Region (SDHR). The CHR has small portions of five hydrologic units (HU) located within east County. These units are collectively referred to as Desert units and contained within the Salton-Sea Transboundary Watershed Management Area (WMA), discussed further below. The SDHR contains 11 HUs within the unincorporated County. These include San Juan, Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, Penasquitos, San Diego, Pueblo San Diego, Sweetwater, Otay, and Tijuana. Figure 2.8-5 shows the boundaries of the HUs within the County.

For the purpose of this section, the HUs in the County will be discussed in terms of WMAs. A watershed is an area of land that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer or ocean. WMAs are grouped according to HUs and have been developed to implement federal and State statutes for the management of water quality in the region. There are a total of ten WMAs within the unincorporated County. All WMAs within the unincorporated County, with two exceptions, include only one HU and are named accordingly. One exception includes the San Diego Bay WMA which includes the Pueblo San Diego HU, Sweetwater HU, and the Otay HU. The other exception is the Salton-Sea Transboundary WMA which includes five HUs located in portions of San Diego and Imperial Counties. The WMAs are discussed below.

San Juan WMA

The San Juan WMA covers 317,440 acres in San Diego, Orange, and Riverside Counties. Approximately 96,000 acres of this area is located in northwestern San Diego County, almost entirely within the Camp Pendleton military base. There is one HU (San Juan) and five hydrologic areas (HAs) in this WMA. The San Onofre and San Mateo HAs are the only HAs located within San Diego County. Major stream systems from these two HAs include San Mateo Creek, San Onofre Creek, and Las Flores Creek. The topography of the San Onofre and San Mateo HAs is varied, ranging from coastal plains in the western portion to the Santa Margarita Mountains in the east, which rise over 2,000 feet above mean sea level. The mouth of San Mateo Creek forms a salt water tidal marsh that is entirely within the Camp Pendleton Marine Corps Base. The land uses within the San Onofre and San Mateo HAs include open space, military base operation areas and agriculture. In addition, there is a State beach along the I-5 corridor near the northern boundary of Camp Pendleton, and a golf course near the southern boundary. Nearby jurisdictions include the City of Oceanside to the south, the City of San Clemente to the north, and the unincorporated community of Fallbrook to the east.

Santa Margarita River WMA

The Santa Margarita River WMA is the second largest in the SDHR. It covers over 473,971 acres, with about three quarters of the watershed located in Riverside County and about one quarter located in San Diego County. Included in it are portions of Camp Pendleton as well as the unincorporated communities of Fallbrook, Palomar/North Mountain, Pala-Pauma, Pendleton/De Luz, and Rainbow. The watershed includes one HU (Santa Margarita) and nine HAs, including: Ysidora, De Luz, Murrieta, Auld, Pechanga, Wilson, Cave Rocks, Aguanga, and Oak Grove. The Ysidora HA is located entirely within the County of San Diego, while the De

Luz HA, Pechanga HA, Aguanga HA, and Oak Grove HA cover portions of both San Diego and Riverside Counties. The remainder of the HAs within the Santa Margarita WMA are located entirely within Riverside County. The WMA contains the Santa Margarita River, Temecula Creek, Murrieta Creek, Rainbow Creek, De Luz Creek, Sandia Creek, Santa Margarita Lagoon, Vail Lake, Skinner Reservoir, and Diamond Valley Lake Reservoir. There are nine dams located in the watershed with 92 percent of the river miles categorized as free flowing. Annual precipitation for the portion of the watershed within San Diego County ranges from 10.5 inches in the coastal areas to more than 16.5 inches in the eastern portion of the watershed. The southwestern portion of the watershed is dominated by the Camp Pendleton military base. Most of the WMA, about 66 percent, is undeveloped. Other land uses include agriculture (18 percent), military uses (8 percent), residential uses (4 percent), and parks (4 percent).

San Luis Rey WMA

The San Luis Rey River WMA, at 359,887 acres, is the third largest of the watersheds entirely or partially within the County of San Diego. It is located along the northern border of the County and includes the unincorporated areas of Bonsall, Desert, Fallbrook, North County Metro, Palomar/North Mountain, Pala-Pauma, Pendleton/De Luz, Rainbow, and Valley Center. In addition, there are several Indian reservations in the WMA. This WMA consists of one HU (San Luis Rey) and three HAs, including Lower San Luis Rey, Monserate, and Warner Valley. The watershed contains two major water bodies. Lake Henshaw is the main reservoir for the San Luis Rey WMA and is the third largest in San Diego County. The San Luis Rey River is the major stream system. Annual precipitation in this WMA is heavier than in other areas, ranging from less than 12 inches near the ocean to 45 inches near Palomar Mountain. Approximately 95 percent of the WMA consists of lands within the County's jurisdiction. The City of Oceanside comprises about four percent of the watershed and small portions of the Cities of Escondido and Vista, and Riverside County make up the remainder of the WMA. Land use within the watershed is classified primarily as undeveloped (54 percent). Other land uses include agriculture (15 percent), residential (15 percent), parks (9 percent), military (three percent), transportation (two percent), and commercial recreation (one percent). Commercial, industrial, and public facilities land uses make up less than one percent of the land use acreage.

Carlsbad WMA

The Carlsbad WMA encompasses 135,322 acres and extends from Lake Wohlford on the east to the Pacific Ocean on the west, and from the Cities of Vista and Oceanside on the north to Cardiff-by-the-Sea on the south. The Carlsbad WMA is primarily located within the jurisdictional boundaries of incorporated cities, including the Cities of Oceanside, Carlsbad, Encinitas, Solana Beach, San Marcos, Vista, and Escondido. However, approximately 31 percent of the WMA is located in unincorporated areas under the jurisdiction of the County, including the North County Metro, Valley Center and San Dieguito Community Planning Areas. It includes one HU (Carlsbad) and six HAs (Loma Alta, Buena Vista Creek, Agua Hedionda, Encinas, San Marcos, and Escondido Creek). The watershed contains five coastal lagoons including Loma Alta Slough, Buena Vista Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, and San Elijo Lagoon. The WMA also includes two small reservoirs, Dixon Lake, and Lake Wohlford. The San Marcos Dam controls approximately 53 percent of the San Marcos HA. The area is drained by Buena Vista, Agua Hedionda, San Marcos and Escondido Creeks. Annual rainfall over the watershed varies from 10.5 inches near the coast to 19.5 inches in the inland areas. The most common land use within the watershed management area is residential (35 percent), followed by undeveloped land (21 percent), parks (14 percent), transportation (12 percent), and

agriculture (7 percent). Industrial, commercial, public facilities, commercial recreation, water, and lands under construction make up the remaining 11 percent of land uses within the watershed. The Carlsbad WMA contains the largest percentage of privately owned land in San Diego County, about 75 percent. The remainder of the WMA is owned by local and state governments. The Carlsbad WMA is the second most densely populated WMA in the San Diego Region.

San Dieguito River WMA

The San Dieguito River WMA covers 221,307 acres and includes portions of the Cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach, as well as the unincorporated communities of Julian, North County Metro, North Mountain, Pala-Pauma, Ramona, San Dieguito, and Valley Center. The WMA consists of one HU (San Dieguito) and five HAs including Solana Beach, Hodges, San Pasqual, Santa Maria Valley, and Santa Ysabel. The watershed contains the San Dieguito River and its tributaries, along with Santa Ysabel and Santa Maria Creeks. It also contains the following reservoirs: Lake Hodges, Lake Ramona, Lake Poway, Sutherland Reservoir, Olivenhain Reservoir, and the San Dieguito Reservoir. There are several important natural areas within the WMA that sustain a number of threatened and endangered species. Annual precipitation ranges from 13.5 inches near the coast to nearly 35 inches in the eastern portion of the watershed. The San Dieguito River WMA is largely located within the unincorporated area (79.8 percent). Land use in the watershed is primarily undeveloped land (42 percent). Other major uses are residential (19 percent), parks (17 percent), and agriculture (15 percent). Transportation, commercial, industrial, public facilities, and water comprise the remaining seven percent of the watershed. Over 60 percent of the watershed is privately owned land. The remaining portions are mostly federal or locally owned with a small percentage of land being State-owned.

Los Penasquitos Creek WMA

The Los Penasquitos Creek WMA includes 60,418 acres of land that extends easterly to Iron Mountain and westerly to Los Penasquitos Lagoon. This WMA includes portions of the Cities of Del Mar, Poway, and San Diego, as well as, the unincorporated areas of Lakeside, Ramona, and the Miramar County Island. This WMA contains the Penasquitos HU and the Miramar Reservoir HA, Poway HA, Scripps HA, Miramar HA, and Tecolote HA. The major receiving waters for the Los Penasquitos Creek WMA are the Los Penasquitos Lagoon and Mission Bay. Los Penasquitos Creek WMA is drained by Los Penasquitos Creek which flows into Los Penasquitos Lagoon near the northern border of the City of San Diego within the Torrey Pines State Reserve. Los Penasquitos Lagoon also receives inputs from Carroll Canyon, just south of Los Penasquitos Creek, and McGonigle Canyon to the north. This Lagoon is a 630-acre wetland that lies near the mouth of the Los Penasquitos Creek and provides coastal wetland habitat. Rose Creek and Tecolote Creek are the main tributaries to Mission Bay. Mission Bay is the largest man-made aquatic park in the country, consisting of 4,235 acres, approximately 46 percent land and 54 percent water. Mission Bay was converted from a coastal marshland in the 1940s after the completion of a large dredging project. There are no major streams in this WMA although it is drained by numerous creeks. Annual precipitation ranges from 10.5 inches near the coast to 16.5 inches in the eastern portion of the watershed. Approximately 83 percent of the Los Penasquitos Creek WMA is located in the City of San Diego. Land uses within the watershed include parks and recreation (30 percent), residential (27 percent), and vacant/undeveloped land (15 percent). Other uses are comprised of transportation (12 percent), industrial (7 percent), public facilities/utilities (three percent), commercial (three

percent), and agriculture (one percent). Over 60 percent of the watershed is privately owned land. The remaining portions are locally owned or State and federally owned.

San Diego River WMA

The San Diego River WMA covers 277,543 acres and includes portions of the Cities of El Cajon, La Mesa, Poway, San Diego, and Santee. The watershed also covers portions of the unincorporated areas of Alpine, Central Mountain, Crest/Dehesa, Harbison Canyon/Granite Hills, Julian, Lakeside/Pepper Drive-Bostonia, North Mountain, Ramona, Valle de Oro, and the Barona Indian Reservation. The watershed contains the San Diego River, Boulder Creek, El Capitan Reservoir, San Vicente Reservoir, Lake Jennings, Lake Cuyamaca, and Lake Murray. Much of the impounded water in the reservoirs is used to serve major population centers, within the County. The watershed is drained by the San Diego River which discharges into the Pacific Ocean between Mission Beach and Ocean Beach in the City of San Diego. Annual precipitation ranges from 10.5 inches near the coast to nearly 35 inches in the eastern portion of the watershed. Approximately 74 percent of the San Diego River WMA is located in the unincorporated area of the County. Land uses in the watershed include undeveloped land (48 percent), parks and recreation (22 percent), and residential (18 percent). Other uses include transportation (6 percent), agriculture (2 percent), commercial (2 percent) and industrial (2 percent). Approximately half of the watershed is privately owned land. The remaining portions are federally, State, or locally owned.

San Diego Bay WMA

The San Diego Bay WMA covers 282,580 acres and consists of three major watersheds: Pueblo San Diego, Sweetwater, and Otay.

Pueblo San Diego Watershed

The Pueblo San Diego Watershed covers nearly 36,000 acres. It is comprised of one HU (Pueblo) and three HAs including Point Loma, San Diego Mesa, and National City. Major water bodies in the watershed include Chollas Creek, Paleta Creek, and San Diego Bay. Rainfall for the watershed averages 10.5 inches in coastal areas and 13.5 inches in the eastern areas. The Pueblo San Diego Watershed is the most developed and most densely populated watershed in the San Diego Bay WMA. Land use in the watershed includes residential (40 percent), transportation (28 percent), parks (7 percent), public facilities (6 percent), commercial (5 percent), undeveloped land (5 percent), military (4 percent), industrial (3 percent), and commercial recreation (2 percent). Most of the watershed (84 percent) falls under the jurisdiction of the City of San Diego. Other jurisdictions include the Cities of La Mesa, Lemon Grove, and National City, the Port of San Diego, the U.S. Navy, and unincorporated land.

Sweetwater Watershed

The Sweetwater Watershed encompasses over 148,000 acres and includes one HU (Sweetwater) and three HAs including Lower Sweetwater, Middle Sweetwater, and Upper Sweetwater. Major water bodies include the Sweetwater River, Sweetwater Reservoir, Loveland Reservoir, and San Diego Bay. Rainfall in the watershed widely varies from 10.5 inches near the coast to approximately 35 inches in the far inland areas. Much of the Sweetwater Watershed is occupied by the undeveloped lands in the Cleveland National Forest, Cuyamaca Rancho State Park, and the unincorporated communities of Pine Valley, Descanso,

Alpine, and the Viejas Indian Reservation. The majority of land uses in the watershed include undeveloped land (36 percent), parks (25 percent), residential (25 percent), and transportation (6 percent). Other land uses are comprised of agriculture (2 percent), public facilities (1 percent), commercial recreation (1 percent), water (1 percent), commercial (1 percent), industrial (1 percent), and land under construction (1 percent). Land ownership is mostly private with the remaining areas controlled by local, State, federal governments, and Native American Indian Tribes. The upper watershed contains large undeveloped areas within the Cleveland National Forest and Cuyamaca Rancho State Park.

Otay Watershed

The Otay Watershed is nearly 98,500 acres in size and consists of the Otay HU and three HAs including Coronado, Otay Valley, and Dulzura. Major water bodies include the Upper and Lower Otay Reservoirs, Otay River, and San Diego Bay. The two major reservoirs in the watershed supply water, important wildlife habitat, and recreational opportunities. The Lower Otay Reservoir lies at the end of the San Diego Aqueduct. Annual rainfall varies from 8.3 inches at the coast to 19.5 inches in the inland areas. Over 69 percent of the Otay Watershed is located in the unincorporated area with the remaining portions located in the following jurisdictions: Port of San Diego and Cities of Chula Vista, Coronado, Imperial Beach, and San Diego. Land uses in the watershed include parks (38 percent), undeveloped land (32 percent), residential (14 percent), transportation (5 percent), industrial (3 percent), public facilities (2 percent), military (2 percent), agriculture (1 percent), commercial recreation (1 percent), water (1 percent), and commercial (1 percent). Land ownership is predominantly private with a small percentage of local, State, and federally owned lands. The Otay Watershed includes the San Diego National Wildlife Refuge, the Rancho Jamul Ecological Reserve, and approximately 23,000 acres that provide habitat for endangered plant and animal species as part of the Multiple Species Conservation Program (MSCP).

Tijuana River WMA

The Tijuana River WMA is the largest of the San Diego watersheds and covers over 1.1 million acres. The Tijuana River is formed by two drainage networks that merge in the City of Tijuana, then flow across the U.S./Mexico international border into the Tijuana River Estuary in Imperial Beach, and ultimately to the Pacific Ocean. The watershed is divided by the U.S./Mexico international border with just over 27 percent lying within the San Diego region. The watershed is comprised of the Tijuana HU and the following HAs: Tijuana Valley, Potrero, Barrett Lake, Monument, Morena, Cottonwood, Cameron, and Campo. Major water bodies in this WMA include the Tijuana River, Cottonwood Creek, and the Tijuana River Estuary. Annual precipitation varies from less than 10.5 inches near the coast to more than 22.5 inches in the inland areas. Mexico governs 73 percent of the Tijuana River WMA. The remaining areas fall within the jurisdiction of the U.S. Dominant land uses in the U.S. portion of the watershed are undeveloped/vacant areas (61 percent) and parks (26 percent). Other land uses include residential (7 percent), agriculture (3 percent) and transportation (3 percent). The combination of commercial, recreation, industrial, military, public facilities, land under construction, and water land uses equals less than two percent of the land area in the U.S. portion of the watershed. Mexico's land uses in the WMA are predominately undeveloped/vacant uses (82 percent). It should be noted that much of Mexico's land that is classified as undeveloped is used for low intensity cattle and goat grazing. The Tijuana River Watershed also includes the Tijuana River Estuary, which is a National Estuarine Sanctuary.

Salton Sea Transboundary WMA

The Salton Sea Transboundary WMA includes hydrologic units located in the Colorado Hydrologic Region (CHR). The Salton Sea Transboundary WMA contains parts of five hydrologic units located in the eastern desert portion of the County. These include the Anza-Borrego, Clark, Whitewater, West Salton, and Imperial Watersheds. The Anza-Borrego Watershed is the largest hydrologic unit, covering about 80 percent of the desert portion of San Diego County and extending into Imperial and Riverside Counties. Portions of the Clark, Whitewater, and West Salton Watersheds are located at the extreme northeast corner of the County. The Imperial Watershed is located at the southeast edge of San Diego County and extends into Imperial County. Water is limited in all of these areas. The surface water that intermittently exists flows toward the Salton Sea and the Colorado River. Average annual precipitation for this WMA ranges from less than three inches along the eastern boundary, near Imperial Valley, to 25 inches in the mountain divide between the Salton Sea and Pacific Ocean drainages. Runoff occurs from winter precipitation especially in the higher elevations and from summer thunderstorms. Approximately 98 percent of the land uses located within the San Diego County portion of the Salton Sea Transboundary WMA is parkland, undeveloped land, or used for agriculture. The remaining portions are sparsely populated with single-family residential units, and a small amount of other uses.

2.8.1.3 Stormwater Drainage Systems

Overview

A stormwater conveyance system, as defined by the County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance, means “private and public drainage facilities other than sanitary sewers within the unincorporated areas of San Diego County by which urban runoff may be conveyed to receiving waters, and includes, but is not limited to, roads, streets, constructed channels, aqueducts, storm drains, pipes, street gutters, inlets to storm drains or pipes, and catch basins.” The stormwater conveyance system is designed to prevent flooding by transporting water away from developed areas. A vast amount of the unincorporated area is rural land that does not support or require stormwater drainage facilities. In contrast, most urban areas within the incorporated areas of San Diego County have a range of stormwater drainage facilities.

Unfiltered and untreated stormwater can contain a number of pollutants that may eventually flow to surface waters. The chief cause of urban stormwater pollution is the discharge of inadequately treated waste or pollutants into the natural water system. Discharge may occur naturally or as a result of human activities. Over recent decades, rapid growth and urbanization have placed increased pressure on water resources and resulted in local impacts to water quality, especially in the densely developed western part of the County. In general, increased urbanization increases the amount of pollutants generated by human activities within a watershed, and increases the amount of impervious (paved) surfaces, thus reducing the amount of water that would normally infiltrate into the soil and be filtered naturally. Pollutants, such as fertilizers and pesticides, motor oil, antifreeze, sediment, heavy metals, bacteria, and viruses, that accumulate on impervious surfaces are easily picked up by rainfall runoff and flow downstream via the stormwater conveyance system to surface waters. The stormwater conveyance system is not connected with the sanitary sewer system; therefore, urban runoff is not filtered to remove trash, cleaned, or otherwise treated before it is discharged to surface

waters. The typical result is that pollutants are carried directly into surface water by runoff. Stormwater discharges that enter the natural receiving waters can be polluted by either point sources or non-point sources.

Point Source Discharge

Point source pollution refers to pollutants discharged to surface water through any discernable, confined, and discrete conveyance. In other words, the boundaries of the source of pollution can be easily defined and identified from a single point. Point sources generally discharge predictable concentrations and volumes of pollutants. Examples of point source pollution are sewage treatment plants, landfills, and industrial facilities, all of which may release effluent and sewage or other liquid waste directly into a body of water.

Non-point Source Discharge

Non-point source pollution refers to diffuse, widespread cumulative sources of pollution and is the primary source of surface water and groundwater contamination. In other words, non-point source pollution can not be traced back to a single point or source. This kind of pollution is caused by rainfall and over-irrigation that washes pollutants into storm drains, streams, rivers, lakes, and oceans. Sources may be large or small, but are generally numerous throughout a watershed. Non-point water pollution is often a by-product of poor land use practices, which do not incorporate adequate best management practices (BMPs), and the collective effects of individual behavior. Common sources of non-point pollution include, but are not limited to, runoff from urban, agricultural, or industrial areas, landscaping, roads, highways, improperly managed construction sites, septic systems failures, recreational boating, timber harvesting, mining, and livestock. Non-point source discharges can also result from physical changes to stream channels and habitat degradation. Typical nonpoint source contaminants include trash, sediments, pesticides, fertilizers, petroleum-based hydrocarbons, metals, and pathogens. Nonpoint sources of pollution can occur year round, during any time that rainfall, snowmelt, irrigation, or any other source of water runs over land, picks up pollutants and deposits them into surface or groundwater.

2.8.1.4 Water Quality

This section defines common water quality contaminants and describes existing groundwater and surface water quality issues within the County's WMAs.

Water Quality Contaminants

Metals

Metals can impact surface water quality by accumulating in sediments and fish tissues. This poses risks of toxicity such as lowering the reproductive rates and life spans of aquatic animals and animals up the food chain. Metals can also alter photosynthesis in aquatic plants and form deposits in pipes. Metals in urban runoff can result from automobile use, industrial activities, water supply infrastructure corrosion, mining, or pesticide application. Atmospheric deposition can also contribute metals to water bodies. Groundwater can be contaminated from metals from improper disposal of waste generated from small businesses such as automobile repair shops

or metal parts cleaning operations. Once groundwater is contaminated with metals it can be extremely difficult, costly or impossible to remove them.

Nutrients (Phosphorous and Nitrogen)

High levels of nitrogen and phosphorus in surface waters can produce harmful algal blooms. In turn, these blooms can produce "dead zones" in water bodies where dissolved oxygen levels are so low that most aquatic life cannot survive. Typical sources of nutrients in surface waters are improper fertilizer usage (both agricultural and residential), discharges from failing or improperly maintained septic systems, and accidental sanitary sewer overflows. Nitrate, which is composed of nitrogen and oxygen, occurs naturally in soil and water. Nitrate is an important constituent in fertilizers used for agricultural purposes and is present in human and animal wastes. Typical sources of elevated nitrates in groundwater are failing septic tanks, feed lots, or farming operations. Infants, young livestock, and pets are extremely susceptible to potential health effects from drinking water with nitrates above regulated levels and could become seriously ill. If untreated, the condition can be fatal.

Petroleum Products (Gasoline, Diesel, Oil and Grease)

Gasoline, diesel, oil, and grease are characterized as high molecular weight organic compounds. Primary sources of gasoline, diesel, oil and grease contaminants are motor products from leaking vehicles and underground storage facilities and tanks. Petroleum hydrocarbon products commonly found in gasoline, including benzene, toluene, ethylbenzene, xylene, and MBTE, are considered common petroleum contaminants to surface water and groundwater. Benzene is used as a gasoline additive, industrial solvent and in the production of drugs, plastics, rubber and dyes. Toluene is widely used as an industrial feedstock and as a solvent. Ethylbenzene is used in the production of plastic while xylene is used as a solvent in the printing, rubber and leather industries. MBTE is a gasoline additive that has historically caused groundwater contamination from spills or leaks at gas stations. Introduction of petroleum pollutants to water bodies is typical due to the widespread use and application of these products in municipal, residential, commercial, industrial, and construction areas. Over 2,000 leaking underground fuel tanks (LUFT), typically storing petroleum products, exist throughout the County. Petroleum products are common contaminants in County groundwater.

Additional sources of oil and grease include esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to water bodies is typical due to the widespread use and application of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of a water body, as well as its water quality.

Pathogens (Bacteria and Viruses)

Water contaminated with pathogens such as bacteria and viruses can introduce diseases to humans and animals. This can have significant public health implications, particularly related to water used for drinking and recreational uses such as swimming, surfing, and shellfish harvesting. Common sources of pathogens in surface water include wild and domesticated animals, urban and agricultural activities, and accidental sanitary sewer overflows. Elevated bacteria in groundwater occur primarily from human and animal wastes. Sources of bacteriological contamination include septic tanks, natural soil/plant bacteria, feed lots, pastures, and other land areas where animal wastes are deposited. Old wells with large

openings, including hand dug wells and wells with inadequate seals, are most susceptible to bacteriological contamination from insects, rodents, or animals entering the well.

Pesticides and Herbicides

Pesticides and herbicides can enter surface water and groundwater from both agricultural and urban areas. Typical impacts include accumulation in sediments and bioaccumulation in the food chain. Pesticides and herbicides can be toxic to both aquatic life and humans.

Radioactive Elements

Naturally occurring radioactive elements are present to some extent in nearly all rocks and soil throughout the world and leach into groundwater from natural mineral deposits. Radioactivity in groundwater is not a new phenomenon, having been present in some form since the earth was formed. Elevated levels of naturally occurring radioactive elements including uranium have been detected in groundwater in various areas throughout San Diego County. Several community water systems have had ongoing problems with radioactive elements and have relatively expensive treatment systems to reduce levels of various contaminants to levels below regulatory limits. Potential health effects of various radioactive elements include an increased risk of various cancers and kidney toxicity. Figure 2.8-6 identifies areas within the unincorporated County that have elevated levels of radiochemicals.

Sediments

Increased sedimentation, over and above the amount that enters the water system by natural erosion, can cause many adverse impacts on aquatic organisms, water supply, and wetlands. Sedimentation can decrease transmission of light, which affects plant production and leads to loss of food and cover for aquatic organisms. It can change behavioral activities (nesting, feeding, mating), and adversely affect respiration, digestion, and reproduction. Contaminants and toxic substances can also be transported in sediments. Sediments can damage water treatment equipment, increasing treatment costs. They can reduce reservoir volume and flood storage and increase peak discharges.

Total Dissolved Solids

Total dissolved solids (TDS) refer to the total concentration of all minerals, salts, metals, cations or anions that are dissolved in water. TDS is composed of inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonate, carbonate, chloride and sulfate), and some small amounts of organic matter that are dissolved in water. The primary source of TDS in groundwater is the natural dissolution of rocks and minerals, but septic tanks, agricultural runoff, and stormwater runoff also contribute. Increased salts in regional freshwater resources from mining, urban runoff, and construction can create stressful environments and even destroy habitat and food sources for wetland animals in aquatic and wetland habitats, as well as favoring salt tolerant species; reduce the quality of drinking water; and may cause skin or eye irritations in people. In deep desert basins like those found underlying Borrego Valley, groundwater in the deeper portions of the basin typically contains older water than the shallower zones. This older water may contain high concentrations of salt and other dissolved minerals making it unsuitable for human consumption. Pumping shallow wells may draw deeper poor quality water into the wells. An elevated TDS concentration is not a health hazard; however, it

can cause the water to have a salty or brackish taste, it can cause the water to be corrosive, and results in scale formation on pipes, pumps, water heaters, etc. Because of the seasonal nature of precipitation within the San Diego region, surfacing groundwater and runoff from applied water (agricultural and urban) represent the primary contributors to dry season stream flows. The interchange between surface water and groundwater, and the extreme seasonal variability of flow, evaporation, and water quality in San Diego County all contribute to a wide range of TDS in our surface waters. It is also of note that much of the water that is imported to the San Diego region is relatively high in TDS content.

Surface Water Quality

The following discussion identifies surface water quality issues facing WMAs within the unincorporated County. Additional information, including beneficial uses, water quality objectives, implementation strategies, plans and policies, and surveillance, monitoring and assessment information, for each WMA discussed below can be found by accessing the San Diego Basin Water Quality Control Plan (Basin Plan) or the Basin Plan for the Colorado River Basin Region, available at the State Water Resources Control Board (SWRCB) website: http://www.swrcb.ca.gov/.

In addition to the watershed-specific Total Maximum Daily Load (TMDL) programs listed below, the San Diego Regional Water Quality Control Board (SDRWQCB) has adopted a Basin Plan amendment for Project I – Beaches and Creeks in the San Diego Region, which is explained further below. The purpose of a TMDL is to attain water quality objectives and restore and protect the beneficial uses of an impaired water body. Project I – Beaches and Creeks is a TMDL addressing indicator bacteria in 12 impaired watersheds in the San Diego region, seven of which are in San Diego County. Watersheds included in Project I and located in San Diego County include San Luis Rey River (San Luis Rey River WMA), San Marcos (Carlsbad WMA), San Dieguito River (San Dieguito River WMA), Miramar (Los Penasquitos Creek WMA), Scripps (Los Penasquitos Creek WMA), San Diego River (San Diego River WMA), and Chollas Creek (San Diego Bay WMA). Information regarding TMDLs was obtained from the SDRWQCB.

San Juan WMA

Water quality concerns for this WMA include surface and groundwater quality degradation, habitat loss, channel bed erosion, and invasive species. Constituents of concern that have been identified include coliform bacteria, nutrients, TDS, solvents, trace metals, and petroleum. Six water bodies located within the San Juan WMA have been identified as having elevated coliform bacteria levels and are listed on the Clean Water Act (CWA 303(d)) List of Impaired Water Bodies. Table 2.8-1 identifies the water bodies included on this list and located within the San Juan WMA.

Santa Margarita River WMA

Major impacts affecting this watershed include surface water and groundwater quality degradation, habitat loss, invasive species, and channel bed erosion. There are eight water bodies in the Santa Margarita River WMA that have been placed on the CWA 303(d) list (see Table 2.8-1) from pollutant/stressors including: eutrophic conditions (from sedimentation), nutrients, TDS, iron, manganese, phosphorous, nitrogen, phosphorous and sulfate. The upper portion of the watershed in Riverside County has been under continuous development and potential sources of contaminants include urban runoff, agriculture/nurseries, septic tanks,

natural sources, and unknown point and non-point sources. Santa Margarita Lagoon is also identified in the SDRWQCB Investigation Order and Technical Report for Lagoons Total Maximum Daily Load (TMDL) Project - Order No. R9-2006-0076, which establishes monitoring requirements for dischargers. This order required monitoring to begin during the 2007-2008 wet weather monitoring season. A basin plan amendment was approved for Rainbow Creek in 2005 that established a TMDL program to address water quality impairment due to nitrogen and phosphorous. Additionally, the Santa Margarita River Watershed Management Plan (WMP) includes sedimentation as a high priority water quality program in the San Diego County portion of the WMP (Anchor 2005). The WMP included actions and identified responsible parties to implement the actions to minimize sedimentation.

San Luis Rey WMA

Major impacts to the San Luis Rey River WMA include surface water quality degradation, habitat loss, invasive species, and channel bed erosion. Three water bodies in the San Luis Rey WMA have been placed on the CWA 303(d) list (see Table 2.8-1). Constituents of concern for the WMA include bacterial indicators along the Pacific Coast Shoreline at the San Luis Rey River mouth, eutrophic conditions within Guajome Lake, and chloride and total dissolved solids in the lower portion of the San Luis Rey River. Potential sources of these contaminants are varied and include both anthropogenic and natural sources. A basin plan amendment that would establish a TMDL for bacteria in this watershed has been approved by the SDRWQCB and is pending final approval from the SWRCB.

Carlsbad WMA

Major impacts to the watershed include surface water quality degradation, sewage spills, beach closures, sedimentation, habitat degradation and loss, invasive species, and eutrophication. Eight water bodies in the Carlsbad WMA have been placed on the CWA 303(d) list (see Table 2.8-1). Pollutant conditions in the WMA include bacterial indicators, eutrophic conditions, nutrients, sediments, sulfates, nitrates and phosphates. Four of the five lagoons within the Carlsbad WMA (Loma Alta Slough, Buena Vista Lagoon, Agua Hedionda Lagoon, and San Elijo Lagoon) are on the CWA 303(d) list. Each impaired lagoon is also identified in the SDRWQCB Investigation Order and Technical Report for Lagoons TMDL Project - Order No. R9-2006-0076, which establishes monitoring requirements for dischargers. This order required monitoring to begin during the 2007-2008 wet weather monitoring season. The sources of these pollutants are varied and include urban runoff, agricultural runoff, sewage spills, livestock/domestic animals, and other natural sources.

San Dieguito River WMA

Major impacts affecting the San Dieguito River WMA include surface water quality degradation, beach closures, sedimentation, habitat degradation and loss, invasive species, and eutrophication. Seven water bodies within this watershed have been placed on the CWA 303(d) list (see Table 2.8-1). Pollutants of concern for the WMA include bacterial indicators, sulfates, nitrogen, phosphorus, and TDS. Land use activities, including urban runoff, agricultural runoff, and domestic animals, as well as other natural sources, are the primary sources of water quality impacts in the area. A basin plan amendment that would establish a TMDL for bacteria in this watershed has been approved by the SDRWQCB and is pending final approval from the SWRCB.

Los Penasquitos Creek WMA

Major impacts to the Los Penasquitos Creek watershed include surface water quality degradation, beach closures, sedimentation, habitat degradation and loss, invasive species, and eutrophication. Table 2.8-1 presents two water bodies in this WMA that have been placed on the CWA 303(d) list. Constituents of concern that have led to these water bodies being placed on the CWA 303(d) list are sedimentation/siltation, phosphate, and TDS. Urban runoff, sewage spills, dredging, landfill leachate, and natural sources are factors that may be impairing water quality within the Los Penasquitos WMA. The Los Penasquitos Lagoon is also identified in the SDRWQCB Investigation Order and Technical Report for Lagoons TMDL Project - Order No. R9-2006-0076, which establishes monitoring requirements for dischargers. A basin plan amendment that would establish a TMDL for bacteria in this watershed has been approved by the SDRWQCB and is pending final approval from the SWRCB.

San Diego River WMA

Major impacts to the San Diego River WMA include surface water quality degradation, habitat degradation and loss, sediment, invasive species, eutrophication, and flooding. Table 2.8-1 presents the seven water bodies in the San Diego River WMA that have been placed on the CWA 303(d) list. Constituents that resulted in water bodies being placed on the CWA 303(d) list include bacterial indicators, TDS, phosphorus, eutrophication, pH, dissolved oxygen, color, chloride, manganese, and sulfates. Factors that may be impairing water quality in the WMA include urban runoff, agricultural runoff, mining operations, sewage spills, sand mining, and other natural sources. Famosa Slough in the City of San Diego has also been identified in the new SDRWQCB Investigation Order and Technical Report for Lagoons TMDL Project - Order No. R9-2006-0076, which establishes monitoring requirements for dischargers. A basin plan amendment that would establish a TMDL for bacteria in this watershed has been approved by the SDRWQCB and is pending final approval from the SWRCB.

San Diego Bay WMA

The San Diego Bay WMA, contains the Pueblo San Diego Watershed, the Sweetwater River Watershed and the Otay River Watershed. There are 25 water bodies within the San Diego Bay WMA that are listed on the CWA 303(d) list (see Table 2.8-1). Pollutants of concern include trace metals, other toxic substances, coliform bacteria, pesticides, and nutrients. Sewer overflows, stormwater runoff, and habitat degradation are all factors that may be impairing water quality within the San Diego Bay WMA. A basin plan amendment was approved for Chollas Creek in 2002 that established a TMDL to address water quality impairment due to the pesticide diazinon. An additional basin plan amendment was approved for Chollas Creek in 2005 that established a TMDL to address water quality impairment due to dissolved copper, lead, and zinc. A TMDL for the Shelter Island Yacht Basin was established in 2005 to address water quality impairment due to dissolved copper. A TMDL for the Shelter Island Shoreline Park was established in 2008 to address water quality impairment due to fecal bacteria. Additionally, two separate TMDLs for Chollas Creek and Seventh Street Channel are in the planning stages to address benthic community degradation and sediment toxicity.

Tijuana River WMA

Major impacts to the watershed include surface water quality degradation, trash, sedimentation, eutrophication, habitat degradation and loss, flooding, erosion, and invasive species. The

Tijuana River Watershed has a variety of water quality issues, many of which stem from runoff that enters the watershed from Mexico, and is outside of the County's jurisdiction. Six water bodies within the Tijuana River WMA have been placed on the CWA 303(d) list (see Table 2.8-1). Constituents of concern in the watershed include bacterial indicators, color, eutrophic conditions, lead, low dissolved oxygen, manganese, nickel, pesticides, pH, phosphorus, solids, synthetic organics, thallium, trace elements, and trash. The sources of the pollutants are varied and include urban runoff, sewage spills, industrial discharges, agricultural/orchards, livestock/domestic animals, natural sources, and septic systems.

Salton Sea Transboundary WMA

Constituents of concern to the Salton Sea Transboundary WMA include high concentrations of salt, TDS and elevated levels of selenium. Replenishment of the watershed is predominantly from farm drainage and seepage and occasional storm runoff from the Coachella Valley, Imperial Valley, Anza-Borrego, and the Mexicali Valley in Mexico. No Salton Sea Transboundary WMA waterbodies located within San Diego County are listed on the CWA 303(d) list.

Groundwater Quality

Traditionally, groundwater supplies within the County have produced high-quality drinking water. However, naturally occurring and more recently anthropogenic sources of contamination have caused the quality of groundwater to be adversely effected in localized areas. The most common anthropogenic sources of groundwater contamination include LUFTs, sewer and septic systems, agricultural applications, and facilities producing animal wastes. The most common contaminants in groundwater within San Diego County include elevated nitrate, naturally occurring radionuclides, TDS, bacteria, and petroleum products. Other groundwater contaminants of concern, which may occur in localized areas, include herbicides, pesticides and other complex organics, and metals. The following section describes areas within the unincorporated County that have been identified by the County General Plan Update Groundwater Study (DPLU 2009f) as experiencing groundwater contamination. Additionally, the groundwater quality of Borrego Valley is individually discussed below.

The County Department of Environmental Health (DEH) has compiled a map of the unincorporated County which depicts nitrate and radionuclide groundwater quality problem areas in the County (Figure 2.8-6). Problem areas mapped are based on a subset of wells in which nitrate and radionuclides (gross alpha and uranium) have exceeded their respective maximum contaminant levels (MCLs) in groundwater samples analyzed. Other areas of groundwater quality concern, such as LUFT sites and parcels smaller than four acres, are also depicted in Figure 2.8-6. The map is based on a limited set of analytical data from water systems regulated by DEH and the State.

Nitrates

Potable water, whether from local or imported supplies, does not contain significant amounts of nitrates. Nitrate impacts in the County are most common from small lots and/or areas of shallow groundwater on septic systems, excess nitrate used in agricultural applications, and feed lots. As depicted on Figure 2.8-6, nitrate impacts are most common in the more urbanized areas of the unincorporated County within the SDCWA service area. This includes portions of the unincorporated communities of Rainbow, Valley Center, Ramona, Crest, and Jamul. The

nitrate impacts can largely be attributed to agricultural uses and/or imported water being brought into these basins causing septic system failures. The imported water, which allows for dense development, results in artificial recharge through septic systems along with irrigation return flows, which cause shallow groundwater conditions and septic system failures. Additional mapped nitrate problem areas within the unincorporated County include areas of the Mountain Empire Subregion, including Morena Village and the Cameron Corners area of Campo, and a small portion of the Alpine CPA along I-8. There are no data available over a vast portion of the unincorporated County; therefore, there are likely additional areas with nitrate problems that are unmapped.

Naturally Occurring Radionuclides

Naturally occurring radionuclides are present to some extent in nearly all rocks and soil throughout the world and leach into groundwater from natural mineral deposits. As shown in Figure 2.8-6, existing radiochemical problem areas include portions of the Campo, Lake Morena and Potrero areas in the Mountain Empire Subregion, Jamul/Dulzura Subregion, Guatay (Central Mountain Subregion), Julian CPA, Cuyamaca (Central Mountain Subregion), the Lake Wohlford area (Valley Center CPA), SR-78 area east of the Ramona CPA, Warner Springs (Desert Subregion), and SR-79 area near the Riverside County border. There are no data available over a vast portion of the County; therefore, there are likely additional areas with potential radionuclide problems that are unmapped.

TDS

TDS originate naturally from the dissolution of rocks and minerals, and also can enter groundwater from septic systems, agricultural runoff, and storm water runoff. The most common groundwater areas with elevated concentrations of TDS in the County include coastal sedimentary formations and deeper water found in desert basins.

Coliform Bacteria

Elevated bacteria levels in groundwater occur primarily from human and animal wastes. Old wells with large openings and wells with inadequate seals are most susceptible to bacteriological contamination from insects, rodents, or animals entering the well.

Petroleum Products

Petroleum products enter groundwater primarily from leaking vehicles and widespread use and application in municipal, residential, commercial, industrial, and construction areas. Areas of potential localized contamination of groundwater from LUFTs include sites in the Cameron Corners area of Campo (Mountain Empire Subregion), Julian CPA, Guatay (Central Mountain Subregion), Pine Valley (Central Mountain Subregion), Santa Ysabel (Julian CPA), and several other areas. In a few cases, water supply wells were inactivated due to the possibility of inducing flow of contaminated groundwater from the leaking underground storage tanks. Figure 2.8-6 identifies areas within the unincorporated County with groundwater quality impacted by LUFT sites.

Borrego Valley

In general, water quality has historically been good within the Borrego Valley Aquifer, as reported by Borrego Water District. Wells from the aquifer show total dissolved solids at concentrations of less than 500 mg/L; however, historical nitrate impacts have been noted from wells taken out of production. High salinity and poor quality water is thought to occur in deeper formational materials of the Borrego Valley Aquifer as well as shallow groundwater in the vicinity of the Borrego Sink in the southern portion of Borrego Valley. Since there have been no comprehensive studies of water quality within Borrego Valley, it is difficult to assess the amount of potable groundwater still available in this area. Although not confirmed, it is plausible that water quality impacts occur as decreased water levels induce flow of poor quality water found in deeper formational materials of the aquifer. This condition would eventually necessitate additional treatment of groundwater to make the water suitable as a drinking water supply, at a sizeable cost.

2.8.1.5 Flooding and Dam Inundation

Overview

Flooding is a general or temporary condition of partial or complete inundation of normally dry land areas near water. Flooding is commonly associated with the overflow of natural rivers or streams, but can also occur near stormwater diversion facilities, dams, or in low-lying areas not designed to carry water.

In previous years, major storms have produced floods that caused significant property losses and resulted in extensive damage to public infrastructure throughout San Diego County. For example, the storms that occurred between December 27, 2004 and January 11, 2005 caused approximately $7.7 million in damages Countywide. In addition to major storm events, flood risks also occur during periods of heavy rainfall in areas where land has been converted from pervious to impervious surfaces or where vegetation has been reduced, such as after a wildfire. In both cases, the land loses its ability to absorb rainfall and more stormwater enters stream beds, river beds and reservoirs. The Hydrology Division of the County of San Diego Flood Control District (FCD) is responsible for maintaining an historical database containing data from over 100 rain gauges. An inventory of historic flooding occurrences for the past 10 years and the associated damages can be found in Table 2.8-2. As this table indicates, since 1993, flash floods have resulted in over $16 billion in property damage throughout San Diego County.

Average precipitation across San Diego County is highly variable. The western coastal and foothills region of the County averages between 6 to 18 inches per year, with increasing amounts in the foothills. The central mountainous region averages between 15 to 35 inches per year. This higher rainfall is attributable to the orographic effect created by the higher elevations of the mountains, which raises and cools the moist marine air as it moves inland from the ocean over the mountains. The highest precipitation in the County occurs on Palomar Mountain and Cuyamaca Peak, with precipitation in the wettest years exceeding 70 inches. In contrast, rainfall diminishes rapidly with decreasing elevation on the eastern slopes of the mountains and into the deserts. Desert areas have reported rainfall less than one inch in extremely dry years.

Precipitation Induced Flooding

Flash Floods and Debris Flows

Debris flows, also known as mudflows, are shallow water-saturated landslides that travel rapidly down slopes carrying rocks, brush, and other debris. Mudflows are a relatively common disaster in San Diego. A mudflow occurs naturally as a result of heavy rainfall on a slope that contains loose soil or debris. Human activity can also induce a slide, such as when soil becomes saturated from a broken water pipe or incorrect diversion of runoff concentrated from developed areas saturates soil.

Mudflows predominantly occur in mountainous areas underlain by geologic formations that produce sandy soils. Weathered gabbroic soils contain large amounts of clay that shrinks and expands with exposure to water, and also have a high potential for instability and sliding. Mudflows can be initiated on slopes as low as 15 degrees, but are more frequently found on slopes as steep as 45 degrees. The path of a mudflow is determined by local topography, and will typically follow existing drainage patterns. The fluidity and depth of the water/soil/debris mixture and the steepness of a channel are all variables that influence the rate of movement of a mudflow. At the foot of a long steep slope, a flow may move at avalanche speed (approximately 40 feet per second or 27 miles per hour) and contains tremendous force capable of destroying buildings and roadways.

Areas recently burned by wildfires are particularly susceptible to flash floods and debris flows during rainstorms. Just a short period of moderate rainfall on a burn scar can lead to flash floods and debris flows. Rainfall that is normally absorbed or intercepted by vegetation can run off almost instantly, causing creeks and drainage areas to flood much sooner during a storm, and with more water, than normal. Additionally, the soils in a burn scar are highly erodible so flood waters can contain high amounts of mud, boulders, and vegetation. The powerful force of rushing water, soil, and rock, both within the burned area and downstream, can destroy culverts, bridges, roadways, and structures, and can place people at risk.

Alluvial Fan Floods

Alluvial fans are a desert phenomenon where streams emerge from canyons and deposit sand and rock in a cone-shaped formation fanning out from the canyon mouth. Alluvial fans form in arid and semi-arid environments where steep mountain fronts meet flatter valley floors. The infrequent but intense storms in these environments produce flash floods that can carry heavy debris and sediment loads. The swiftly flowing streams and washes of steep canyons can transport more debris than slowly moving streams on the gentle valley slopes. When fast moving debris-laden flows reach the mouth of the canyon and spread out across the land, the energy is dissipated over a wider area and they lose the capacity to carry the debris. The flows then deposit large amounts of debris along the mountain front. Over the centuries this buildup of debris spreads out from the canyon mouth to form the classic conical shape of the alluvial fan. In San Diego County alluvial fans occur mostly in the desert. As development expands in the desert, more projects are built on the alluvial fans and are subject to sheet flow flooding.

Non-Precipitation Induced Flooding

Urbanization

The conversion of undeveloped, natural areas to urbanized uses throughout San Diego's watersheds have contributed to increased potential for flooding, by increasing the rate and amount of runoff in a watershed and altering drainage patterns. Construction of impervious surfaces such as rooftops, roads and driveways reduces the amount of rainfall that can infiltrate the ground surface and move to the subsurface. As a result, the volume of surface water runoff increases within a watershed; subsequently, artificial conveyances such as gutters, storm pipes and natural channel improvements to accommodate additional volume accelerate the rate of flow of water in the watershed. This faster moving, higher volume of surface water runoff within a watershed results in a higher probability and increased severity of flooding within a watershed, if facilities are not adequately maintained or constructed to carry peak flow capacity.

Landform Modification

Any alteration to natural drainage patterns by modifying landforms that control the conveyance of surface water can increase the potential for flooding. Grading or other modifications, including directly altering the course of a stream or river by excavation or embankment, can increase velocities of floodwaters, which increases the potential for flooding downstream of the modification. A reduction in the capacity of the watercourse can increase the potential for flooding at the site of the modification as well as upstream from the activity.

Faulty Drainage Facilities

Drainage facilities including storm drains, culverts, inlets, channels or other such structures are designed to prevent flooding by collecting stormwater runoff and directing flows to either the natural drainage course and/or away from urban development. The capacity of a drainage structure can typically be adequately determined by a hydrology and drainage study; however if drainage facilities are not adequately designed or built, or properly maintained, the facilities can overflow or fail, resulting in flooding.

Dam Failure

Dam failure inundation is flooding caused by the release of impounded water from structural failure or overtopping of a dam. The failure of a dam occurs most commonly as a result of extreme rainfall, poor design, neglect, or structural damage caused by earthquakes. This event is extremely hazardous, as it will typically occur quickly and without warning. Areas directly below the dam are at the greatest risk, and as the water moves farther downstream and reduces in velocity and depth, the magnitude of the damage and potential risk to life and property decreases.

The San Diego Multi-Jurisdictional Hazard Mitigation Plan (URS 2004) identifies dam failure risk levels based on dam inundation map data. A dam is considered a high hazard if it stores more than 1,000 AF of water, is higher than 150 feet tall, and has the potential for downstream property damage and/or downstream evacuation. Ratings are set by the Federal Emergency Management Agency (FEMA) and confirmed with site visits by engineers. Dam inundation areas affecting the unincorporated County are listed in Table 2.8-4. Generally, open space, agriculture, or other low occupancy uses are located within these areas, although there are

exceptions. Figure 2.8-7 identifies dam locations, dam inundation areas and dam hazard ratings for San Diego County. According to the Multi-Jurisdictional Hazard Mitigation Plan, an estimated total of 38,004 people in urban unincorporated areas and 3,420 people in rural unincorporated areas would be potentially exposed to flood hazards related to dam failure.

Tsunamis

Tsunamis are long-wavelength, long-period sea waves generated by an abrupt movement of large volumes of water. These waves can be caused by underwater earthquakes, landslides, volcanic eruptions, meteoric impacts, or onshore slope failures. In San Diego, wave heights and run-up elevations from tsunami have historically fallen within the normal range of tides. Table 2.8-3 gives the years and heights of the largest tsunami effects in San Diego. At the most risk for tsunamis is the coast of San Diego, all of which is incorporated or Federal land (Camp Pendleton). The historic record and the location of unincorporated lands away from the coastline indicate that no projects within the unincorporated County have probable potential to be inundated by a tsunami.

Seiches

A seiche is a standing wave in a completely or partially enclosed body of water. Areas located along the shoreline of a lake or reservoir are susceptible to inundation by a seiche. High winds, seismic activity, or changes in atmospheric pressure are typical causes of seiches. The size of a seiche and the affected inundation area is dependant on different factors including size and depth of the water body, elevation, source, and if human made, the structural condition of the body of water in which the seiche occurs.

In San Diego's semi-arid climate, naturally occurring enclosed water bodies are not common. Instead most enclosed water bodies are reservoirs built by local municipalities and water districts to provide water service to local residents and businesses. Typically, all land around the reservoirs' shorelines are in public holdings, such as the City of San Diego or Helix Water District, which restrict private land development and minimize risk of inundation from seiches. Moreover, the public land holdings are not within the jurisdiction of the unincorporated County.

Flood Prone Areas

The potential for flooding in the County of San Diego is high. The climate is semi-arid and the seasonal precipitation is highly variable in frequency, magnitude and location. Infrequent large bursts of rain can rush down steep canyons and flood areas unexpectedly. Flooding in San Diego and the rest of southern California most frequently occurs during winter storm events between the months of November and April, and occasionally during the summer when a tropical storm makes landfall in the region. Most flooding events occur over several days, but can also develop within a matter of hours, particularly in narrow valleys, or in desert alluvial fans that are prone to sheet flow.

Nearly every CPA or Subregion in the unincorporated County contains areas that are subject to flood inundation. As shown in Table 2.8-5, most communities in the unincorporated areas have between 100 to 4,700 acres of land identified as a floodplain. The exception is Borrego Springs in the Desert Subregion, which has more than 30,000 acres of land in its alluvial floodplain. The increased area of the floodplain can be attributed to flash flooding that occurs in desert areas.

According to San Diego's Multi-Jurisdictional Hazard Mitigation Plan (URS 2004), an estimated 19,807 people in unincorporated urban areas and 1,339 people in the unincorporated rural areas would have the potential to be exposed to flood hazards associated with the 100-year floodplain.

Flood Mapping

The Federal Insurance Rate Map (FIRM) is the official map created and distributed by the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP) that delineates the Special Flood Hazard Areas (SFHAs), those areas subject to inundation by the base flood, for every county and community that participates in the NFIP. FIRMs contain flood risk information based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development. It should be noted that alluvial fans are designated as SFHAs on FIRMs. Figure 2.8-8 shows FEMA floodway and floodplain areas for the unincorporated County of San Diego. In addition to the FEMA FIRMs, the County of San Diego has developed its own flood maps that account for additional areas of known risk. The County flood maps delineate 1 percent annual chance (100-year) riverine flood boundaries and elevations for areas not studied by FEMA. The County Mapping Program has floodplain-mapped 148.7 miles of rivers and streams in the unincorporated area.

2.8.2 Regulatory Framework

2.8.2.1 Federal

Clean Water Act (CWA)

The 1972 CWA was designed to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. The CWA also directs states to establish water quality standards for all waters of the U.S. and to review and update such standards on a triennial basis. The U.S. Environmental Protection Agency (EPA) has delegated responsibility for implementation of portions of the CWA in California to the SWRCB and the regional water quality control boards (RWQCBs). This includes water quality control planning and control programs such as the National Pollutant Discharge Elimination System (NPDES), which seeks to control water pollution through the issuance of permits regulating the discharge of pollutants into waters of the U.S. Section 303 of the CWA requires states to adopt water quality standards for all intrastate waters of the U.S.

National Flood Insurance Act

The National Flood Insurance Act of 1968 established the National Flood Insurance Program (NFIP) in order to provide flood insurance within communities that were willing to adopt floodplain management programs to mitigate future flood losses. The Act also required the identification of all floodplain areas within the U.S. and the establishment of flood-risk zones within those areas. The Federal Emergency Management Agency (FEMA) is the primary agency responsible for administering programs and coordinating with communities to establish effective floodplain management standards. FEMA is responsible for preparing Federal Insurance Rate Maps (FIRM) that delineate the areas of known special flood hazards and their risk applicable to the community.

National Flood Insurance Reform Act

The National Flood Insurance Reform Act of 1994 resulted in major changes in the NFIP. The Act, which amended the Flood Disaster Protection Act of 1973, provided tools to make NFIP more effective in achieving its goals of reducing the risk of flood damage to properties and reducing federal expenditures for uninsured properties that are damaged by flood. The Act required mitigation insurance and established a grant program for state and community flood mitigation planning projects.

2.8.2.2 State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, enacted in 1969, authorizes the SWRCB to adopt, review, and revise policies for all waters of the state (including both surface and ground waters) and directs the RWQCBs to develop region-specific Basin Plans. Section 13170 of the California Water Code also authorizes the SWRCB to adopt water quality control plans on its own initiative. The purpose of these plans is to designate beneficial uses of the region's surface and ground waters, designate water quality objectives for the reasonable protection of those uses, and establish an implementation plan to achieve the objectives.

Cobey-Alquist Floodplain Management Act of 1965

Under this Act, local governments are encouraged to plan, adopt and enforce land use regulations for floodplain management, in order to protect people and property from flooding hazards. This Act also identifies requirements that jurisdictions must meet in order to receive state financial assistance for flood control. The County has used the guidelines established by this legislation to produce ordinances, such as the Flood Damage Prevention Ordinance, which promotes public health, safety, and general welfare, and minimizes public and private losses due to flood conditions in specific areas throughout the County. Furthermore, the Act has influenced the direction of Board of Supervisors (BOS) policy decisions, such as defining watercourses in the County of San Diego subject to flood control.

National Pollution Discharge Elimination System (NPDES) Permits

In California, the SWRCB and its RWQCBs administer the NPDES permit program. The NPDES permit system was established in the CWA to regulate both point source discharges and nonpoint source discharges to surface waters of the U.S. The NPDES program consists of characterizing receiving water quality, identifying harmful constituents, targeting potential sources of pollutants, and implementing a comprehensive stormwater management program. Construction and industrial activities are typically regulated under statewide general permits that are issued by the SWRCB. The RWQCB also issues Waste Discharge Requirements that serve as NPDES permits under the authority delegated to the RWQCBs, under the CWA. In November 1990, under Phase I of the urban runoff management strategy, the EPA published NPDES permit application requirements for municipal, industrial, and construction stormwater discharges. With regard to municipalities, the permit application requirements were directed at jurisdictions owning or operating municipal separate storm sewer systems (MS4s) serving populations of 100,000 or more, or contributing significant pollutants to waters of the U.S. Such municipalities were required to obtain coverage under a NPDES municipal stormwater permit as

well as to develop and implement an urban runoff management program to reduce pollutants in urban runoff and stormwater discharges.

California Groundwater Rights

California created a system of appropriating surface water rights through a permitting process in 1913, but groundwater has never had any statewide regulation. Though the regulation of groundwater has been considered on several occasions since 1913, the California Legislature has repeatedly determined that groundwater management should remain a local responsibility. The right to use groundwater in California has evolved through a series of court decisions dating back to the late 1800s. Groundwater rights are usufructuary, meaning the right is not one of absolute ownership, but of the opportunity of use on the overlying land. This use must be reasonable and beneficial.

In 1903, a court ruling established that for landowners overlying an aquifer, each property had a correlative or co-equal right to a just and fair proportion of the resource. These correlative rights only require that all property owners share equally in the resource until it is exhausted, irrespective of the consequences. When the consequences of over-pumping are severe, groundwater users can ask the court to adjudicate, or define, the rights that overlying users have to groundwater resources. To date, there are 19 adjudicated basins in California, mostly in southern California. Eighteen of the adjudications were undertaken in the State Superior Court and one in Federal Court. For each adjudication case, the court appoints a Watermaster to oversee the court judgment. In 15 of these basins, the court judgment limits the amount of groundwater that can be extracted by all parties based on a court determined safe yield of the basin. The Santa Margarita Basin, which is partially located in San Diego County, was adjudicated in Federal Court and requires that water users report the amount of surface and groundwater they use, but groundwater extraction is not restricted.

California Water Code

In the California Water Code there are 22 kinds of districts or local agencies with specific statutory provisions to manage surface water. Many of these agencies have statutory authority to exercise some forms of groundwater management. For example, a Water Replenishment District (Water Code Section 60000 et seq.) is authorized to establish groundwater replenishment programs and collect fees for that service, while a Water Conservation District (Water Code Section 75500 et seq.) can levy groundwater extraction fees. Through special acts of the Legislature, 13 local agencies have been granted greater authority to manage groundwater. Most of these agencies, formed since 1980, have the authority to limit export and even control some in-basin extraction upon evidence of overdraft or the threat of an overdraft condition. These agencies can also generally levy fees for groundwater management activities and for water supply replenishment.

Assembly Bill 3030 - Groundwater Management Act

In 1992, AB 3030 was passed which greatly increased the number of local agencies authorized to develop a groundwater management plan and set forth a common framework for management by local agencies throughout California. These agencies could possess the same authority as a water replenishment district to “fix and collect fees and assessments for

groundwater management" (Water Code Section 10754), provided they receive a majority of votes in favor of the proposal in a local election (Water Code Section 10754.3).

2.8.2.3 Regional/Local

San Diego Basin Plan

The Basin Plan for the San Diego Basin, most recently amended in 2007, sets forth water quality objectives for constituents that could potentially cause an adverse effect or impact on the beneficial uses of water. Specifically, the Basin Plan is designed to accomplish the following: 1) designate beneficial uses for surface and ground waters; 2) set the narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy; 3) describe mitigation measures to protect the beneficial uses of all waters within the region; and 4) describe surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan. The Basin Plan incorporates by reference all applicable SWRCB and RWQCB plans and policies.

Colorado River Basin Plan

Similar to the San Diego Region Basin Plan, the Colorado River Basin Plan (adopted in 2006) sets forth water quality objectives for constituents that could potentially cause an adverse effect or impact on the beneficial uses of water. Specifically, the Colorado River Basin Plan lists and defines the various beneficial water uses of water bodies within its boundaries, describes the water quality which must be maintained to support such uses, describes programs, projects and other actions which are necessary to achieve the standards established in the plan and summarizes the various plans and policies which protect water quality.

San Diego County BOS Policy I-45, Definition of Watercourses in the Subject of Flood Control

The purpose of this policy is to define those watercourses in County of San Diego that are subject to flood control so that appropriate responsibility can be determined. The policy was developed because consideration of flood control methods is essential in the land use decision-making process and the failure of flood control systems may result in property damage and loss of life. The policy provides for maps that specifically designate the watercourses that are subject to flood control, thus eliminating uncertainty and providing a clear and easily accessible record of the district's areas of concern.

San Diego County BOS Policy I-68, Proposed Projects in Floodplains with Defined Floodways

This policy was developed to identify procedures to be used when proposed projects impact floodways as defined on County floodplain maps. The policy defines procedures to be implemented for the following types of proposals: 1) major construction that would change the floodplain or floodway; 2) relocation of a floodway; 3) partial filling of the floodplain fringe; 4) erosion and sedimentation in a floodplain; 5) increased flood flows; and 6) concrete or rip rap facilities.

San Diego County BOS Policy I-73, Hillside Development Policy

The purpose of this policy is to minimize the effects of disturbing natural terrain and to provide for creative design for hillside developments. It provides policies designed to minimize the permanent impact on-site resources including, but not limited to, existing natural terrain, established vegetation, visually significant geologic displays, and portions of a site that have significant public or multiple-use value. Specifically, Policy 1.e requires planning of hillside developments to minimize potential soil, geological and drainage problems.

County of San Diego Code of Regulatory Ordinances Section 91.1.105.10, Flood Damage Prevention Ordinance

This ordinance was established to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas throughout the County of San Diego. This ordinance defines methods to accomplish the goals of reducing flood losses, including: restricting uses which are dangerous to health, safety and property due to erosion or water hazards; requiring uses vulnerable to floods to be protected against flood damage at the time of construction; controlling the alteration of natural flood plains; controlling filling, grading, or dredging which may increase flood damage; and preventing construction of flood barriers which will divert flood waters or increase flood hazards in other areas. This ordinance also provides for provisions for standards of construction and standards for subdivisions in areas of special flood hazards.

County of San Diego Code of Regulatory Ordinances Sections 86.601-86.608, Resource Protection Ordinance (RPO)

For certain discretionary permit types, the RPO prohibits development of permanent structures for human habitation or as a place of work in a floodway. Uses permitted in a floodway pursuant to Section 86.604(c) of this ordinance include agricultural, recreational, and other such low-intensity uses provided that no use shall be permitted which will substantially harm the environmental values of a particular floodway area. Mineral resource extraction is also permitted in a floodway, with an approved Major Use Permit and Reclamation Plan, provided that mitigation measures are required which produce a net gain in the functional wetlands and riparian habitat. Additionally, Section 86.604(d) of the RPO allows uses in the floodplain fringe if they are permitted by zoning and are allowable in the floodway, as long as specific criteria are met.

County of San Diego Code of Regulatory Ordinances Sections 67.801-67.814, Watershed Protection, Stormwater Management, and Discharge Control Ordinance (WPO)

The current WPO was adopted in March of 2008. The stated purposes of this ordinance is to protect the health, safety and general welfare of the County of San Diego residents; to protect water resources and to improve water quality; to cause the use of management practices by the County and its citizens that will reduce the adverse effects of polluted runoff discharges on waters of the State; to secure benefits from the use of stormwater as a resource; and to ensure the County is compliant with applicable state and federal law. The WPO contains discharge prohibitions, and requirements that vary depending on type of land use activity and location in the County. The WPO defines the requirements that are legally enforceable by the County in the unincorporated area.

In addition, the County has adopted its Standard Urban Stormwater Mitigation Plan (SUSMP) for Land Development and Public Improvement Projects. The SUSMP is focused on project design requirements and related post-construction requirements for land development and capital improvement projects, and addresses WPO requirements for these project types. The WPO also contains Low Impact Development (LID) requirements. LID is a storm water management approach that maintains the natural hydrologic character of a site or region by using design techniques that infiltrate, filter, store, evaporate, and detain runoff on site. A LID Handbook was developed in December 2007 to provide the development community with guidance on implementing LID strategies and practices.

San Diego County Code of Regulatory Ordinances Sections 67.701-67.703, 67.710-67.711, 67.720-67.722, Groundwater Ordinance

The County of San Diego currently manages anticipated future groundwater demand through the County Groundwater Ordinance. This Ordinance does not limit the number of wells or the amount of groundwater extraction from existing landowners. However, the Ordinance does identify specific measures to mitigate potential groundwater impacts of projects requiring specified discretionary permits. Existing land uses are not subject to the Ordinance unless a listed discretionary permit is required. Additionally, Major Use Permits or Major Use Permit Modifications which involve construction of agricultural and ranch support facilities or those involving new or expanded agricultural land uses are among the exemptions from the Ordinance. However, the agricultural exemption does not supersede or limit the application of any law or regulation, including CEQA. The Groundwater Ordinance separates the County into three areas of regulations: Borrego Valley, Groundwater Impacted Basins, and All Other Projects.

2.8.3 Analysis of Project Effects and Determination of Significance

2.8.3.1 Issue 1: Water Quality Standards and Requirements

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed General Plan Update have a significant impact if it would violate any water quality standards, otherwise degrade water quality or violate any water quality standards or waste discharge requirements. For land uses proposed at the maximum build-out allowed under the proposed General Plan Update, groundwater impacts may be potentially significant in areas of the County where pollutants exceed their respective Primary State or Federal Maximum Contaminant Level.

Impact Analysis

The following section evaluates the potential for the proposed General Plan Update to violate any water quality standards or otherwise degrade water quality by examining potential surface water quality issues and groundwater quality issues within the unincorporated County. Waste discharge requirements associated with wastewater are addressed in Section 2.16, Utilities and Service Systems.

Surface Water Quality

Development of future land uses as designated in the proposed General Plan Update would have the potential to contribute to a violation of water quality standards or degradation of surface water quality. The following discussion of impacts is organized into two subsections: 1) Impacts from Construction Activities; and 2) Impacts Following Construction.

Impacts from Construction Activities

The development of future land uses as designated in the proposed General Plan Update would have the potential to result in substantial additional sources of polluted runoff which would have short-term impacts on surface water quality through activities such as demolition, clearing and grading, excavation of undocumented fill materials, stockpiling of soils and materials, concrete pouring, painting, and asphalt surfacing. Typically, construction activities involve various types of equipment such as dozers, scrapers, graders, loaders, compactors, dump trucks, cranes, water trucks, and concrete mixers. Additionally, soils are typically stockpiled outdoors, in addition to other construction materials that would be used later during construction. Pollutants associated with these construction activities that would substantially degrade water quality include soils, debris, other materials generated during demolition and clearing, fuels and other fluids associated with the equipment used for construction, paints, other hazardous materials, concrete slurries, and asphalt materials.

Pollutants associated with construction would degrade water quality if they are washed by stormwater or non-stormwater into surface waters. Sediment is often the most common pollutant associated with construction sites because of the associated earth-moving activities and areas of exposed soil. Sediment that is washed off site can result in turbidity in surface waters, which can impact aquatic species. In addition, when sediment is deposited into receiving water it can smother species, alter the substrate and habitat, and alter the drainage course. Hydrocarbons such as fuels, asphalt materials, oils, and hazardous materials such as paints and concrete slurries discharged from construction sites could also impact aquatic plants and animals downstream. Debris and trash could be washed into existing storm drainage channels to downstream surface waters and could impact wildlife as well as aesthetic value.

Under the NPDES permit program, Stormwater Pollution Prevention Plans (SWPPPs) are prepared and the BMPs identified in the SWPPPs are implemented for construction sites greater than one acre, in order to reduce the occurrence of pollutants in surface water. In compliance with applicable construction permits, the development of future land uses as designated in the proposed General Plan Update would continue to implement BMPs that minimize disturbance, protect slopes, reduce erosion, and limit or prevent various pollutants from entering surface water runoff. While these measures help prevent degradation of water quality associated with construction sites greater than one acre, smaller construction activities pursuant to the General Plan Update designations would still have the potential to contribute pollutants such as soils, debris and other materials in quantities that would exceed water quality standards and otherwise significantly degrade water quality.

Impacts Following Construction

Equipment and hazardous materials associated with construction operations would be removed from construction sites after development of proposed land uses is complete, which would reduce the potential for pollutants to be discharged. However, there are multiple constituents that have the potential to degrade surface water quality which are associated with land use

operations after development is constructed. These would include sediment discharge due to construction activities and post-construction areas left bare; nutrients from fertilizers; household hazardous waste that is improperly disposed of, including heavy metals and organic compounds; trash and debris deposited in drain inlets by new residents; oil and grease; by products resulting from vehicle use, including heavy metals; bacteria and viruses; and pesticides from landscaping, agriculture or home use. Generally, these constituents can be referred to as non-point source pollutants. Increased runoff from the development of future land uses as designated in the proposed General Plan Update would result in the contribution of non-point source pollution into surface and groundwater bodies. Although it is not expected that non-point source pollutants, caused from the development of future land uses as designated in the proposed General Plan Update, would violate water quality standards; these constituents would be expected to otherwise degrade water quality.

The NPDES permit program, as authorized by the CWA, controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. Point sources which require a NPDES permit are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Implementation of the General Plan Update would continue to require NPDES permits for any future projects subject to this regulation. Additionally, processes developed by the SWRCB and the RWQCB to improve water quality, such as storm water permits for new development and construction, would continue to be required for land uses and development implemented under the General Plan Update. For example, the State would continue to require General Construction Storm Water Permits, which regulate the discharge of polluted runoff during construction, for all future development over one acre proposed under the General Plan Update. Additionally, the County would continue to specify discharge prohibitions and additional requirements for construction sites as stated in the WPO.

Implementation of the General Plan Update would also have the potential to contribute non-point source pollutants to surface water bodies in quantities that could potentially violate water quality standards. Land uses proposed under the General Plan Update include residential, commercial and industrial, which could increase urban runoff containing oil, grease, metals, pathogens, TDS, sediments, or toxic chemicals. Additionally, multiple policies are proposed under the General Plan Update that would encourage agricultural operations in the County, which have the potential to contribute non-point source pollutants such as fertilizers, herbicides, insecticides, or bacteria into surface water bodies. However, the General Plan Update also includes multiple policies, such as low impact development, that would reduce the potential adverse environmental impacts associated with non-point source pollution.

Within both the incorporated and unincorporated County, over 70 water bodies are in violation of water quality standards. Table 2.8-1 identifies watersheds within the County that contain impaired water bodies as defined by the CWA 303(d) list. This table also shows the major pollutant/stressor for each impaired water body. Generally, pollutants of concern include elevated coliform bacteria levels, elevated levels of iron, manganese, phosphorus, nitrogen, total dissolved solids and various other pollutants. Implementation of the General Plan Update would concentrate future land uses in the western portion of the unincorporated County. Land uses proposed under the General Plan Update, such as residential, commercial, industrial and agricultural, would result in development that would contribute both point and non-point source pollutants to surface water bodies. WMAs that would be impacted by General Plan Update-

designated land uses include Santa Margarita River WMA, San Luis Rey WMA, Carlsbad WMA, San Dieguito WMA, Los Penasquitos WMA, San Diego River WMA, San Diego Bay WMA (including Sweetwater HU, Pueblo San Diego HU and Otay HU), and Tijuana River WMA. The location of these WMAs are shown on Figure 2.8-5. All of these WMAs have water bodies listed on the impaired water body list, as defined by the CWA 303(d) list (see Table 2.8-1). The General Plan Update would allow land uses and development that would contribute additional point and non-point source pollutants within WMAs that are in violation of water quality requirements.

Groundwater Quality

As part of the process for this EIR, the County General Plan Update Groundwater Study (DPLU 2009f) was prepared to evaluate existing water quality conditions that would have the potential to have a potentially significant impact to land uses proposed under the maximum build-out of the proposed General Plan Update. The following discussion summarizes the results of the County General Plan Update Groundwater Study in terms of the contaminants most likely to violate water quality standards. The complete study is provided in Appendix D. Additional information regarding the Groundwater Study is discussed below in Issue 2: Groundwater Supplies and Recharge. It should be noted that there is no water quality data available over a vast portion of the County; therefore, it is likely that there are additional areas within the unincorporated County with groundwater quality problems that are unknown.

The County General Plan Update Groundwater Study determined that the proposed General Plan Update would result in potentially significant impacts to water quality from proposing land uses in groundwater dependent areas that are currently experiencing groundwater contamination. Areas with existing contamination would not be able to support new development due to the non-potable (contaminated) water supply in the area. Groundwater that has contaminants that exceed the federal and State primary MCLs is not considered potable. Therefore, any land uses or development allowable under the proposed General Plan Update and dependent on areas with existing contaminated groundwater would not have a viable source of water. In addition, the proposed General Plan Update would allow for the development of small lots on septic systems and agricultural operations, which have the potential to contribute nitrate in quantities that degrade water quality and contribute to the continual degradation of existing water quality impacted areas. For some future projects, mitigation could be implemented by providing a water treatment system that reduces impacts to below the MCL. To ensure proper water treatment in accordance with the California Safe Drinking Water Act, the County requires discretionary permits which require treatment to form or merge with a water system regulated by the County Department of Environmental Health (up to 200 service connections) or the State Department of Public Health (greater than 200 service connections). For smaller projects, the ongoing costs of a regulated water system may prove economically infeasible and for projects with less than five service connections, there is no feasible regulated water system category available. In some cases, such as aquifers contaminated with gasoline from a leaking underground fuel tank, the County may not approve projects reliant on groundwater in such areas. Therefore, it is likely there will be specific cases where water quality impacts would be significant and unmitigable.

As discussed above in Section 2.8.1.4, Figure 2.8-6 depicts existing areas within the unincorporated County that are currently experiencing groundwater quality issues. These issues include LUFT sites, nitrates, radiochemicals, and areas with parcels smaller than four acres which are potentially susceptible to groundwater quality problems. Groundwater dependent land

uses proposed in the areas identified as having potential water quality impacts would potentially be dependent on a groundwater supply that contains water quality constituents at concentrations above Primary Federal or State Maximum Contaminant Levels, thus violating water quality standards. Contaminants identified in Figure 2.8-6 are discussed below in terms of the proposed General Plan Update.

Nitrates

The development of land uses as designated in the proposed General Plan Update has the potential to violate water quality standards because of existing nitrate contamination. As depicted on Figure 2.8-6, existing unincorporated areas that are experiencing nitrate impacts to groundwater in quantities which violate water quality standards and limit the availability of potable groundwater include portions of: Alpine CPA along I-8; Cameron Corners in Campo (Mountain Empire Subregion); Crest/Dehesa Subregion; Jamul/Dulzura Subregion; Morena Village (Mountain Empire Subregion); Rainbow CPA; Ramona CPA; Valley Center CPA; and areas near Escondido and San Marcos. Other nitrate areas of concern within the unincorporated County include clustered residences located on parcels less than four acres on septic systems, which are also depicted on Figure 2.8-6. As shown in this figure, residences located on parcels less than four acres are generally located in the central portion of the unincorporated County, with increased concentrations occurring in Julian CPA, Jamul/Dulzura Subregion, and the Mountain Empire Subregion.

The proposed General Plan Update would designate land uses in unincorporated areas that are currently experiencing nitrate groundwater quality problems which would be susceptible to concentrations of nitrates that violate water quality standards. Future development of small lots and/or areas with shallow groundwater on septic systems or agricultural operations has the potential to degrade water quality from nitrates.

Naturally Occurring Radionuclides

As discussed above, naturally occurring radionuclides are present to some extent in nearly all rocks and soil throughout the world and leach into groundwater from natural mineral deposits. As depicted in Figure 2.8-6, unincorporated areas that have been identified as having radionuclide contamination include: 1) Campo/Lake Morena (Mountain Empire Subregion); 2) Cuyamaca (Central Mountain Subregion)/Julian CPA; 3) Guatay (Central Mountain Subregion); 4) Jamul/Dulzura Subregion; 5) Lake Wohlford (Valley Center CPA); 6) Potrero (Mountain Empire Subregion); 7) Ramona CPA (east); 8) SR-79 (Dodge Valley) near Riverside County border; and 9) Warner Springs (Desert Subregion).

The proposed General Plan Update would designate land uses over unincorporated County areas that are currently experiencing radionuclide contamination in groundwater. Although it is unlikely that the proposed General Plan Update would exacerbate radionuclde contamination (as this is naturally occurring contaminant), new wells constructed to support development in the above identified areas would be susceptible to concentrations of radionuclides that violate water quality standards. This would be considered a potentially significant impact associated with groundwater quality.

Leaking Underground Fuel Tanks (LUFT)

As depicted on Figure 2.8-6, there are many LUFT sites throughout the unincorporated County which have resulted, or have the potential to result, in petroleum hydrocarbon impacts to groundwater in quantities that violate water quality standards and limit the availability of potable

groundwater. Areas of concern include the Cameron Corners area of Campo (Mountain Empire Subregion), Julian CPA, Pine Valley (Central Mountain Subregion), and several other areas. The proposed General Plan Update would designate land uses over unincorporated County areas that are currently experiencing petroleum contaminated groundwater from LUFT sites. New wells constructed to support development in these areas would be susceptible to inducing the flow of contaminated groundwater which could result in a non-potable water supply. Additionally, some land uses proposed under the General Plan Update, such as industrial and commercial, would be associated with the use of underground fuel tanks. If these tanks were not adequately installed or maintained, they would contribute to groundwater quality degradation. This would be considered a potentially significant impact associated with groundwater water quality.

Other Constituents of Concern

TDS originate naturally from the dissolution of rocks and minerals, and also can be from septic systems, agricultural runoff, and storm water runoff. Elevated bacteria in groundwater occurs primarily from human and animal wastes. The development of future land uses as designated in the proposed General Plan Update would have the potential to contribute other constituents of concern, specifically TDS and bacteria, in quantities that would violate water quality standards. The land uses proposed under the General Plan Update would allow for the development of septic systems, agricultural operations and impermeable surfaces, which are associated with TDS contamination. Additionally, when compared to existing conditions, implementation of the proposed General Plan Update would accommodate an increase in County population, thereby potentially increasing the chance of localized areas of elevated bacteria in groundwater that is attributable to humans. This would be considered a potentially significant impact associated with groundwater water quality.

Federal, State and Local Regulations and Existing Regulatory Processes

In addition to the goals and policies proposed as part of the General Plan Update, federal and State regulations exist that reduce the potential for projects to violate water quality standards. These include, but are not limited to the CWA, which establishes water quality standards for all waters of the U.S.; Porter-Cologne Water Quality Control Act, which requires region-specific basin plans; NPDES, which regulates point source and nonpoint source discharges to surface waters of the U.S.; San Diego Basin Plan, which sets water quality objectives for the San Diego Basin; Colorado River Basin Plan, which sets water quality objectives for the Colorado River Basin; WPO, which protects water resources and improves water quality; and LID requirements, which establish stormwater management techniques.

All discretionary projects, including grading permits, are subject to review by the County for impacts to water quality. Storm Water Management Plans are prepared for essentially all actions associated with increases to impervious surfaces. Larger projects receive more in-depth analysis and have more stringent requirements pursuant to the WPO. Projects that propose the use of groundwater must demonstrate a viable water supply that meets state standards. Samples must be analyzed for radionuclides, nitrates, and other contaminants depending on location. If applicable standards cannot be met, alternative sources or treatment is required.

Septic systems are reviewed by the Department of Environmental Health. Potential impacts to water quality from septic systems are addressed as part of this review and, if necessary, would also be addressed as part of the CEQA compliance for a project.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update includes goals and policies that would reduce the potential for surface and groundwater quality requirements to be violated. Within the Land Use Element and the Conservation and Open Space Element, various goals include specific policies to reduce impacts to a level that would be less than significant. In the Land Use Element, Goal LU-6 would create a built environmental in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policies LU-6.5 and LU-6.9 would support this goal by ensuring that development implement sustainable stormwater management techniques and conform with topography. Goal LU-14 strives for communities and development with adequate wastewater disposal and addresses potential hazards to human health and the environment. This goal is supported by Policy LU-14.1, Policy LU-14.2, Policy LU-14.3 and Policy LU-14.4. These policies would require coordination with wastewater agencies or districts, require land development projects to provide adequate disposal of wastewater, require wastewater treatment facilities serving more than one private property owner to be operated and maintained by a public agency, and prohibit sewer facilities that would induce unplanned growth.

Within the Conservation and Open Space Element, Goal COS-4 promotes a balanced and regionally integrated water management approach to achieve the long-term viability of San Diego County's water quality and supply. Policies COS-4.2, COS-4.3 and COS-4.4 support this goal by requiring drought efficient landscaping, maximizing stormwater filtration and minimizing groundwater contamination from certain land uses. Goal COS-5 encourages the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policies COS-5.2, COS-5.3 and COS-5.5 support this goal minimizing impervious space and impacts from development to local water supplies.

Summary

The development of future land uses as designated in the proposed General Plan Update would contribute pollutants such as sediments, hydrocarbons and paints in quantities that would otherwise significantly degrade surface water quality. It is also anticipated that non-point source pollutants, caused from the development of future land uses as designated in the proposed General Plan Update, would otherwise degrade surface water quality. Additionally, the County General Plan Update Groundwater Study determined that the proposed General Plan Update would result in potentially significant impacts to water quality from proposing land uses in groundwater dependent areas that are currently experiencing groundwater contamination. Additionally, proposed land uses may exacerbate existing groundwater quality impacts. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to protect water quality, specific measures that implement these policies and regulations are proposed to ensure that the intended protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact to water quality standards and requirements and specific implementation programs are identified as mitigation.

2.8.3.2 Issue 2: Groundwater Supplies and Recharge

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed General Plan Update would have a significant impact if it would 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).

Impact Analysis

As part of this EIR, a County General Plan Update Groundwater Study (DPLU 2009f) was prepared to evaluate the impacts of the proposed General Plan Update land uses on groundwater resources within the groundwater dependent portion of the County. The results from the County's groundwater study provide a regional screening level assessment to evaluate impacts to groundwater resources from the maximum build-out of the land uses proposed under the General Plan Update. The complete Groundwater Study is provided in Appendix D.

The study area for the County General Plan Update Groundwater Study consisted of approximately 1,885 square miles in the unincorporated County which is entirely groundwater dependent. The study area is bounded by Riverside County to the north, the U.S./Mexico international border to the south, the SDCWA service area boundary to the west, and desert basin aquifers and Imperial County to the east. The study area boundaries for the County Groundwater Study are identified in Figure 2.8-2. The study area uses no imported water, and imported water service is unlikely to be available for the foreseeable future within the study area. This is due to a number of reasons including: 1) lack of infrastructure, 2) limited availability of water in the desert southwest, 3) cost of providing imported water service; and, 4) discretionary approvals needed to extend the SDCWA boundaries further to the east.

Unincorporated areas excluded from the General Plan Update Groundwater Study include the western region of the County within the SDCWA service area, which is largely supplied with imported water from member agencies of the SDCWA. The analysis methodology used in the Groundwater Study was not applicable to desert basins and, therefore, desert basin aquifers in the eastern portion of the County were excluded. A summary of groundwater conditions within Borrego Valley are discussed separately below. The water supply situation of unincorporated lands that rely on imported water from the SDCWA is discussed within Section 2.16, Utilities and Service Systems.

The following discussion summarizes the methodology and results of the County Groundwater Study by examining groundwater supplies and recharge constraints under build-out of the proposed General Plan Update within four categories: 1) areas that would experience a 50 percent reduction of groundwater in storage; 2) areas that may be currently impacted by the combined drawdown of existing wells; 3) areas that would experience a high frequency of low well yield; and 4) Borrego Valley Aquifer.

50 Percent Reduction of Groundwater in Storage

As part of the County General Plan Update Groundwater Study, an evaluation of long-term groundwater availability within the unincorporated County was conducted on a basin-by-basin basis by comparing estimated groundwater recharge rates over a 34-year period of record to groundwater demand from existing land uses and land uses proposed under the proposed General Plan Update. For land uses proposed at the maximum build-out allowed under the proposed General Plan Update, groundwater impacts were considered potentially significant if a soil moisture balance, conducted using 34 years of precipitation data, indicated that at any time groundwater in storage within a basin was reduced to a level of 50 percent or less of maximum theoretical storage as a result of groundwater extraction.

The evaluation of long-term groundwater availability for each basin within the County General Plan Update Groundwater Study involved estimating the rate of groundwater recharge, the available storage capacity, and the rate of groundwater consumption. To estimate cumulative impacts to each basin, the soil moisture balance methodology was used to calculate groundwater recharge on a monthly basis for a 34-year time period. The groundwater demand and groundwater storage capacity were then estimated for each basin. A comparison of monthly recharge with groundwater extraction was made to calculate depletion of groundwater in storage during months when groundwater extraction exceeded recharge. If the cumulative depletion of storage of a basin during any month (over the 34-year period calculated) reached a level of 50 percent or less as a result of groundwater extraction, this was considered a potentially significant impact. The 50 percent criterion was established to address the unique characteristics of the County fractured rock aquifers which are characterized by limited storage capacity and very limited groundwater recharge during droughts and excess recharge during wet periods. These unique characteristics typically cause large fluctuations of the groundwater table over the short-term which are generally not observed in aquifers with large storage capacities. Unlike alluvial basins, it should be understood that groundwater impacts within fractured rock basins are typically limited to localized areas near a given pumping well (or wells) and impacts from any given area likely do not extend basin-wide. For this reason, the County General Plan Update Groundwater Study also identifies large quantity/clustered groundwater users (discussed below) within the study area where localized groundwater impacts are most likely to occur.

The County General Plan Update Groundwater Study identified 11 groundwater basins as potentially experiencing substantial groundwater in storage depletion from build-out of the proposed General Plan Update. These include the Ballena Basin, Barona Basin, Engineer Springs Basin, Guatay Basin, Las Lomas Muertas Basin, Lee Basin, Lyon Basin, Morena South Basin, Pine South Basin, San Felipe South Basin, and Spencer Basin. Figure 2.8-9 identifies the location of these impacted basins in addition to providing a summary of long-term groundwater availability results for each of the 86 basins evaluated in the County Groundwater Study. As shown in Figure 2.8-9, the majority of the 86 groundwater basins evaluated in the County Groundwater Study would retain a minimum of 80 to 100 percent of groundwater in storage under implementation of the General Plan Update. However, the 11 basins previously mentioned were determined to be potentially impacted upon build-out of the proposed General Plan Update. Table 2.8-6 identifies the 11 impacted groundwater basins in terms of existing minimum groundwater in storage and estimated minimum groundwater in storage at maximum build-out of future land uses as designated in the proposed General Plan Update. Seven of these 11 basins are expected to experience an estimated minimum groundwater in storage level of zero percent at a maximum buildout. This reduction in groundwater in storage would

substantially deplete groundwater supplies to a level that would not support the development of future land uses as designated in the proposed General Plan Update. Therefore, this would be considered a potentially significant impact. However, it is important to understand that due to the sheer size and complexity of the 1,885 square mile study area, the long-term groundwater availability results (being based on a limited amount of readily available information) are subject to substantial error and uncertainty. Therefore, a conservative approach was mandatory in the study to bias any potential errors towards overestimation of potential impacts. It should further be understood, that due to the nature of fractured rock aquifers, impacts to these basins would likely be limited to localized areas of higher groundwater use and do not necessarily extend basin-wide into areas with adequately spaced groundwater users. As discussed below, large quantity/clustered groundwater users identified within these 11 basins are areas where localized groundwater impacts are most likely to occur. Site-specific groundwater investigations would be necessary for future groundwater-dependent projects in these potentially impacted basins to provide specific details of the significance of groundwater impacts that cannot be provided at the screening level scale in which the study was conducted.

Large Quantity/Clustered Groundwater Users

The General Plan Update Groundwater Study identified areas that have been impacted in the past by large quantity groundwater users. As a screening tool to evaluate potential impacts from the proposed General Plan Update, groundwater impacts were considered potentially significant in identified areas of the County which would be currently impacted by the combined drawdown of existing wells. This screening tool identified potential impacts to proposed land uses from known areas where existing drawdown may prevent future wells from meeting their proposed land use objectives.

Clustered development areas utilize a concentrated amount of groundwater in a relatively small area, which increases the potential for a localized rapid decline in the water table to occur. As discussed in Section 2.8.1.1, susceptible areas that could be impacted by the combined drawdown of existing wells (well interference) include clustered residences on lots smaller than four acres, irrigated agricultural lands, and other known large groundwater users. Well interference reduces the well yield in affected wells by reducing the available drawdown in the well. The magnitude of well interference is dependent on the number and spacing of wells, the pumping rate, groundwater recharge, properties of the aquifer, and duration over which the pumping has occurred. Additionally, if clustered development is underlain by fractured rock with little saturated alluvium or residuum, the potential for water shortages is greater.

Areas that have been identified within the unincorporated County as currently experiencing groundwater supply impacts from large quantity and clustered groundwater users are shown on Figure 2.8-3. Based upon the screening tool identified above, this figure also depicts areas that would be potentially susceptible to localized groundwater problems under implementation of the proposed General Plan Update (shown in red). Areas identified as potentially experiencing localized groundwater impacts include parcels smaller than four acres, and irrigated agricultural lands.

Implementation of the proposed General Plan Update would designate land uses in areas that are currently experiencing groundwater supply impacts from large quantity and clustered groundwater users. Ballena Valley (Ramona CPA), Guatay (Central Mountain Subregion), Julian Town Center in Julian CPA, and Morena Village (Mountain Empire Subregion) have been identified under existing conditions as potentially experiencing groundwater problems from large

quantity and clustered groundwater users. Under implementation of the proposed General Plan Update, these areas would also face potentially significant groundwater supply issues because existing drawdown would have the potential to prevent future wells from meeting their proposed land use objectives. Therefore, this would be considered a significant impact.

Low Well Yield

The General Plan Update Groundwater Study considered groundwater impacts to be potentially significant if land uses proposed under the General Plan Update would occur in identified areas of the County which currently have a high frequency of wells with low well yield. Well yield and storage infrastructure must be capable of providing the water demand for a given project in groundwater-dependent areas of the County. For proposed residential groundwater discretionary projects on private wells, DPLU requires project applicants to conduct well testing on selected lots to determine if well production meets the required standard of 3 gpm for each well tested. Wells tested that cannot meet this requirement are considered to have a significant impact.

While most wells drilled in the County have been able to meet the needs of a typical single-family residence, approximately 11 percent of the 750 well logs reviewed within fractured rock aquifer areas had a reported well production rate of less than 3 gpm. As illustrated on Figure 2.8-2, area distribution of well yields often show no discernable pattern in fractured rock aquifers, and wells located near one another often have a large difference in yield. However, certain areas do have a series of wells with low production rates. Any area that has a series of wells with an indicated production rate of less than 3 gpm is shown in red on Figure 2.8-2 as a potentially susceptible area for low well yield. Portions of Lakeside CPA, Ramona CPA, and Morena Village (Mountain Empire Subregion) have been identified as areas which have a high frequency of wells with low well yield. Also, all steep slope areas depicted as slightly fractured crystalline rock on Figure 2.8-2 are considered generally susceptible to having low yielding wells.

The proposed General Plan Update would designate land uses requiring groundwater dependency in areas currently experiencing a high frequency of wells with low well yield, which would exacerbate existing groundwater impacts and potentially result in an inadequate water supply for additional users. The General Plan Update Groundwater Study indicates that the build-out development of future land uses as designated in the proposed General Plan Update would not be supported by adequate groundwater due to some wells having low-well yield in the portions of Lakeside, Ramona, and Morena Village and areas with steep slopes. Therefore, this would be considered a significant impact.

Borrego Valley

Borrego Valley covers an area of approximately 100 square miles within the Borrego Springs area of the Desert Subregion. As discussed in Appendix A of the General Plan Update Groundwater Study (provided as Appendix D to this EIR), Borrego Water District estimated that in 1999 the water remaining in the Borrego Valley upper and middle aquifers was approximately 1,685,000 AF. Based upon this estimation of groundwater in storage in 1999, if the overdraft condition continues at the estimated rate of 14,300 AF/Y, the upper and middle aquifers would be 50 percent depleted in approximately 50 years, and would be completely depleted in approximately 100 years. Although there are a number of factors that are not fully known regarding the Borrego Valley aquifer, groundwater overdraft conditions have more than tripled

since the 1980s, and any development consistent with the proposed General Plan Update and without groundwater mitigation measures in Borrego Valley would intensify the existing overdraft conditions.

Groundwater impacts from the overdraft condition are already occurring and will continue to worsen as mining of groundwater continues from development allowable under land uses proposed in the General Plan Update. Current impacts include dry wells, decreased well efficiency and increased pumping costs as water levels continue to decline. Under implementation of the General Plan Update, these conditions would continue and more wells would need to be replaced as water levels drop below perforated levels. Also, water quality impacts would occur as decreased water levels would induce flow of high salinity, poor quality connate water found in deeper formational materials of the aquifer. If continuing unabated, this would eventually necessitate the additional costly treatment of groundwater to make the water suitable as a drinking water supply.

Currently, building permits are granted on a case-by-case basis by the County, and it is not possible to accurately estimate the number of legally buildable parcels in Borrego Valley. However, the significant inventory of existing un-built lots could possibly provide over 3,000 future residential units without any additional subdivision. For Borrego Valley, the maximum number of allowable additional residential units permitted by the proposed General Plan Update is 8,689. An additional 8,689 residential units would be anticipated to use approximately 8,255 AF of groundwater per year (0.95 AF per residential unit). Without mitigation, this would increase the overdraft condition in Borrego Valley to over 22,000 AF/year and the aquifer would be depleted in far less time than previously estimated. The full build-out of the proposed General Plan land uses in the Desert Subregion is the worst-case scenario. Therefore, the General Plan Update would have a potentially significant impact to the Borrego Valley aquifer.

It should be noted that, based on recent development trends in Borrego Valley, build-out in the 21st century is unlikely, unless development trends change drastically. Between January 2001 and June 2008, approximately 42 residential building permits for Borrego Valley were processed per year by the County. At this rate of development, it would take approximately 200 years for build-out of the General Plan Update to occur.

Federal, State and Local Regulations and Existing Regulatory Processes

In addition to the goals and policies proposed as part of the General Plan Update, federal and State regulations exist that reduce impacts to groundwater supplies and recharge. These include, but are not limited to the: Porter-Cologne Water Quality Control Act, which requires region-specific Basin Plans; San Diego Basin Plan, which sets water quality objectives for the San Diego Basin; Colorado River Basin Plan, which sets water quality objectives for the Colorado River Basin; WPO, which protects water resources and improves water quality; and the County Groundwater Ordinance, which is intended to mitigate potential groundwater impacts of discretionary projects.

Through the Groundwater Ordinance and the County's CEQA Groundwater Guidelines, projects are currently reviewed on a case-by-case basis when proposing to use groundwater. Pump tests and modeling are typically required to demonstrate a viable water supply. These requirements are described in greater detail in these documents. In addition, specific guidance and mitigation is provided in the Groundwater Guidelines for all projects in Borrego since they all rely on its aquifer for water. It should also be noted that groundwater in Borrego Valley is

currently managed through local water agencies (Borrego Water District and Borrego Springs Park Community Services District). Management efforts aimed at addressing the overdraft condition of the Borrego aquifer include groundwater preservation fees; irrigated agricultural land purchases; tiered water rates; water recycling; artificial recharge; monitoring and data gathering; importation from other nearby basins or districts; and potential water storage and recovery efforts (see Appendix D, Groundwater Study, for additional details).

Proposed General Plan Update Goals and Policies

The proposed General Plan Update includes goals and policies that promote sustainable groundwater resources throughout the unincorporated County. Within the Land Use Element and the Conservation and Open Space Element, various goals include specific policies to reduce impacts to a level that would be less than significant. In the Land Use Element, Goal LU-8 promotes sustainable aquifers and functional groundwater recharge areas. Policies LU-8.1 and LU-8.2 would support this goal by requiring land use densities relate to groundwater sustainability and resources. Goal LU-13 and Goal COS-4 are the same and encourage a balanced and regionally integrated water management approach to ensure the long-term viability of San Diego County's water quality and supply. Policies LU-13.1 and LU-13.2 support this goal by requiring a commitment of water supply for new development and coordinating land use planning with water infrastructure planning. Policies COS-4.1, COS-4.2, COS-4.3 and COS-4.4 also support these goals by encouraging water conservation, drought efficient landscaping, stormwater filtration and minimizing potential groundwater contamination. Goal COS-5 would ensure the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.5 would support this goal by requiring new development projects to avoid impacts to the water quality in local reservoirs.

Conclusion

As discussed in the County General Plan Update Groundwater Study, there are multiple areas in the unincorporated County that are currently experiencing groundwater supply impacts. Implementation of the General Plan Update would allow land uses and development to occur in these areas, thereby worsening an already unsustainable groundwater supply. As discussed above, at maximum build-out of land uses proposed in the General Plan Update, groundwater supply impacts would occur in: 1) areas that experience a 50 percent reduction of groundwater in storage; 2) areas that may be currently impacted by the combined drawdown of existing wells; 3) areas that experience a high frequency of low well yield; and 4) Borrego Valley. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to protect groundwater resources, they would not be sufficient to ensure that significant impacts to groundwater resources are avoided. Therefore, the proposed project would result in a potentially significant impact to groundwater resources and mitigation measures would be required.

2.8.3.3 Issue 3: Erosion or Siltation

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would substantially alter the existing drainage pattern of the

site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

Impact Analysis

Implementation of the General Plan Update would result in the alteration of drainage patterns during construction activities and after construction activities associated with proposed land uses and development. The following section describes the potential impacts that would result from these activities that could alter the existing drainage pattern of a site or area, including through the alternation of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

Impacts from Construction Activities

Development of land uses designated in the proposed General Plan Update would result in the construction of residential, commercial and industrial structures. Land-disturbing construction activities such as the grading and excavation of land for construction of new building foundations, roads, driveways, and trenches for utilities, has the potential to result in localized temporary or permanent alteration of drainage patterns, or hydromodification. Hydromodification refers to changes in the magnitude and frequency of stream flows as a result of urbanization, and the resulting impacts on the receiving channels in terms of erosion, sedimentation, and degradation of in-stream habitat. This can lead to indirect effects on communities and sensitive biological resources downstream in the watershed, including: the deposition of pollutants and sediment to the watershed outlets; an increase in polluted runoff to surface and groundwater receiving bodies, and an increase in the flood potential downstream.

New construction and development of land uses designated in the proposed General Plan Update would continue to implement the NPDES permit program, which requires a SWPPP to be prepared and BMPs to be identified for construction sites greater than one acre. Additionally, all land disturbance activities occurring within the unincorporated County would be subject to the discharge prohibitions and additional requirements stated in the County WPO. Adherence to existing regulations would reduce erosion by minimizing site disturbance and controlling internal construction erosion.

Implementation of the General Plan Update would result in land disturbing activities from the construction of residential structures, industrial structures, commercial structures or infrastructure. These land disturbing activities would alter drainage patterns in a manner that would result in substantial erosion or siltation on or off site.

Impacts Following Construction

Development of land uses designated in the proposed General Plan Update would result in the construction of new residential, commercial, and industrial buildings, roadways, agriculture, landscaping, and other features within the unincorporated County that are anticipated to result in permanent alterations to existing drainage patterns by converting areas within the County from pervious surfaces to impervious surfaces. Allowing the permanent development of impervious surfaces within the unincorporated County would increase runoff and potentially result in new erosion problems or the worsening of existing erosion problems. Development of land uses designated in the proposed General Plan Update would result in alterations to

existing drainage patterns in a manner that would result in substantial erosion or siltation on and off site.

Federal, State and Local Regulations and Existing Regulatory Processes

In addition to the goals and policies proposed as part of the General Plan Update, federal and State regulations exist that reduce on-site and off-site erosion. For example, the MS4 permit, required by NPDES, requires the development of a hydromodification management plan (HMP). Pursuant to RWQCB Order 2007-0001, provision D.1.g, HMPs shall be prepared with the purpose of managing increases in runoff discharge rates and durations from specific projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force. Additional existing regulations include, but are not limited to, the following: NPDES, which regulates point source and nonpoint source discharges to surface waters of the U.S.; the County Grading, Clearing and Watercourses Ordinance, which requires work to be conducted in such a manner as to protect against both short-term and long-term erosion and instability; WPO, which protects water resources and improves water quality; and LID, which establishes stormwater management techniques. As a result of these requirements, discretionary projects are reviewed for hydrology similar to the extent that they are for storm water quality. Regulations require site design to account for hydrology and drainage studies are required for projects with significant increases in impervious surfaces. Projects are discouraged from diverting or increasing flows that cross a site. Larger projects (those with 50 acres of disturbance or greater) are subject to hydromodification requirements and must develop a project-level HMP.

Proposed General Plan Update Goals and Policies

The General Plan Update includes goals and policies that would reduce the potential for significant drainage impacts to occur in a manner which would result in substantial erosion or siltation on or off site. Within the Land Use Element and Conservation and Open Space Element, various goals include specific policies to reduce impacts to a level that would be less than significant. Within the Land Use Element, Goal LU-6 would create a built environment in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policy LU-6.5 supports this goal by ensuring that development minimize the use of impervious surfaces, use Low Impact Development techniques, and incorporate best management practices. Policy LU-6.9 would require new development to conform to the natural topography of the site to utilize natural drainage and topography in conveying stormwater.

Within the Conservation and Open Space Element, Goal COS-5 would ensure the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.3 would support this goal by requiring new development to protect downslope areas from erosion.

Summary

The development of future land uses as designated in the proposed General Plan Update would have the potential to result in the alteration of drainage patterns in a manner which would result in substantial erosion or siltation on or off site. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts

associated with excessive erosion or siltation, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with excessive erosion or siltation and specific implementation programs are identified as mitigation.

2.8.3.4 Issue 4: Flooding

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site.

Impact Analysis

Implementation of the General Plan Update would result in the alteration of drainage patterns during construction activities and after construction activities associated the development of future land uses as designated in the proposed General Plan Update. The following section describes the potential impacts that would result from these activities that could alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site.

Impacts from Construction Activities

Land-disturbing construction activities associated with the development of future land uses as designated in the General Plan Update, such as grading and excavation, construction of new building foundations, roads, driveways, and trenches for utilities, would result in the localized alteration of drainage patterns. Temporary ponding and/or flooding could result from such activities, from temporary alterations of the drainage system (reducing its capacity of carrying runoff), or from the temporary creation of a sump condition due to grading.

Under the NPDES permit program, Stormwater Pollution Prevention Plans (SWPPP) are prepared and BMPs identified in the SWPPPs are implemented for construction sites greater than one acre, which reduce the likelihood of alterations in drainage to result in these impacts. In compliance with applicable construction permits, the development of future land uses as designated in the proposed General Plan Update would continue to implement BMPs, such as the following:

- **Minimizing disturbed areas.** Clearing of land is limited to that which will be actively under construction in the near term, new land disturbance during the rainy season is minimized, and disturbance to sensitive areas or areas that would not be affected by construction is minimized.
- **Stabilizing disturbed areas.** Temporary stabilization of disturbed soils is provided whenever active construction is not occurring on a portion of the site, and permanent stabilization is provided by finish grading and permanent landscaping.

- **Protecting slopes and channels.** Outside of the approved grading plan area, disturbance of natural channels is avoided, slopes and crossings are stabilized, and increases in runoff velocity caused by the project is managed to avoid erosion to slopes and channels.
- **Controlling the site perimeter.** Upstream runoff is diverted around or safely conveyed through the project and is kept free of excessive sediment and other constituents.
- **Controlling internal erosion.** Sediment-laden waters from disturbed, active areas within the site are detained.

Implementation of appropriate BMPs, as part of compliance with construction permits for construction sites greater than one acre, would reduce the potential for the development of future land uses as designated in the proposed General Plan Update to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in flooding on or off site.

Impacts Following Construction

The development of future land uses as designated in the proposed General Plan Update would result in land uses that would convert permeable surfaces to impermeable surfaces, such as houses, buildings, parking lots, and roadways. An increase in impermeable surfaces would substantially alter the existing drainage pattern of a site or area by increasing the amount and rate of surface runoff in a manner which would have the potential to result in flooding on or off site. Additionally, impermeable surfaces and development would potentially create a diversion from the natural runoff pattern in a manner that would have the potential to result in flooding. In undeveloped areas such as much of eastern unincorporated San Diego County, rainfall collects and is stored on vegetation, in the soil column, or in surface depressions. When this storage capacity is filled, runoff flows slowly through the soil as subsurface flow. In contrast, developed areas, where much of the land surface is covered by roads and buildings, have less capacity to store rainfall. Impermeable surfaces such as roads, roofs, parking lots, and sidewalks that store little water, reduce infiltration of water into the ground, and accelerate runoff to ditches and streams. Even in suburban areas, where lawns and other permeable landscaping would be common, rainfall can saturate thin soils and produce overland flow, which runs off quickly. As a result of accelerated runoff from development or construction activities, the peak discharge, volume, and frequency of floods would increase in nearby streams (Konrad 2003).

The development of future land uses as designated in the proposed General Plan Update would increase the rate and amount of surface runoff to streams and rivers in a manner which would result in flooding on or off site.

Federal, State and Local Regulations and Existing Regulatory Processes

In addition to the goals and policies proposed as part of the General Plan Update, federal and State regulations exist that reduce the potential for on-site or off-site flooding from drainage pattern alteration. These include, but are not limited to, the following: National Flood Insurance Act, which establishes flood-risk zones within floodplain areas; National Flood Insurance Reform Act, which reduces the risk of flood damage to properties; Cobey-Alquist Floodplain Management Act, which protects people and property from flooding hazards; BOS Policy I-45, which identifies procedures to use when proposed projects impact floodways; County Flood Damage Prevention Ordinance, which regulates development within all areas of special flood

hazards and areas of flood-related erosion hazards, and establishes policies that minimize public and private losses due to flood conditions; the County Grading, Clearing and Watercourses Ordinance, which prohibits work within watercourses that would result in flood hazards; and RPO, which prohibits development of permanent structures for human habitation in a floodway. As discussed under Issue 3, these and other regulations result in a substantial amount of review by the County on the hydrologic impacts of proposed projects. Through these reviews, studies are performed and design changes or mitigation are required when necessary.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update includes goals and policies that reduce the potential for the substantial alteration of existing drainage patterns of a site or area or the excessive increase in runoff to occur in a manner which would result in flooding on or off site. Within the Land Use Element, and Safety Element, various goals include specific policies to reduce impacts to a level that would be less than significant. Within the Land Use Element, Goal LU-6 would to create a built environment in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policy LU-6.5 supports this goal by ensuring that development minimizes the use of impervious surfaces, to use other Low Impact Development techniques, and to use best management practices. Policy LU-6.10 supports this goal by requiring new development be located and designed to protect property and residents from hazard risks.

Within the Safety Element, Goal S-9 is to minimize personal injury and property damage losses resulting from flood events. Policy S-9.3 would support this goal by minimizing new development in floodplains. Goal S-10 would ensure that floodways and floodplains have acceptable capacity to accommodate flood events. Policy S-10.2 would support this goal by requiring the use of natural channels for County flood control facilities. Policy S-10.3 would require flood control facilities to be adequately sized, constructed, and maintained to operate effectively. Policy S-10.4 would require new development to incorporate measures to minimize storm water impacts. Policy S-10.6 would ensure new development maintains the existing area's hydrology.

Summary

The development of future land uses as designated in the proposed General Plan Update would have the potential to result in substantial alteration of existing drainage patterns and increase the rate or amount of surface runoff in a manner which would result in flooding on or off site during construction activities and after construction activities. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce flooding hazards, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with flooding and specific implementation programs are identified as mitigation.

2.8.3.5 Issue 5: Exceed Capacity of Stormwater Systems

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would 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.

Impact Analysis

Drainage facilities including storm drains, culverts, inlets, channels, curbs, roads, or other such structures are designed to prevent flooding by collecting stormwater runoff and directing flows to either the natural drainage course and/or away from urban development. If drainage facilities are not adequately designed, built, or properly maintained, the capacity of the existing facilities can be exceeded resulting in flooding and increased sources of polluted runoff.

Implementation of the proposed General Plan Update would have the potential to substantially alter drainages and hydrology, during construction and post-construction activities allowable under the proposed land uses, which would potentially increase runoff in volumes that would exceed the existing storm water drainage systems in the County. Land disturbing construction activities associated with development allowable under the land uses proposed in the General Plan Update, such as grading and excavation of project sites, construction of new building foundations, roads, driveways, and trenches for utilities, would result in the localized alteration of drainage patterns. These alterations would have the potential to result in temporarily exceeding the capacity of storm water facilities if substantial drainage is rerouted. Under the NPDES permit program, construction activities on sites larger than one acre, and allowable under the proposed General Plan Update land uses, would be required to prepare SWPPPs and identify BMPs to reduce the likelihood that existing stormwater facilities would be exceeded. Additionally, all ground disturbing activities, allowable under the land uses proposed in the General Plan Update, would be required to comply with the WPO.

Implementation of the General Plan Update would result in land uses and development that would increase the amount of impermeable surfaces throughout the County and potentially result in an excess of polluted runoff that would exceed the capacity of existing drainage facilities. Storm water discharges are generated by precipitation and runoff from land, pavement, building rooftops, and other surfaces. Storm water runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Residential, commercial and industrial land uses proposed under the General Plan Update would increase the amount of impermeable surfaces within the unincorporated County from the development of building rooftops, parking lots, pedestrian paths and sidewalks, roads and driveways associated with these land uses. Generally, higher density land uses, such as village residential or village core mixed use, are attributable to higher concentrations of impermeable surfaces. Under implementation of the proposed General Plan Update, the western portion of the unincorporated County would be particularly susceptible to an increase in impermeable surfaces because this area would be concentrated with higher density land uses to accommodate future growth. Substantial increased runoff volumes would have the potential to overload existing drainage facilities and increase flows and velocity which could result in flooding, increased erosion, and impacts to downstream receiving waters and habitat integrity.

In most cases, future development of land uses proposed under the General Plan Update would incorporate swales, ditches, and storm drains where appropriate to convey runoff. In some cases, detention facilities would be proposed to attenuate post-development flows. However, if drainage facilities are not adequately designed, built, or properly maintained, existing stormwater facilities would potentially overflow or fail. Therefore, the construction and post-construction activities involved with the development of the land uses proposed under the General Plan Update would have the potential to increase runoff in volumes that would exceed the existing storm water drainage systems in the County.

Federal, State and Local Regulations and Existing Regulatory Processes

The regulations that apply to this issue are the same as those discussed above in Section 2.8.3.1, Issue 1: Water Quality Standards and Requirements; Section 2.8.3.3, Issue 3: Erosion or Siltation; and Section 2.8.3.4, Issue 4: Flooding.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update contains goals and policies that would reduce the potential for the development of future land uses as designated in the General Plan Update to exceed stormwater drainage systems. Within the Land Use Element, Conservation and Open Space Element and Safety Element, various goals include specific policies to reduce impacts to a level that would be less than significant. Within the Land Use Element, Goal LU-6 aims to create a built environment in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policy LU-6.5 would support this goal by ensuring development minimizes the use of impervious surfaces, to use other Low Impact Development techniques, and to use best management practices. Policy LU-6.9 would require new development to utilize natural drainage and topography in conveying stormwater to the maximum extent practicable.

Within the Conservation and Open Space Element, Goal COS-4 would create a balanced and regionally integrated water management approach to achieve the long-term viability of San Diego County's water quality and supply. Policy COS-4.3 would support this goal by maximizing stormwater filtration and the natural drainage patterns. Goal COS-5 would ensure the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.2 would support this goal by requiring new development to minimize the use of directly connected impervious surfaces and to retain stormwater runoff.

Within the Safety Element, Goal S-9 would minimize personal injury and property damage from flood events. Policy S-9.2 would support this goal by minimizing new development in floodplains. Goal S-10 would ensure that floodways and floodplains have acceptable capacity to accommodate flood events. Policy S-10.2 would support this goal by requiring the use of natural channels for County flood control facilities. Policy S-10.3 would require flood control facilities to be adequately sized, constructed, and maintained to operate effectively. Policy S-10.4 would require new development to minimize storm water impacts. Policy S-10.5 would require new development to provide necessary on-site and off-site improvements to storm water runoff and drainage facilities. Policy S-10.6 would ensure that new development maintains the existing area's hydrology.

Summary

The development of future land uses as designated in the proposed General Plan Update would have the potential to contribute run-off in a manner that would exceed existing stormwater drainage facilities. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts to stormwater systems, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with the exceedance of stormwater drainage system capacity and specific implementation programs are identified as mitigation.

2.8.3.6 Issue 6: Housing within a 100-year Flood Hazard Area

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

Impact Analysis

Flooding can inundate and cause water damage to structures, bury structures, knock them off their foundations, or completely destroy them by the impact of high velocity water and debris, which can include sizable boulders. Impacts resulting from flooding include the loss of life and/or property; health and safety hazards; disruption of commerce, water, power, and telecommunications services; loss of agricultural lands; and infrastructure damage.

Land uses proposed under the General Plan Update that have the highest potential to contain housing, due to residential designations, include village residential, village core mixed use, semi-rural residential, and rural residential. Table 2.8-7 identifies proposed land uses under implementation of the General Plan Update that would occur within a FEMA 100-year floodway or floodplain or alluvial fan. Under the proposed General Plan Update, approximately 2,824 acres of village residential, less than one acre of village core mixed use, 15,282 acres of semi-rural residential, and 19,925 acres of rural land uses are proposed within these flood areas. Allowable land uses under these designations include housing. Increased development of land uses in the flood plain would reduce the County's ability to respond to floodplain issues and result in a greater potential for conflicts with flooding hazards. Therefore, this is considered to be a significant impact.

It should be noted that when compared to existing land use designations throughout the County, the General Plan Update would designate lower density land uses in some areas with the potential to experience flooding and would, therefore, result in less development and a lesser risk for housing to be placed within certain flood hazard areas. Chapter 4.0, Project Alternatives, provides more information on the proposed project as compared to the No Project Alternative, which would continue to implement the existing General Plan land uses throughout the unincorporated County.

Federal, State and Local Regulations and Existing Regulatory Processes

Federal, state and local regulations exist that would reduce impacts related to the placement of housing within a 100-year flood hazard area. These include, but are not limited to, the following: National Flood Insurance Act, which establishes flood-risk zones within floodplain areas; National Flood Insurance Reform Act, which reduces the risk of flood damage to properties; Cobey-Alquist Floodplain Management Act, which protects people and property from flooding hazards; BOS Policy I-45, which identifies procedures to use when proposed projects impact floodways; County Flood Damage Prevention Ordinance, which regulates development within all areas of special flood hazards and areas of flood-related erosion hazards and establishes policies that minimize public and private losses due to flood conditions; the County Grading, Clearing and Watercourses Ordinance, which requires the lowest floor of structures to be elevated to or above the level of the 100-year flood; County Subdivision Ordinance, which requires mapping and drainage easements to avoid certain drainages; and RPO, which prohibits development of permanent structures for human habitation in a floodway. As a result of these regulations, development within floodplains and development that would have the potential to adversely affect flooding hazards are highly regulated and addressed at all levels of the County's development review process.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update contains goals and policies that would reduce the potential for housing to be placed within a 100-year flood area. Within the Land Use Element, Conservation and Open Space Element and Safety Element, various goals include specific policies to reduce impacts to a level that would be less than significant. Within the Land Use Element, Goal LU-6 would create a built environmental in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policy LU-6.12 would support this goal by requiring document and annual review of areas within floodways.

Within the Conservation and Open Space Element, Goal COS-5 would ensure the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.1 would support this goal by restricting development in floodways and floodplains. Within the Safety Element, Goal S-9 would minimize personal injury and property damage from flood events. This goal is supported by Policies S-9.1, S-9.2, S-9.3, S-9.4, and S-9.5. These policies support this goal by prohibiting development is various areas with increased flooding hazards. Goal S-10 is floodways and floodplains that have acceptable capacity to accommodate flood events. Policy S-10.1 supports this goal by limiting new and expanded land uses within floodways.

Summary

The development of future land uses as designated in the proposed General Plan Update would result in the placement of housing within flood hazard areas. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts associated with the placement of housing in flood hazard areas, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with housing in flood hazard areas and specific implementation programs are identified as mitigation.

2.8.3.7 Issue 7: Impeding or Redirecting Flood Flows

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would place within a 100-year flood hazard area structures which would impede or redirect flood flows.

Impact Analysis

Development along stream channels and floodplains can alter the capacity of a channel to convey water and can increase the height of the water surface corresponding to a given discharge. In particular, structures that encroach on a floodplain, such as bridges, can increase upstream flooding by narrowing the width of the channel and increasing the channel's resistance to flow. As a result, the water is at a higher level as it flows past the obstruction, creating a backwater that could inundate a larger area upstream.

Most land use designations proposed under the General Plan Update would allow for the construction of structures. For example, houses would be constructed in areas designated for residential land use, buildings, factories and stores would be constructed in areas designated for commercial and industrial land uses, and bridges would be constructed in areas designated as national forest and open space in order to provide public access to these areas. If these structures were proposed in the 100-year floodplain, they would impede or redirect flood flows. However, certain land uses are more likely to be associated with high density development and therefore have a higher potential to impede or redirect flood flows if proposed within a 100-year flood plain. Land uses proposed under the General Plan Update with an increased potential to impede or redirect flood flows due to high density development include village residential, village core mixed use, neighborhood commercial, general commercial, limited impact industrial, medium impact industrial, and high impact industrial. Table 2.8-7 identifies proposed land uses, under implementation of the General Plan Update that would occur within a 100-year flood area. Under implementation of the General Plan Update the following land uses designations would include areas located within a floodplain or floodplain fringe: village residential, 2,824 acres; village core mixed use, less than one acre; neighborhood commercial, 4 acres; general commercial, 285 acres; limited impact industrial, 161 acres; medium impact industrial, 230 acres; and high impact industrial, 71 acres. These land uses have the potential to contain structures that would impede or redirect flood flows. Therefore, this is considered a potentially significant impact.

Federal, State and Local Regulations and Existing Regulatory Processes

The regulations that apply to this issue are the same as those discussed above in Section 2.8.3.6, Issue 6: Housing within a 100-year Flood Hazard Area.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update contains goals and policies within the Land Use Element, Conservation and Open Space Element and Safety Element, that would reduce the potential for structures to impede or redirect flood flows.

Goal LU-6 would create a built environmental in balance with the natural environment, scarce resources, natural hazards, and the unique local character of individual communities. Policy LU-6.12 would support this goal by requiring document and annual review of areas within floodways.

Goal COS-5 would create the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.1 would support this goal by restricting development in floodways and floodplains.

Goal S-9 would minimize personal injury and property damage losses resulting from flood events**.** This goal is supported by Policies S-9.1, S-9.2, S-9.3, S-9.4 and S-9.5. Policy S-9.1 would manage development based on Federal floodplain maps. Policy S-9.2 would minimize new development in floodplains. Policy S-9.3 would require new development within mapped flood hazard areas be sited and designed, to minimize on-site and off-site hazards to health, safety, and property due to flooding. Policy S-9.4 would allow, in villages, new uses and development within the floodplain fringe and in semi-rural and rural lands only when environmental impacts and hazards are mitigated. Policy S-9.5 prohibits, in semi-rural and rural lands, development in the floodplain fringe to maintain the capacity of floodplain. Goal S-10 would ensure that floodways and floodplains have acceptable capacity to accommodate flood events. Policy S-10.1 supports this goal by limiting new or expanded land uses within floodways.

Summary

The General Plan Update would propose village residential, village core mixed use, neighborhood commercial, general commercial, limited impact industrial, medium impact industrial, and high impact industrial land uses in areas located within a floodplain or floodplain fringe. These land uses have the potential to contain structures that would impede or redirect flood flows. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts associated with placement of structures that impede or redirect flood flows, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact related to placement of structures within flood hazard areas and specific implementation programs are identified as mitigation.

2.8.3.8 Issue 8: Dam Inundation and Flood Hazards

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would 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.

Impact Analysis

Certain land uses have a higher risk of exposing people or structures to flooding hazards associated with the failure of a levee or dam because they allow for higher density development.

These include village residential, village core mixed use, neighborhood commercial, general commercial, limited impact industrial, medium impact industrial, and high impact industrial development. In order to present a hazard, these land uses must also be located in an area subject to flooding or levee/dam inundation. Within the unincorporated County there are approximately 31 dams that pose inundation risk in the event of a breach or failure. These dams are listed in Table 2.8-4 and shown in Figure 2.8-7. Often, a single dam can pose inundation risks to multiple communities. The affected CPAs associated with each dam are also provided in Table 2.8-4.

Approximately 56,000 acres of unincorporated County land would be subject to flooding and inundation as a result of dam failure. Table 2.8-8 identifies the proposed General Plan Update land use designations that would be located within the dam inundation areas. Land uses that would experience the greatest inundation risk from implementation of the proposed General Plan Update include the following: open space (13,941 acres); military installations (13,955 acres); and rural lands (9,942 acres). Rural lands and open space are low density land use designations that would reduce the risk of loss of life and property from dam inundation as compared to higher density land uses. It should be noted that military lands are not under the jurisdiction of the County and are not subject to the proposed goals and policies of the General Plan Update. In addition, implementation of the proposed General Plan Update would result in the location of high density land uses in areas that are subject to flooding from dam inundation, including: specific plan areas (4,669 acres); village residential (2,762 acres); public/semi-public lands (1,733 acres); neighborhood commercial (8 acres); general commercial (530 acres); medium impact industrial (243 acres); office professional (26 acres); and high impact industrial (72 acres). In total, approximately 10,043 acres of land would be designated for high density land uses that would have a high risk of loss of life or property from flooding due to dam inundation.

Emergency response plans, such as Dam Inundation Maps or the County's Multi-Jurisdictional Hazard Mitigation Plan, are the official documents that describe the principles, policies, and concepts of the operations, methods and procedures to be applied when carrying out emergency operations or rendering mutual aid in the event of a dam inundation emergency. All dam owners within the unincorporated County have prepared Dam Inundation Maps that delineate dam inundation zones or the areas at risk in the event of failure, for each dam. These maps are on file with the County of San Diego. The Multi-Jurisdictional Hazard Mitigation Plan identifies dam failure risk levels based on Dam Inundation Map data. A dam is considered to be high hazard if it stores more than 1,000 acre-feet of water, is higher than 150 feet in height, has the potential to cause downstream property damage, and has the potential for to require downstream evacuation. Ratings are set by FEMA and confirmed with site visits by engineers. Most of the County's dams are greater than 50 years old, characterized by increased hazard potential due to downstream development, and have increased risk from structural deterioration and inadequate spillway capacity.

Unique institutions located or proposed in dam inundation zones could result in a significant loss of life in the event of a dam failure due to the size and nature of the uses and the difficulty with evacuating large concentrations of people. Unique institutions include hospitals, schools, skilled nursing facilities, retirement homes, mental health care facilities, care facilities with patients that have disabilities, adult and childcare facility, jails/detention facilities, stadiums, arenas, amphitheaters, or any other use that would involve concentrations of people. The inability to efficiently evacuate unique institutions could cause a significant loss of life.

The OES maintains Dam Evacuation Plans within the unincorporated County. Emergency plans for dam evacuation are necessary to plan for the loss of life, damage to property, displacement of people, and other ensuing hazards that can occur from dam failure. In the event of dam failure, damage control and disaster relief would be required and mass evacuation of the inundation areas would be essential to save lives. Dam evacuation plans contain information concerning the physical situation, affected jurisdictions, evacuation routes, unique institutions and event responses. In addition, the plans include inundation maps showing direction of flow; inundation area boundaries; hospitals, schools, multipurpose staging areas; command posts/sites; and mass care and shelter facilities/sites. Unique institutions, as defined by the OES, include the following types of facilities: hospitals, schools, skilled nursing facilities, retirement homes, mental health care facilities, care facilities with patients that have disabilities, adult and childcare facilities, jails/detention facilities, stadiums, arenas and amphitheaters.

As shown in Table 2.8-8, the proposed General Plan Update would designate approximately 2,762 acres of village residential, 8 acres of neighborhood commercial, 530 acres of general commercial, 243 acres of medium impact industrial and 72 acres of high impact industrial land uses in dam inundation risk areas. These land uses would allow large concentrations of people or unique institutions in a dam inundation area and could cause adverse effects related to the implementation of Dam Evacuation Plans and the Multi-Jurisdictional Hazard Mitigation Plan. Additional information on Dam Evacuation Plans and the Multi-Jurisdictional Hazard Mitigation Plan is provided in Section 2.7, Hazards and Hazardous Materials. Successful implementation of a Dam Evacuation Plan depends on the ability of proposed land uses in dam inundation areas to expeditiously evacuate in order to minimize the loss of life from the dam failure. Unique institutions proposed within dam inundation areas would typically be difficult to evacuate safely and expeditiously, thus impeding successful implementation of a Dam Evacuation Plan.

It should be noted that in 2006, California Governor declared a State of Emergency for California's levee system in an attempt to prevent substantial adverse impacts associated with flooding in the event of levee failure. Since that time, hundreds of levee sites have been identified for repair so that the functionality of these flood control systems can be maintained. Levees identified as needing repairs were found to have deteriorated over time and/or not meet current design standards. There are no levee repair sites located in San Diego County (DWR 2008).

Federal, State and Local Regulations and Existing Regulatory Processes

The regulations that apply to flooding are the same as those discussed above in Section 2.8.3.6, Issue 6: Housing within a 100-year Flood Hazard Area. In contrast to flood hazards, few regulations exist for dam inundation areas. The County maintains maps of dam inundation areas and reviews discretionary projects against them. Through compliance with CEQA, projects are reviewed for their consistency with the Office of Emergency Services' policies related to dam inundation areas. These policies discourage uses such as group care, hospitals, schools, and similar uses, that would have the potential to impair evacuation efforts should the need arise. If another suitable site cannot be found for these uses, it is possible that impacts can be mitigated through a site specific evacuation plan.

Proposed General Plan Goals and Policies

The proposed General Plan Update contains several goals and policies within the Conservation and Open Space Element and the Safety Element that would reduce the risk to people and

property from dam inundation. Goal COS-5 would create the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.1 would support this goal by restricting development in floodways and floodplains.

Goal S-9 would minimize personal injury and property damage losses resulting from flood events**.** This goal is supported by Policies S-9.1, S-9.2, S-9.3, and S-9.6. Policy S-9.1 would manage development based on Federal floodplain maps. Policy S-9.2 would minimize new development in floodplains. Policy S-9.3 would require new development within mapped flood hazard areas be sited and designed, to minimize on-site and off-site hazards to health, safety, and property due to flooding. Policy S-9.6 prohibits development in dam inundation areas that may interfere with the County's emergency response and evacuation plans. Goal S-10 would ensure that floodways and floodplains have acceptable capacity to accommodate flood events. Policy S-10.1 supports this goal by limiting new or expanded land uses within floodways.

Summary

The development of future land uses as designated in the proposed General Plan Update would result in the potential to expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a levee or dam failure, by placing persons or housing in areas subject to flooding risks. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts associated with dam inundation and flood hazards, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with dam inundation and flooding and specific implementation programs are identified as mitigation.

2.8.3.9 Issue 9: Seiche, Tsunami and Mudflow Hazards

Guidelines for Determination of Significance

Based on Appendix G of the CEQA Guidelines, the proposed County General Plan Update would have a significant impact if it would expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

Impact Analysis

The following section identifies the potential for a tsunami, seiche or mudflow event to occur within the unincorporated County, and the potential for people or structures to be exposed to significant risk of these hazards under implementation of the proposed General Plan Update.

Tsunami

A tsunami is a very large ocean wave caused by an underwater earthquake or volcanic eruption. Tsunamis can cause flooding to coastlines and inland areas less than 50 feet above sea level and within one mile of the shoreline. The majority of unincorporated San Diego County is located more than one mile inland, and is therefore not susceptible to inundation or flooding due to a tsunami. Pendleton/De Luz is the only portion of the unincorporated County that is

located on the coast of the Pacific Ocean, and therefore susceptible to inundation or flooding from a tsunami. However, the County does not have jurisdiction over land uses and development in the western portion of Pendleton/De Luz, which would potentially be affected by a tsunami. Additionally, as shown in Table 2.8-3, tsunamis have historically been infrequent and low in height in the vicinity of San Diego County. Four tsunamis have been reported since 1952, none more than five feet in height. Therefore, due to the location of the unincorporated County, mostly inland from the ocean and the fact that past historical tsunami events have been slight, potential impacts to the proposed General Plan Update from a tsunami would not be considered significant.

Seiche

A seiche is a standing wave in a completely or partially enclosed body of water. Areas located along the shoreline of a lake or reservoir are susceptible to inundation by a seiche. High winds, seismic activity, or changes in atmospheric pressure are typical causes of seiches. The size of a seiche and the affected inundation area is dependant on different factors including size and depth of the water body, elevation, source, and if human made, the structural condition of the body of water in which the seiche occurs.

In the unincorporated County's semi-arid climate, naturally occurring enclosed water bodies are not common. Instead most enclosed water bodies are reservoirs built by local municipalities and water districts to provide water service to local residents and businesses. Typically, all land around the reservoirs' shorelines are in public holdings, such as the City of San Diego or Helix Water District, which restrict private land development and minimize risk of inundation from seiches. Moreover, the public land holdings are not within the jurisdiction of the unincorporated County. Therefore, the impact from a seiche on the proposed General Plan Update would be considered less than significant.

Mudflows

Debris flows, also known as mudflows, are shallow water-saturated landslides that travel rapidly down slopes carrying rocks, brush, and other debris. Mudflows are the most common disaster in San Diego. A mudflow occurs naturally as a result of heavy rainfall on a slope that contains loose soil or debris. There is a high potential for mudflows to occur in some areas of the unincorporated County as a result of large amounts of precipitation in a relatively small time frame. Unincorporated San Diego County contains many areas with steep slopes, or mountainous areas, that would be subject to mudflows in the event of large amounts or precipitation. Additionally, much of the unincorporated County has recently been burned by wildland fires (see Figure 2.7-7 in Section 2.7 Hazards and Hazardous Materials) and is particularly susceptible to flash floods and debris flows during rainstorms. Under implementation of the General Plan Update, past areas affected by wildland fires would be designated as residential, commercial and industrial land uses, which have an increased risk of exposing people or structures to damage in the event of a mudflow. Therefore, this would be considered a significant impact.

Federal, State, and Local Regulations

Few regulations exist that relate specifically to seiche, tsunami, or mudflow hazards. Mudflows are partially addressed through the flood hazard regulations that are discussed under Issue 6.

All issues are also covered by CEQA reviews for all discretionary projects processed by the County.

Proposed General Plan Update Goals and Policies

The General Plan Update several goals and policies that would reduce the potential for significant impacts to occur to people or structures from mudflows, seiches or tsunamis. Within the Conservation and Open Space Element, Goal COS-5 would create the protection and maintenance of local reservoirs, watersheds, aquifer-recharge areas, and natural drainage systems to maintain high quality water resources. Policy COS-5.1 would support this goal by restricting development in floodways and floodplains. Within the Safety Element, Goal S-8 is to minimize personal injury and property damage caused by mudslides, landslides and rockfalls. Policies S-8.1 and S-8.2 support this goal by reducing landslide risks to development and prohibiting development from contributing or causing slope instability. Goal S-9 is to minimize personal injury and property damage losses resulting from flood events. Policies S-9.3 and S-9.6 support this goal by minimizing development in flood hazard areas and prohibiting development in dam inundation areas.

Summary

Due to the inland location of the unincorporated County and the history of minor tsunami events, implementation of the proposed General Plan Update would not expose people or structures to hazards associated with inundation by a tsunami. Therefore, impacts associated with a tsunami would be less than significant. Additionally, implementation of the General Plan Update would not result in land uses or development within areas subject to inundation from a seiche. Therefore, this would not be considered a significant impact.

Implementation of the General Plan Update would locate land uses and development in areas that would be considered susceptible to mudflows. Therefore, this would be considered a significant impact. While existing County policies and regulations and proposed General Plan Update goals and policies are intended to reduce impacts associated with mudflows, specific measures that implement these policies and regulations are proposed to ensure that the intended environmental protections are achieved. Therefore, the proposed project is concluded to result in a potentially significant impact associated with mudflows and specific implementation programs are identified as mitigation.

2.8.4 Cumulative Impact Analysis

The geographic scope of cumulative impact analysis for hydrology and water quality includes drainage basins, watersheds, water bodies or groundwater basins, depending on the location of the potential impact and its tributary area.

2.8.4.1 Issue 1: Water Quality Standards and Requirements

Construction and development associated with cumulative regional land use projects, such as those identified in adjacent city and county general plans and regional transportation plans would contribute both point and non-point source pollutants to downstream receiving waters that have the potential to violate water quality standards. However, development and construction proposed under most cumulative projects would be subject to regulations that require

compliance with water quality standards, including: the CWA, Porter-Cologne Water Quality Control Act, NPDES, applicable basin plans, and local regulations. The exception to this would be projects proposed in Mexico, which are not subject to water quality discharge requirements and would result in water quality violations in shared WMAs, such as the Tijuana WMA and Anza-Borrego WMA. Therefore, even though required regulations would minimize the cumulative impact of projects in the U.S, watersheds or receiving waters that receive runoff from projects in Mexico, which would not be protected by the same requirements, would result in a potentially significant cumulative impact to water quality standards and requirements.

As discussed above, the proposed project would contribute both non-point and point source pollutants in quantities that have the potential to violate water quality standards or waste discharge requirements. Therefore, the proposed project, in combination with the identified cumulative projects, would have the potential to result in a significant cumulative impact associated with water quality standards and requirements.

2.8.4.2 Issue 2: Groundwater Supplies and Recharge

Groundwater basins typically serve localized areas and, therefore, any cumulative impacts would generally be localized. The area of cumulative analysis for groundwater supplies and recharge includes the groundwater dependent areas of the unincorporated County and the immediately adjacent jurisdictional areas that share groundwater basins with County areas. An inventory of General Plan Update land uses proposed in the groundwater dependent portion of the County adjacent to neighboring jurisdictions was compiled (DPLU 2009f) and is further discussed within Appendix D, Groundwater Study. Due to the rural nature of land uses proposed adjacent to Riverside and Imperial Counties, potential groundwater impacts would be less than significant. This is also true for the majority of proposed land use designations adjacent to State and federal lands, and those adjacent to most Native American reservations. The exceptions are the Campo and Los Coyotes Indian Reservations, which are located near the following higher density areas: Live Oak Springs and Warner Springs, respectively. Additional subdivisions are not anticipated within Live Oak Springs based on a review of the existing parcels there. Warner Springs is an existing Specific Plan that is well separated from development within the Los Coyotes Reservation. As such, potential cumulative impacts to supplies and recharge near tribal lands would not be considerable.

With the exception of the communities of Tecate and Jacumba, proposed land uses in the groundwater dependent portion of the County adjacent to Mexico consist of open space and rural lands. Due to the rural nature of these land uses, potential groundwater impacts to Mexico in these areas would be less than significant. Industrial and commercial designations are proposed in the port-of-entry community of Tecate; however, proposed groundwater usage will not be significant due to the low growth potential relative to neighboring Tecate City in Mexico. Semi-rural residential land uses are proposed within the community of Jacumba, which is located near the small community of Jacume, Mexico. As discussed in Appendix D, Groundwater Study, this community's watershed receives water from the south and would not be impacted by proposed land uses in the Jacumba community.

While cumulative contributions are not anticipated from these other sources, the impacts evaluated in Section 2.8.3.2 are cumulative in nature because they represent the combined influence of numerous past, present, and future users of the groundwater aquifers. Therefore,

similar to the conclusion in that section, the General Plan Update is also concluded to result in a significant cumulative impact.

2.8.4.3 Issue 3: Erosion or Siltation

Cumulative projects identified in this analysis would result in multiple developments that would potentially alter existing drainage patterns in a manner that would result in substantial erosion or siltation. It is reasonably foreseeable that some cumulative projects would occur simultaneously, which would compound the impacts of erosion and siltation and therefore create a significant cumulative impact. Cumulative projects such as regional transportation projects, development consistent with general plans, and tribal developments would be expected to increase impervious surfaces within the region and, therefore, increase the potential for runoff to occur that would lead to erosion and siltation impacts. While cumulative projects would be expected to follow regulations, such as NPDES or others as applicable, when combined, they would still have the potential to result in a significant cumulative erosion and siltation impact, especially in watersheds that extend into Mexico, where U.S. hydrology and water quality regulations do not apply. Therefore, a significant cumulative impact to erosion or siltation would occur from proposed cumulative projects.

As discussed above, implementation of the General Plan Update has the potential to result in new erosion or worsen existing erosion problems. Therefore, the proposed project, in combination with the identified cumulative projects, would have the potential to result in a significant cumulative impact associated with erosion or siltation.

2.8.4.4 Issue 4: Flooding

Cumulative projects would result in land uses and development that would convert permeable surfaces to impermeable surfaces, such as through the construction of buildings, parking lots, and roadways. New development proposed under cumulative projects would have the potential to alter existing drainage patterns, increase the amount of runoff and potentially increase flooding in the San Diego region. Many cumulative projects in the U.S. would be subject to regulations that reduce the potential for existing drainages to be altered in such a way which would result in flooding on or off site. However, projects proposed in Mexico are not subject to the same drainage requirements and have the potential to alter drainage patterns that would increase flooding in watersheds that extend to both Mexico and the San Diego region. Therefore, even though required regulations would minimize the cumulative impact of projects in the U.S., watersheds that are located in Mexico and the U.S. would not be protected by the same requirements and a potentially significant cumulative impact to flooding would occur, especially in unincorporated County areas bordering Mexico.

As discussed above, implementation of the General Plan Update includes designations for land uses and development that would have the potential to increase the amount and rate of surface runoff in a manner which has the potential to result in flooding on or off site. Therefore, the proposed project, in combination with the identified cumulative projects, would have the potential to result in a significant cumulative impact associated with flooding.

2.8.4.5 Issue 5: Exceed Capacity of Stormwater Systems

Many of the cumulative projects included in this analysis are proposed to accommodate the expected population growth within the region. Impermeable surfaces, constructed under implementation of these cumulative projects, would have the potential to contribute substantial quantities of runoff which would exceed the capacity of existing stormwater drainage systems, while contributing to substantial additional sources of polluted runoff. However, a cumulative project that would exceed the capacity of a stormwater system would be unlikely to contribute to a cumulative impact because the area of exposure would be limited to the immediate surrounding area. Additionally, the majority of cumulative projects would be subject to CEQA and/or NEPA review, and local regulations that require development to construct or retrofit stormwater drainage systems so that they would not cause flooding. A significant cumulative impact would not occur. Therefore, the proposed project, in combination with the identified cumulative projects, would not contribute to a significant cumulative impact associated with the capacity of stormwater systems.

2.8.4.6 Issue 6: Housing within a 100-year Flood Hazard Area

Cumulative projects, such as those proposed in adjacent city and county general plans, would potentially place housing within a 100-year flood hazard area. However, most cumulative projects in California would be required to conform with applicable regulations, such as National Flood Insurance Act, National Flood Insurance Reform Act, and Cobey-Alquist Floodplain Management Act, which prohibit housing from being placed in floodways. Therefore, due to existing regulations, a cumulative impact would not occur. Therefore, the proposed project, in combination with the identified cumulative projects, would not result in a significant cumulative impact associated with housing within a flood hazard area.

2.8.4.7 Issue 7: Impeding or Redirecting Flood Flows

Cumulative projects included in this analysis have the potential to place residential land uses, commercial land uses, industrial land uses and various other land uses, with the potential to contain structures, within a 100-year flood plain. Placing structures within a 100-year flood plain would impede or redirect flood flows, thereby causing a significant impact. However, it is expected that most cumulative projects in California would be required to comply with applicable regulations that would prevent the construction of structures in floodways, such as the National Flood Insurance Act, National Flood Insurance Reform Act, Cobey-Alquist Floodplain Management. Therefore, it is expected that through regulation, a cumulative impact would not occur. The proposed project, in combination with the identified cumulative projects, would not result in a significant impact associated with impeding or redirecting flood flows.

2.8.4.8 Issue 8: Dam Inundation and Flood Hazards

It is reasonably foreseeable that cumulative projects would place housing or structures within dam inundation areas, thereby increasing the potential for a significant risk of loss, injury or death involving flooding. However, multiple regulations exist, such as the National Flood Insurance Act, National Flood Insurance Reform Act, Cobey-Alquist Floodplain Management Act, and local regulations that would be expected to mitigate any potential impacts to below a level of significance. A cumulative impact would not occur. Therefore, the proposed project, in

combination with the identified cumulative projects, would not contribute to a significant cumulative impact associated with dam inundation and flood hazards.

2.8.4.9 Issue 9: Seiche, Tsunami and Mudflow Hazards

Cumulative projects in surrounding jurisdictions on the coast have the potential to expose people or structures to loss, injury or death involving inundation of a tsunami, due to the inherent risk involved with coastal development. However, the proposed project has no risk of tsunami and so it would not contribute to a cumulative impact. Additionally, cumulative projects would be located in the vicinity of natural water bodies that have the potential to be affected by a seiche, thereby exposing people and structures to flooding from this natural disaster. Mudflows would also potentially affect cumulative projects, especially in surrounding jurisdictions that have been affected by the extreme wildfire events in the recent past. However, the majority of cumulative projects would be subject to CEQA and/or NEPA review, in addition to compliance with applicable regulations such as the National Flood Insurance Act, National Flood Insurance Reform Act, Cobey-Alquist Floodplain Management Act and local regulations, and impacts would be reduced to a level below significant. A cumulative impact would not occur. Therefore, the proposed project, in combination with the identified cumulative projects, would not contribute to a significant cumulative impact associated with seiche, tsunami, and mudflow hazards.

2.8.5 Significance of Impact Prior to Mitigation

The proposed General Plan Update would result in a potentially significant impact associated with water quality standards, groundwater supplies, erosion, flooding, stormwater systems, housing within a flood area, impeding flood flows, dam inundation, and mudflow hazards. Additionally, impacts related to water quality standards, groundwater supplies, erosion, and flooding would be cumulatively considerable prior to mitigation.

2.8.6 Mitigation

2.8.6.1 Issue 1: Water Quality Standards and Requirements

The General Plan Update policies and mitigation measures provided below under the Mitigation Measures section would minimize the proposed project's potentially significant impacts associated with water quality standards and requirements. However, even with mitigation measures in place, the development of future land uses as designated in the proposed General Plan Update would propose land uses in areas that are currently experiencing groundwater contamination, thereby exacerbating water quality impacts. The General Plan Update policies and feasible mitigation measures described below would be implemented to reduce impacts associated with water quality standards and requirements; however, not to below a significant level. Additional mitigation measures have been identified that would fully reduce impacts to below a level of significance; however, the County has determined that their implementation would be infeasible. A discussion of infeasible mitigation measures, as well as General Plan policies and feasible mitigation measures is provided below.

Infeasible Mitigation Measures

The following measures were considered in attempting to reduce impacts to water quality standards and requirements to below a level of significance. However, the County has

determined that these measures would be infeasible as described below; therefore, these mitigation measures would not be implemented.

- Provide a water treatment system that reduces constituents to below the MCL in all groundwater impaired areas. This measure would require treatment plants in many areas of the County, which would potentially result in numerous environmental impacts and conflict with the project objective to minimize public costs and infrastructure.

- In groundwater quality impaired areas, require water to be imported from other sources. This measure would not be feasible based on the existing lack of infrastructure needed to import water to impaired areas. To provide such infrastructure would conflict with the project objectives to minimize public costs of infrastructure and services and correlate their timing with new development.

- In groundwater quality impaired areas, place a moratorium on building permits and development applications. This measure would be inconsistent with the land use designations proposed for the project. It would also conflict with goals of the Housing Element to provide sufficient housing stock and would not achieve one of the primary objectives of the proposed project which is to accommodate a reasonable amount of growth.

Because the measures listed above have been found to be infeasible by the County and would not be implemented, impacts would remain significant and unavoidable. Chapter 4.0, Project Alternatives, provides a discussion of several land use alternatives to the proposed project that would result in some reduced impacts associated with water quality standards and requirements as compared to the proposed project.

General Plan Update Policies

The following policies would reduce impacts associated with water quality, although not to below a significant level.

Policy LU-6.5: Sustainable Stormwater Management. Ensure that development minimizes the use of impervious surfaces and incorporates other Low Impact Development (LID) techniques as well as a combination of site design, source control, and stormwater best management practices, where applicable and consistent with the County's LID Handbook.

Policy LU-6.9: Development Conformance with Topography. Require development to conform to the natural topography to limit grading; incorporate and not significantly alter the dominant physical characteristics of a site; and to utilize natural drainage and topography in conveying stormwater to the maximum extent practicable.

Policy LU-14.1: Wastewater Facility Plans. Coordinate with wastewater agencies and districts during the preparation or update of wastewater facility master plans and/or capital improvement plans to provide adequate capacity and assure consistency with the County's land use plans.

Policy LU-14.2: Wastewater Disposal. Require that development provide for the adequate disposal of wastewater concurrent with the development and that the infrastructure is designed and sized appropriately to meet reasonably expected demands.

Policy LU-14.3: Wastewater Treatment Facilities. Require wastewater treatment facilities serving more than one private property owner to be operated and maintained by a public agency. Coordinate the planning and design of such facilities with the appropriate agency to be consistent with applicable sewer master plans.

Policy LU-14.4: Sewer Facilities. Prohibit sewer facilities that would induce unplanned growth. Require sewer systems to be planned, developed, and sized to serve the land use pattern and densities depicted on the Land Use Map. Sewer systems and services shall not be extended beyond either Village boundaries or extant Urban Limit Lines, whichever is more restrictive, except:

- When necessary for public health, safety, or welfare;
- When within existing sewer district boundaries;
- When necessary for a conservation subdivision adjacent to existing sewer facilities; or
- Where specifically allowed in the Community Plan.

Policy COS-4.2: Drought-Efficient Landscaping. Require efficient irrigation systems and in new development encourage the use of native plant species and non-invasive drought tolerant/low water use plants in landscaping.

Policy COS-4.3: Stormwater Filtration. Maximize stormwater filtration and/or infiltration in areas that are not subject to high groundwater by maximizing the natural drainage patterns and the retention of natural vegetation and other pervious surfaces. This policy shall not apply in areas with high groundwater, where raising the water table could cause septic system failures, moisture damage to building slabs, and/or other problems.

Policy COS-4.4: Groundwater Contamination. Require land uses with a high potential to contaminate groundwater to take appropriate measures to protect water supply sources.

Policy COS-5.2: Impervious Surfaces. Impervious Surfaces. Require development to minimize the use of directly connected impervious surfaces and to retain stormwater run-off caused from the development footprint at or near the site of generation.

Policy COS-5.3: Downslope Protection. Require development to be appropriately sited and to incorporate measures to retain natural flow regimes, thereby protecting downslope areas from erosion, capturing runoff to adequately allow for filtration and/or infiltration, and protecting downstream biological resources.

Policy COS-5.5: **Impacts of Development to Water Quality.** Require development projects to avoid impacts to the water quality in local reservoirs, groundwater resources, and recharge areas, watersheds, and other local water sources.

Mitigation Measures

The following mitigation measures would reduce impacts associated with water quality, although not to below a significant level.

Hyd-1.1 Update and implement the County of San Diego's Jurisdictional Urban Runoff Management Program (JURMP).

Hyd-1.2 Implement and revise as necessary the Watershed Protection Ordinance to reduce the adverse effects of polluted runoff discharges on waters and to encourage the removal of invasive species and restore natural drainage systems.

Hyd-1.3 Establish and implement LID standards for new development to minimize runoff and maximize infiltration.

Hyd-1.4 Revise and implement the Stormwater Standards Manual requiring appropriate measures for land use with a high potential to contaminate surface water or groundwater resources.

Hyd-1.5 Utilize the County Guidelines for Determining Significance for Surface Water Quality, Hydrology, and Groundwater Resources to identify adverse environmental effects.

Hyd-1.6 Implement, and revise as necessary, Board Policy I-84 requiring that discretionary project applications include commitments from available water and sanitation districts.

Hyd-1.7 Ensure County planning staff participation in the review of wastewater facility long range and capital improvement plans.

Hyd-1.8 Allow wastewater facilities contingent upon approval of Major Use Permit to ensure facilities are adequately sized.

Hyd-1.9 Review septic system design, construction, and maintenance in cooperation with the Regional Water Quality Control Board through the Septic Tank Permit Process.

Hyd-1.10 Coordinate with the State Water Resources Control Board to develop statewide performance and design standards for conventional and alternative On-site Wastewater Treatment Systems.

2.8.6.2 Issue 2: Groundwater Supplies and Recharge

The General Plan Update policies and mitigation measures provided below would minimize the proposed project's potentially significant impact associated with the loss of groundwater supplies and recharge. However, even with mitigation measures in place, implementation of the General Plan Update would allow land uses and development to occur in these areas currently experiencing groundwater supply and recharge impacts, thereby worsening an already unsustainable groundwater supply. The General Plan Update policies and feasible mitigation

measures described below would be implemented to reduce impacts associated with groundwater supplies and recharge; however, not to below a significant level. Additional mitigation measures have been identified that would fully reduce impacts to below a level of significance; however, the County has determined that their implementation would be infeasible. A discussion of infeasible mitigation measures, as well as General Plan policies and feasible mitigation measures is provided below.

Infeasible Mitigation Measures

The following measures were considered in attempting to reduce impacts to groundwater supplies and recharge to below a level of significance. However, the County has determined that these measures would be infeasible as described below; therefore, these mitigation measures would not be implemented.

- In areas with potentially impacted groundwater supplies, require all proposed discretionary projects to share well water through a well sharing agreement. This mitigation measure would prove infeasible or enforceable because such agreements would only apply to current landowners and would not be binding on future owners of the affected properties.

- In areas with inadequate groundwater supply, project proponents shall be required to secure water contracts with other groundwater providers to import water through the construction of new infrastructure from another groundwater basin that is not impacted, prior to the issuance of discretionary permits. This mitigation measure is considered to be infeasible because piping in groundwater from an off-site source would be a complex and costly process which would involve any number of issues, including: 1) water rights issues; 2) need to obtain proper permits to encroach on public roadways or other private properties to convey the water; 3) potential need to the create a new water district/water company; and 4) accelerated deterioration of the groundwater basin that is providing the imported water. Additionally, requiring complex piping to import groundwater from an alternative location has the potential to result in multiple secondary environmental impacts, including cultural resources, biological resources, and hydrology/water quality. Although some water districts within the unincorporated County have imported water from another groundwater basin in the past, requiring that all development obtain water contracts, as described above, would put an undue burden on both the developer and water district. Implementing this mitigation measure would also contradict the proposed General Plan Update objective to promote environmental stewardship that protects the range of natural resources and habitats that uniquely define the County's character and ecological importance because it would result in multiple secondary environmental impacts to both unincorporated County groundwater and surface resources. In addition, this solution may not be sustainable for all projects in the long-term. Implementation of this mitigation measure would also conflict with the project objective to minimize costs of infrastructure and services because this mitigation measure would require extensive infrastructure costs to implement. Therefore, for the reasons listed above, this measure is considered infeasible.

- In groundwater dependent areas with inadequate groundwater supply, project proponents shall be required to secure water contracts with other water providers to truck in water from local water districts or other sources such as an off-site well, prior to

the issuance of discretionary permits. This mitigation measure is considered to be infeasible because trucked water is not a guaranteed, sustainable, long-term source of water since a water district can rescind or preclude the selling of trucked water in times of drought and limited water supplies. Additionally, implementation of this mitigation measure would conflict with the project objective to maintain environmentally sustainable communities and reduce greenhouse gas emissions that contribute to climate change because it would require extensive vehicle travel and is not a sustainable solution. Therefore, this would not be a feasible mitigation measure.

- In groundwater dependent areas with inadequate groundwater supply, project proponents shall be required to secure water contracts with the SDCWA in order to import water from SDCWA facilities. This mitigation measure is considered to be infeasible due to the lack of infrastructure in place to convey the water, the limited availability of water within the desert southwest, the cost of providing these services, and the discretionary approval to extend the SDCWA boundary, which is outside of the County's jurisdiction. Implementation of this mitigation measure would also conflict with the project objective to minimize costs of infrastructure and services because the implementation of this mitigation measure would result in extensive infrastructure costs.

- Implement a Countywide moratorium on building permits and development applications in any areas of the County that would have the potential to adversely impact groundwater supplies and recharge. This would effectively result in no new impacts to groundwater supplies and recharge within the unincorporated County. However, due to the size and complexity of the groundwater dependent portion of the County, it is not possible to specifically identify at a parcel by parcel scale where significant impacts to groundwater resources would occur. Site-specific groundwater investigations are necessary to provide details of impacts that cannot be provided at the scale in which the General Plan Update Groundwater Study was conducted. Therefore, there is not enough technical evidence in which to impose a moratorium. Additionally, this measure would impede the County's ability to implement the General Plan Update because it would prohibit future development in areas identified for increased growth in the General Plan Update. This mitigation measure would also conflict with the project objective to support a reasonable share of projected regional population growth. Therefore, for the reasons listed above, this mitigation measure would not be implemented.

Because the measures listed above have been found to be infeasible by the County and would not be implemented, impacts would remain significant and unavoidable. Chapter 4.0, Project Alternatives, provides a discussion of several land use alternatives to the proposed project that would result in some reduced impacts associated with groundwater supply and recharge as compared to the proposed project.

General Plan Update Policies

The policies listed under Section 2.8.6.1 for Issue 1 are applicable to groundwater supplies and recharge and are incorporated here by reference. In addition, the following policies would reduce impacts associated with groundwater supplies and recharge, although not to below a significant level.

Policy LU-8.1: Density Relationship to Groundwater Sustainability. Require land use densities in groundwater dependent areas to be consistent with the long-term sustainability of groundwater supplies, except in the Borrego Valley.

Policy LU-8.2: Groundwater Resources. Require development to identify adequate groundwater resources in groundwater dependent areas, as follows:

- In areas dependent on currently identified groundwater overdrafted basins, prohibit new development from exacerbating overdraft conditions. Encourage programs to alleviate overdraft conditions in Borrego Valley.
- In areas without current overdraft groundwater conditions, evaluate new groundwater-dependent development to assure a sustainable long-term supply of groundwater is available that will not adversely impact existing groundwater users.

Policy LU-13.1: Adequacy of Water Supply. Coordinate water infrastructure planning with land use planning to maintain an acceptable availability of a high quality sustainable water supply. Ensure that new development includes both indoor and outdoor water conservation measures to reduce demand.

Policy LU-13.2: Commitment of Water Supply. Require new development to identify adequate water resources, in accordance with State law, to support the development prior to approval.

Policy COS-4.1: Water Conservation. Require development to reduce the waste of potable water through use of efficient technologies and conservation efforts that minimize the County's dependence on imported water and conserve groundwater resources.

Mitigation Measures

Mitigation measures Hyd-1.1, Hyd-1.2, Hyd-1.3, Hyd-1.4, and Hyd-1.5 as described above are applicable to this issue and are incorporated here by reference. In addition, the following mitigation measures would reduce impacts associated with groundwater supplies and recharge, although not to below a significant level.

Hyd-2.1 Implement, and revise as necessary, Board Policy I-84 requiring that discretionary project applications include commitments from available water districts. Also implement and revise as necessary Board Policy G-15 to conserve water at County facilities.

Hyd-2.2 Implement the Groundwater Ordinance to balance groundwater resources with new development. Also revise the Ordinance Relating to Water Conservation for Landscaping (currently Zoning Ordinance Sections 6712 through 6725) to further water conservation through the use of recycled water.

Hyd-2.3 Establish a water credits program between the County and the Borrego Water District to provide a streamlined and consistent process for the permanent cessation of outdoor water intensive uses such as irrigated agricultural or golf course land.

Hyd-2.4 Coordinate with the San Diego County Water Authority and other water agencies to coordinate land use planning with water supply planning and implementation and enhancement of water conservation programs.

Hyd-2.5 Implement and revise as necessary the Resource Protection Ordinance and Policy I-68 Proposed Projects in Flood Plains / Floodways to restrict development in flood plains / floodways.

2.8.6.3 Issue 3: Erosion or Siltation

The policies listed under Section 2.8.6.1 for Issue 1 are applicable to erosion or siltation and are incorporated here by reference. In addition, the mitigation measures below would mitigate the proposed project's direct and cumulative impacts related to erosion or siltation to below a level of significance.

Mitigation Measures

Mitigation measures Hyd-1.2, Hyd-1.3, and Hyd-1.5 as described above are applicable to this issue and are incorporated here by reference. In addition, the following mitigation measures would further reduce impacts associated with erosion and siltation to below a level of significance.

Hyd-3.1 Implement and revise, as necessary, ordinances to require new development to be located down and away from ridgelines, conform to the natural topography, not significantly alter dominant physical characteristics of the site, and maximize natural drainage and topography when conveying stormwater.

Hyd-3.2 Implement and revise as necessary the RPO to limit development on steep slopes. Also incorporate Board Policy I-73, the Hillside Development Policy, into the RPO to the extent that it will allow for one comprehensive approach to steep-slope protections.

Hyd-3.3 Implement the Grading, Clearing and Watercourses Ordinance to protect development sites against erosion and instability.

2.8.6.4 Issue 4: Flooding

The following General Plan Update policies and mitigation measures would mitigate the proposed project's direct and cumulative impacts related to flooding to below a level of significance.

General Plan Update Policies

Policy LU-6.5: Sustainable Stormwater Management. Ensure that development minimizes the use of impervious surfaces and incorporates other Low Impact Development (LID) techniques as well as a combination of site design, source control, and stormwater best management practices, where applicable and consistent with the County's LID Handbook.

Policy LU-6.10: Protection from Hazards. Require that development be located and designed to protect property and residents from the risks of natural and man-induced hazards.

Policy S-9.2: **Development in Floodplains.** Limit development in designated floodplains to decrease the potential for property damage and loss of life from flooding and to avoid the need for engineered channels, channel improvements, and other flood control facilities. Require development to conform to federal flood proofing standards and siting criteria to prevent flow obstruction.

Policy S-10.2: Use of Natural Channels. Require the use of natural channels for County flood control facilities except where necessary to protect existing structures from a current flooding problem and where natural channel use is deemed infeasible. The alternative must achieve the same level of biological and other environmental protection, such as water quality, hydrology, and public safety.

Policy S-10.3: Flood Control Facilities. Require flood control facilities to be adequately sized, constructed, and maintained to operate effectively.

Policy S-10.4: Stormwater Management. Require development to incorporate low impact design, hydromodification management, and other measures to minimize stormwater impacts on drainage and flood control facilities.

Policy S-10.6: Stormwater Hydrology. Ensure development avoids diverting drainages, increasing velocities, and altering flow rates to off-site areas to minimize adverse impacts to the area's existing hydrology.

General Plan Update Mitigation Measures

Mitigation measures Hyd-1.1, Hyd-1.2, Hyd-1.3, Hyd-1.4, Hyd-1.5, and Hyd-2.5 as described above are applicable to this issue and are incorporated here by reference. In addition, the following mitigation measures would further reduce impacts associated with flooding.

Hyd-4.1 Implement the Flood Damage Prevention Ordinance to reduce flood losses in specified areas.

Hyd-4.2 Implement the Grading, Clearing and Watercourses Ordinance to limit activities affecting watercourses.

Hyd-4.3 Implement and revise as necessary Board Policies such as: Policy I-68, which establishes procedures for projects that impact floodways; Policy I-45, which defines watercourses that are subject to flood control; and Policy I-56, which permits, and establishes criteria for, staged construction of off-site flood control and drainage facilities by the private sector when there is a demonstrated and substantial public, private or environmental benefit.

2.8.6.5 Issue 5: Exceed Capacity of Stormwater Systems

The policies listed under Section 2.8.6.1 for Issue 1 and Section 2.8.6.4 for Issue 4 are applicable to the exceedance of stormwater system capacity and are incorporated here by

reference. In addition, the following General Plan Update policy and mitigation measures would mitigate proposed project direct and cumulative impacts related to the exceedance of stormwater system capacity to below a level of significance.

General Plan Update Policies

Policy S-10.5: Development Site Improvements. Require development to provide necessary on-site and off-site improvements to stormwater runoff and drainage facilities.

General Plan Update Mitigation Measures

Mitigation Measures Hyd-1.1, Hyd-1.2, Hyd-1.3, Hyd-1.4, Hyd-1.5, Hyd-2.5, Hyd-3.1, Hyd-4.1, Hyd-4.2, and Hyd-4.3 as described above are applicable to this issue of stormwater systems and are incorporated here by reference.

2.8.6.6 Issue 6: Housing within a 100-year Flood Hazard Area

The following General Plan Update policies and mitigation measures would mitigate the proposed project's direct and cumulative impacts related to housing within a 100-year flood hazard area to below a level of significance.

General Plan Update Policies

Policy LU-6.12: Flooding: Document and annually review areas within floodways and 100- and 200-year floodplains to ensure areas subject to flooding are accurately mapped in accordance with AB 162 (enacted January 1, 2008).

Policy COS-5.1: Impact to Floodways and Floodplains. Restrict development in floodways and floodplains in accordance with policies in the Flood Hazards section of the Safety Element.

Policy S-9.1: Floodplain Maps. Manage development based on federal floodplain maps. County maps shall also be referred to and in case of conflict(s) between the County flood plain maps and the federal floodplain maps, the more stringent of restrictions shall apply.

Policy S-9.2: Development in Floodplains. Limit development in designated floodplains to decrease the potential for property damage and loss of life from flooding and to avoid the need for engineered channels, channel improvements, and other flood control facilities. Require development to conform to federal flood proofing standards and siting criteria to prevent flow obstruction.

Policy S-9.3: Development in Flood Hazard Areas. Require development within mapped flood hazard areas be sited and designed to minimize on-site and off-site hazards to health, safety, and property due to flooding.

Policy S-9.4: Development in Villages. Allow new uses and development within the floodplain fringe (land within the floodplain outside of the floodway) only when environmental impacts and hazards are mitigated. This policy does not apply to floodplains with unmapped floodways. Require land available outside the floodplain to be fully utilized before locating development within a floodplain. Development within a floodplain may be denied if it will cause

significant adverse environmental impacts or is prohibited in the community plan. Channelization of floodplains is allowed within villages only when specifically addressed in community plans.

Policy S-9.5: Development in the Floodplain Fringe. Prohibit development in the floodplain fringe when located on Semi-Rural and Rural Lands to maintain the capacity of the floodplain. For parcels located entirely within a floodplain or without sufficient space for a building pad outside the floodplain, development is limited to a single family home on an existing lot or those uses that do not compromise the environmental attributes of the floodplain or require further channelization.

Policy S-10.1: Land Uses within Floodways. Limit new or expanded uses in floodways to agricultural, recreational, and other such low-intensity uses and those that do not result in any increase in flood levels during the occurrence of the base flood discharge, do not include habitable structures, and do not substantially harm, and fully offset, the environmental values of the floodway area. This policy does not apply to minor renovation projects, improvements required to remedy an existing flooding problem, legal sand or gravel mining activities, or public infrastructure.

General Plan Update Mitigation Measures

Mitigation Measures Hyd-1.2, Hyd-1.5, Hyd-2.5, Hyd-4.1, and Hyd-4.2 as described above are applicable to this issue and are incorporated here by reference. In addition, the following mitigation measure would further reduce impacts associated with placement of housing within a 100-year flood hazard area.

Hyd-6.1 Implement the RPO to prohibit development of permanent structures for human habitation or employment in a floodway and require planning of hillside developments to minimize potential soil, geological and drainage problems.

2.8.6.7 Issue 7: Impeding or Redirecting Flood Flows

The policies listed under Section 2.8.6.6 for Issue 6 are applicable to impeding or redirecting flood flows and are incorporated here by reference. In addition, the following General Plan Update policies and mitigation measures would mitigate proposed project direct and cumulative impacts related to impeding or redirecting flood flows to below a level of significance.

General Plan Update Policies

Policy LU-6.12: Flooding. Document and annually review areas within floodways and 100- and 200-year floodplains to ensure areas subject to flooding are accurately mapped in accordance with AB 162 (enacted January 1, 2008).

Policy COS-5.1: Impact to Floodways and Floodplains. Restrict development in floodways and floodplains in accordance with policies in the Flood Hazards section of the Safety Element.

General Plan Update Mitigation Measures

Mitigation measures Hyd-1.2, Hyd-1.5, Hyd-2.5, Hyd-4.1, Hyd-4.2, Hyd-4.3, and Hyd-6.1 as described above are applicable to the issue of impeding or redirecting flood flows and are incorporated here by reference.

2.8.6.8 Issue 8: Dam Inundation and Flood Hazards

The policies listed under Section 2.8.6.6 for Issue 6 are applicable to dam inundation and flood hazards and are incorporated here by reference. In addition, the following General Plan Update policy and mitigation measures would mitigate proposed project direct and cumulative impacts related to dam inundation and flood hazards to below a level of significance.

General Plan Update Policy

Policy S-9.6: Development in Dam Inundation Areas. Prohibit development in dam inundation areas that may interfere with the County's emergency response and evacuation plans.

General Plan Mitigation Measures

Mitigation measures Hyd-1.2, Hyd-1.5, Hyd-2.5, Hyd-4.1, Hyd-4.2, Hyd-4.3, and Hyd-6.1 as described above are applicable to this issue and are incorporated here by reference. In addition, the following mitigation measures would further reduce impacts associated with dam inundation and flood hazards.

Hyd-8.1 Perform regular inspections and maintenance of County reservoirs to prevent dam failure.

Hyd-8.2 Review discretionary projects for dam inundation hazards through application of the County's Guidelines for Determining Significance for Hydrology and Guidelines for Determining Significance for Emergency Response Plans.

2.8.6.9 Issue 9: Seiche, Tsunami and Mudflow Hazards

The following General Plan Update policies and mitigation measures would mitigate proposed project direct and cumulative impacts related to seiches, tsunamis and mudflows to below a level of significance.

General Plan Update Policies

Policy COS-5.1: Impact to Floodways and Floodplains. Restrict development in floodways and floodplains in accordance with policies in the Flood Hazards section of the Safety Element.

Policy S-8.1: Landslide Risks. Direct development away from areas with high landslide, mudslide, or rock fall potential when engineering solutions have been determined by the County to be infeasible.

Policy S-8.2: Risk of Slope Instability. Prohibit development from causing or contributing to slope instability.

Policy S-9.3: Development in Flood Hazard Areas. Require development within mapped flood hazard areas be sited and designed to minimize on-site and off-site hazards to health, safety, and property due to flooding.

Policy S-9.6: Development in Dam Inundation Areas. Prohibit development in dam inundation areas that may interfere with the County's emergency response and evacuation plans.

General Plan Mitigation Measures

Mitigation measures Hyd-3.1, Hyd-3.2, and Hyd-3.3 as described above are applicable to the issue of seiche, tsunami and mudflow hazards and are incorporated here by reference.

2.8.7 Conclusion

The discussion below provides a synopsis of the conclusion reached in each of the above impact analyses, and the level of impact that would remain after mitigation measures are implemented.

2.8.7.1 Issue 1: Water Quality Standards and Requirements

Implementation of the proposed General Plan Update would contribute to surface water quality contaminants and would place land uses in groundwater quality impaired areas, which would result in potentially significant impacts to water quality standards and requirements. Therefore, the proposed project would result in a potentially significant direct impact. Implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would reduce proposed project impacts. However, proposed impacts associated with groundwater quality would not be mitigated to below a level of significance and would remain significant and unavoidable. Additionally, the proposed project would result in a cumulatively considerable contribution to a significant cumulative impact associated with groundwater quality standards and requirements.

2.8.7.2 Issue 2: Groundwater Supplies and Recharge

At full build-out of land uses designated in the proposed General Plan Update, groundwater supply and recharge impacts would occur in: 1) areas that experience a 50 percent reduction of groundwater in storage; 2) areas that may be currently impacted by the combined drawdown of existing wells; 3) areas that experience a high frequency of low well yield; and 4) Borrego Valley. Therefore, the proposed project would result in a potentially significant impact. Implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would reduce proposed project impacts. However, the proposed project impact would not be mitigated to below a level of significance and would remain significant and unavoidable. Additionally, the proposed project would result in a cumulatively considerable contribution to a significant cumulative impact associated with groundwater supplies and recharge.

2.8.7.3 Issue 3: Erosion or Siltation

Implementation of the General Plan Update would result in increased runoff that has the potential to cause new erosion or worsen existing erosion problems. Therefore, the proposed project would result in a potentially significant impact. Additionally, the proposed project would result in a potentially significant cumulative impact associated with erosion or siltation. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate the proposed project's direct and cumulative impacts to below a level of significance.

2.8.7.4 Issue 4: Flooding

Implementation of the General Plan Update would convert permeable surfaces to impermeable surfaces, which have the potential to result in flooding on or off site. Therefore, the proposed project would result in a potentially significant impact. Additionally, the proposed project would result in a potentially significant cumulative impact associated with flooding. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate the proposed project's direct and cumulative impacts to below a level of significance.

2.8.7.5 Issue 5: Exceed Capacity of Stormwater Systems

Implementation of the proposed General Plan Update would exceed the capacity of existing stormwater drainage facilities. Therefore, the proposed project would result in a potentially significant impact. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate proposed project impacts to below a level of significance. With implementation of mitigation, the proposed project would not contribute to a significant cumulative impact associated with the capacity of stormwater systems.

2.8.7.6 Issue 6: Housing within a 100-year Flood Hazard Area

Implementation of the proposed General Plan Update would include land designated for residential land use within a 100-year flood plain. Therefore, the proposed project would result in a potentially significant impact. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate proposed project impacts to below a level of significance. With implementation of mitigation, the proposed project would not contribute to a significant cumulative impact associated with housing within a flood hazard area.

2.8.7.7 Issue 7: Impeding or Redirecting Flood Flows

Implementation of the General Plan Update would impede or redirect flood flows. Therefore, the proposed project would result in a potentially significant impact. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate proposed project impacts to below a level of significance. With implementation of mitigation, the proposed project would not contribute to a significant cumulative impact associated with impeding or redirecting flood flows.

2.8.7.8 Issue 8: Dam Inundation and Flood Hazards

Implementation of the proposed General Plan Update would result in inundation risk associated with dam failure. Therefore, the proposed project would result in a potentially significant impact. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate proposed project impacts to below a level of significance. With implementation of mitigation, the proposed project would not contribute to a significant cumulative impact associated with dam inundation and flood hazards.

2.8.7.9 Issue 9: Seiche, Tsunami and Mudflow Hazards

Implementation of the proposed General Plan Update would result in an increased risk of exposing people or structures to damage in the event of a mudflow. Therefore, the proposed project would result in a potentially significant impact. However, implementation of the proposed General Plan Update policies and mitigation measures, in addition to compliance with applicable regulations, would mitigate proposed project impacts to below a level of significance. With implementation of mitigation, the proposed project would not contribute to a significant cumulative impact associated with seiche, tsunami, and mudflow hazards.

Table 2.8-1. Water Bodies Identified as Impaired under the Clean Water Act

Watershed Management Area	Water Body Name	Pollutant/Stressor
San Juan WMA	Pacific Ocean, Aliso	Elevated coliform bacteria levels
	Laguna	Elevated coliform bacteria levels
	Dana Point	Elevated coliform bacteria levels
	Lower San Juan Creek, Mouth	Elevated coliform bacteria levels
	Aliso Creek	Elevated coliform bacteria levels
	Lower San Juan Creek	Elevated coliform bacteria levels
Santa Margarita Watershed	Santa Margarita Lagoon	Eutrophic
	De Luz Creek	Iron, Manganese
	Rainbow Creek	Iron, Sulfates, Total Dissolved Solids (TDS)
	Upper Santa Margarita River	Phosphorus
	Sandia Creek	Nitrogen, Phosphorus, TDS
	Temecula Creek	Nitrogen, Phosphorus, TDS
	Murrieta Creek	Iron, Manganese, Nitrogen, Phosphorus
	Long Canyon Creek	TDS
San Luis Rey WMA	Pacific Ocean Shoreline	Indicator Bacteria
	San Luis Rey River	Chloride, TDS
	Guajome Lake	Eutrophic
Carlsbad WMA	Pacific Ocean Shoreline	Bacterial Indicators
	Loma Alta Slough	Bacterial Indicators, Eutrophic
	Buena Vista Lagoon (202 acres)	Bacterial Indicators, Nutrients, Sedimentation/Siltation
	Buena Vista Creek	Sediment toxicity
	Pacific Ocean Shoreline	Bacterial Indicators
	Aqua Hedionda Lagoon (7 acres)	Bacterial Indicators, Sedimentation/Siltation
	Agua Hedionda Creek	TDS, Manganese, Selenium, Sulfates
	Lake San Marcos	Ammonia as Nitrogen, Nutrients, Phosphorus
	San Marcos Creek	DDE, Phosphorus, Sediment toxicity
	Buena Creek	DDT, Nitrate, Phosphate
San Dieguito WMA	Pacific Ocean Shoreline	Bacterial Indicators
	Green Valley Lake	Sulfates, Chloride, Manganese, PCP
	Lake Hodges	Color, Nitrogen, Phosphorus, Turbidity, Manganese, pH
	Kit Carson Creek	TDS, PCP
	Felicita Creek	TDS, Aluminum
	Cloverdale Creek	Phosphorus, TDS
	Sutherland Reservoir	Color, Manganese, pH
Los Penasquitos WMA	Los Penasquitos Lagoon	Sediment/Siltation
	Los Penasquitos Creek	Phosphate, TDS
San Diego River Watershed	Famosa Slough and Channel	Eutrophic
	Pacific Ocean Shoreline	Bacterial Indicators
	Lower San Diego River	Fecal Coliform, Low Dissolved Oxygen, Phosphorus, TDS
	Forrester Creek	Fecal Coliform, pH, TDS, Dissolved Oxygen, Phosphorus
	El Capitan Lake	Color, Manganese, pH
	Murray Reservoir	pH
	San Vicente Reservoir	Chloride, Color, Manganese, pH, Sulfates

Table 2.8-1 (Continued)

Watershed Management Area	Water Body Name	Pollutant/Stressor
San Diego Bay WMA	San Diego Bay Shoreline, at Harbor Island (West Basin)	Copper
	San Diego Bay Shoreline, G St. Pier	Bacterial Indicators
	San Diego Bay Shoreline, Near Switzer Creek	Chlordane, Lindane/Hexachlorocyclohexane, PAHs
	San Diego Bay Shoreline, Vicinity of B St. and Broadway Piers	Bacterial Indicators, Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, Downtown Anchorage	Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, at Harbor Island (East Basin)	Copper
	San Diego Bay Shoreline, at Marriott Marina	Copper
	San Diego Bay Shoreline, at America's Cup Harbor	Copper
	Chollas Creek	Bacteria Indicators, Copper, Lead, Zinc
	San Diego Bay Shoreline, Near Chollas Creek	Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, 32nd St. Navel Station	Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, Between Sampson and 28th Streets	Copper, Mercury, PAHs, PCBs, Zinc
	San Diego Bay Shoreline, Near Coronado Bridge	Benthic Community Effects, Sediment Toxicity
	San Diego Shoreline, Seventh St. Channel	Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, North of 24th St. Marine Terminal	Benthic Community Effects, Sediment Toxicity
	San Diego Bay Shoreline, at Bayside Park (J Street)	Indicator Bacteria
	San Diego Bay Shoreline, at Chula Vista Marina	Copper
	Sweetwater Reservoir	Dissolved Oxygen
	Loveland Reservoir	Aluminum, Manganese, Dissolved Oxygen
	Pacific Ocean Shoreline, Imperial Beach Pier	PCBs
	San Diego Bay	PCBs
	San Diego Bay Shoreline, and Coronado Cays	Copper
	San Diego Bay Shoreline, at Glorietta Bay	Copper
	Poggi Canyon Creek	DDT
	Otay Reservoir, Lower	Color, Iron, Manganese, Nitrogen ammonia (total ammonia), pH (high)
Tijuana River Watershed Management Area	Tijuana River	Bacteria Indicators, Euthrophic conditions, Low Dissolved Oxygen, Pesticides, Solids, Synthetic Organics, Trace Elements, Trash
	Tijuana River Estuary	Bacteria Indicators, Eutrophic conditions, Lead, Low Dissolved Oxygen, Nickel, Pesticides, Thallium, Trash, Turbidity
	Pacific Ocean Shoreline, Tijuana HU	Bacteria Indicators
	Barrett Lake	Color, Manganese, pH
	Pine Valley Creek (Upper)	Enterococcus, Phosphorus, Turbidity
	Morena Reservoir	Color, Manganese, pH

Source: Weston 2007

Table 2.8-2. Historic Flood Occurrences in San Diego County

Location	Date	Property Damage (in millions of dollars)
North County Communities		
Agua Caliente Springs	Aug. 29, 2000 Feb. 22, 2004	0 .010
Rancho Santa Fe	Jan. 10. 1995	5,000
Rincon	June 21, 2000	.006
Valley Center	Feb. 18, 2004 Feb. 26, 2004 Mar. 2, 2004	0.030 0.035 0.020
Warner Springs	Aug. 8, 1998 July 11, 1999 Aug. 22, 2003	0 .005 .060
East County Communities		
Alpine	Aug. 20, 2003	0
Crest	March 2, 2004	.060
Lakeside	March 2, 2004	.080
Ramona	Feb. 18, 2004 April 2, 2004	0 .045
Backcountry Communities		
Borrego Springs	July 28, 1999 Aug. 29, 2000 Aug. 1, 2003 Aug. 27, 2003 March 3, 2004	.100 1,000 .150 .010 .010
Campo	Aug. 25, 2000 Aug. 27, 2003 Sep. 4, 2003	0 .012 .020
Jacumba	Aug. 14, 2003	.150
Julian	Aug. 19, 1999 Sep. 2, 2001 Aug. 25, 2003	.010 0 .030
Mt Laguna	July 15, 2002 Aug. 14, 2003 Feb. 22, 2004	0 0 .070
Ocotillo Wells	Aug. 17, 2000	.030
Palomar Mountain	Aug. 24, 2000 Sep. 5, 2003	0 0
Pine Valley	Aug. 25, 2000 Aug. 24, 2003 Aug. 27, 2003 Sep. 4, 2003	.020 .010 .030 .030
Santa Ysabel	Aug. 21, 2003 Sep. 2, 2003 Sep. 4, 2003 Sep. 4, 2003	.050 .050 .060
West Portion	Feb. 23, 1998	10,300
Total		**$16,301.19**

Source: FCD 2008

Table 2.8-3. Tsunami Heights in San Diego

Year	Height (feet)
1952	2.3
1957	1.5
1960	4.6
1964	3.7

Source: URS 2004

Table 2.8-4. Dam Inundation Areas Affecting the Unincorporated County

Dam	CPAs Affected	Inundation Acreage	Existing Use
Agua Tibia	North Mtn., Pala-Pauma	491	Open space, agriculture
Barrett Dam	Jamul-Dulzura	6,157	Vacant
Blossom Valley Reservoir	Lakeside	38	Residential
Chet Harritt	Lakeside	5,780	Residential, vacant, open space commercial
Cuyamaca	Alpine, Central Mtn., Lakeside	2,736	Parks, vacant, some residential
Dixon	NC Metro, San Dieguito	4,115	Agricultural, residential, parks
El Capitan	Alpine, Lakeside	3,447	Residential, commercial, parks
Henshaw	Bonsall, Fallbrook, North Mtn., Pala-Pauma, Pendleton/De Luz, Valley Center	12,176	Agricultural, vacant lands, open space
Lake Hodges	DEL MAR	0	
Lake Hodges	SAN DIEGO	8	
Lake Hodges	San Dieguito	4	
Lake Hodges	San Dieguito	12	Residential, commercial, agricultural
Lake Loveland	Alpine, County Islands, Crest-Dehesa, Jamul-Dulzura, Spring Valley, Sweetwater, Valle de Oro	6,992	Parks, Vacant
Lake Skinner	Fallbrook, Pendleton/De Luz	201	Other
Lake Skinner Finished Water Reservoir	Fallbrook, Pendleton/De Luz	259	Other
Lake Wohlford	NC Metro, San Dieguito	545	Vacant, residential
Morena Overtopping Barrett	Jamul-Dulzura, Mtn. Empire	1,268	Parks, vacant
Olivenhain Reservoir	San Dieguito	200	
Palo Verde	Alpine	62	Open Space/Vacant
Pechstein	NC Metro	478	Residential , parks
Ramona	Ramona	153	Vacant, parks
Red Mountain Reservoir	Fallbrook	294	Agricultural, residential, vacant
San Dieguito	San Dieguito	465	Residential, agricultural

Table 2.8-4 (Continued)

Dam	CPAs Affected	Inundation Acreage	Existing Use
San Marcos 848	NC Metro	336	Parks
San Marcos 854	NC Metro	780	Residential
San Vicente	Lakeside	1,582	Vacant, parks, residential
Stehly Dam – Lower	Bonsall, Fallbrook, Valley Center	128	Agricultural/Vacant
Stehly Dam – Upper	Valley Center	131	Agricultural, Vacant
Sutherland	NC Metro, North Mtn., Ramona	136	Parks, agricultural, vacant
Sutherland (Overtopping Hodges)	NC Metro, North Mtn., San Dieguito	960	Residential, agricultural
Sweetwater	County Islands, Sweetwater	31	Residential, parks, commercial recreation
Turner	Valley Center, Bonsall, NC Metro,	776	Agricultural, parks
Upper /Lower Otay	Otay	4,270	Parks, industrial, vacant lands
Vail	Fallbrook, Pendleton/De Luz	5,061	Undeveloped, other
Total		**60,060**	

Note: Data has been rounded to nearest whole number.
Source: DPLU 2007e

Table 2.8-5. Unincorporated Communities with Areas in 100-year Floodplains (in Acres)

CPA	Acreage	Existing Use
North County		
Bonsall	1,681	agriculture, vacant, residential
Fallbrook	1,243	residential, open space, vacant
North Co. Metro	320	open space, residential, agricultural
Pala-Pauma	1,969	agriculture, vacant, open space
Pendleton/De Luz	0	--
San Dieguito	1,092	agriculture, open space, vacant
Rainbow	158	agriculture, residential
Valley Center	1,134	agriculture, vacant, residential
Subtotal	**7,597**	
East County		
Alpine	155	residential
County Islands	4	residential, vacant
Crest-Dehesa	345	open space, industrial
Jamul-Dulzura	2,028	open space, vacant
Lakeside	1,474	industrial , residential
Otay	0	vacant
Ramona	627	agriculture, vacant
Spring Valley	237	residential
Sweetwater	547	open space, residential
Valle De Oro	191	open space
Subtotal	**5,608**	
Backcountry		
Central Mountain	1,029	agriculture, commercial recreation, parks, undeveloped
Desert	30,349	residential, agriculture, vacant
Julian	275	agricultural, residential
Mountain Empire	905	vacant, agricultural
North Mountain	4,720	vacant, agriculture, residential
Subtotal	**37,238**	
Total	**50,483**	

Note: Data has been rounded to nearest whole number.
Source: DPLU 2007e

Table 2.8-6. Groundwater Basins Experiencing Significant Impacts in Storage

Estimated Minimum Groundwater in Storage (Worst Month in a 34-Year Period Analyzed)		
Groundwater Basin	**Existing (percent)**	**General Plan Update at Buildout (percent)**
Ballena	0	0
Barona	42	38
Engineer Springs	26	0
Jamul	0	0
Las Lomas Muertas	0	0
Lee	36	16
Lyon	78	50
Morena South	37	0
Pine South	63	37
San Felipe South	0	0
Spencer	0	0

Source: DPLU 2009f

Table 2.8-7. Land Use Designations within Flood Areas under the proposed General Plan Update

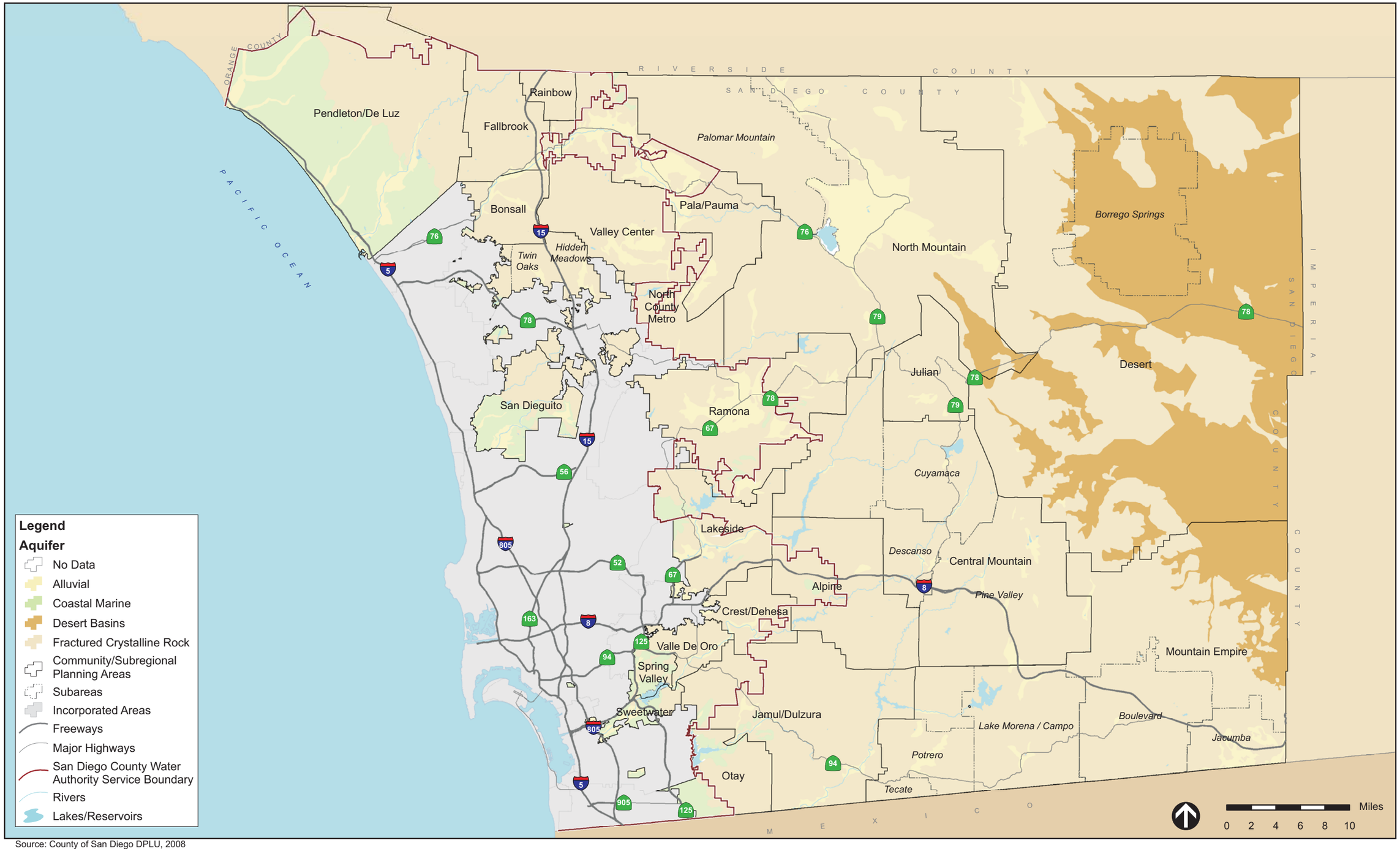
General Plan Update Land Use Designation	Total Acres located within a Flood Area
Village Residential	2,824
Semi-Rural Residential	15,282
Rural Lands	19,925
Specific Plan Area	2,835
Office Professional	44
Neighborhood Commercial	4
General Commercial	285
Rural Commercial	347
Limited Impact Industrial	161
Medium Impact Industrial	230
High Impact Industrial	71
Village Core Mixed Use	< 1
Public/Semi-Public Lands	1,188
National Forest and State Parks	8,738
Tribal Lands	433
Open Space	19,184
Military Installations	899

Note: Data has been rounded to nearest whole number.
Source: DPLU GIS 2008

Table 2.8-8. Land Use designations within Dam Inundation Areas under proposed General Plan Update

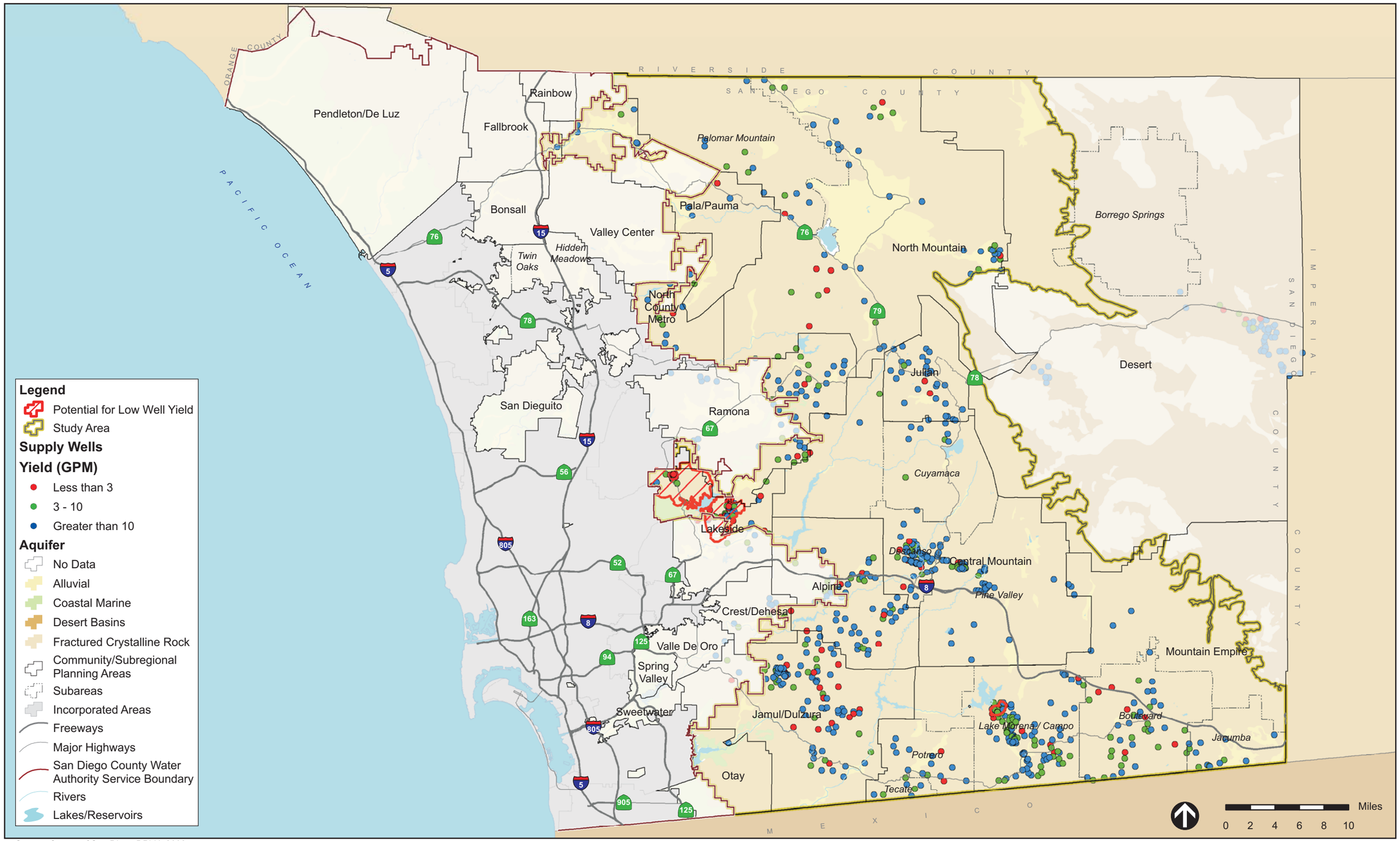
General Plan Update Land Use Designation	Total Acres located within Dam Inundation Area
Village Residential	2,762
Semi-Rural Residential	4,961
Rural Lands	9,942
Specific Plan Area	4,669
Office Professional	26
Neighborhood Commercial	8
General Commercial	530
Rural Commercial	20
Limited Impact Industrial	0
Medium Impact Industrial	243
High Impact Industrial	72
Village Core Mixed Use	0
Public/Semi-Public Lands	1,733
National Forest and State Parks	1,673
Tribal Lands	1,592
Open Space	13,941
Military Installations	13,955

Note: Data has been rounded to nearest whole number.
Source: DPLU GIS 2008



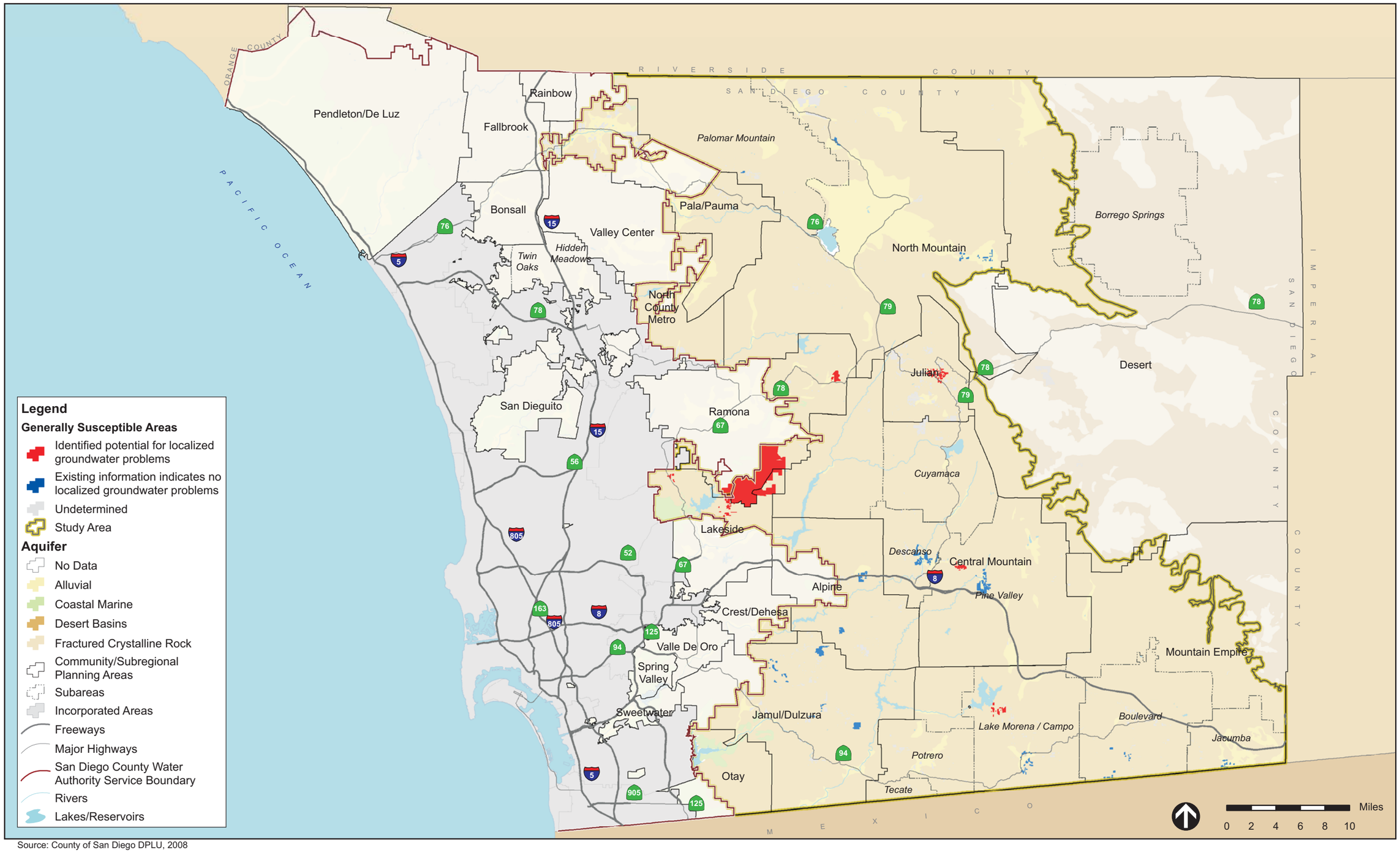
Source: County of San Diego DPLU, 2008

AQUIFER TYPES WITHIN THE COUNTY **FIGURE 2.8-1**



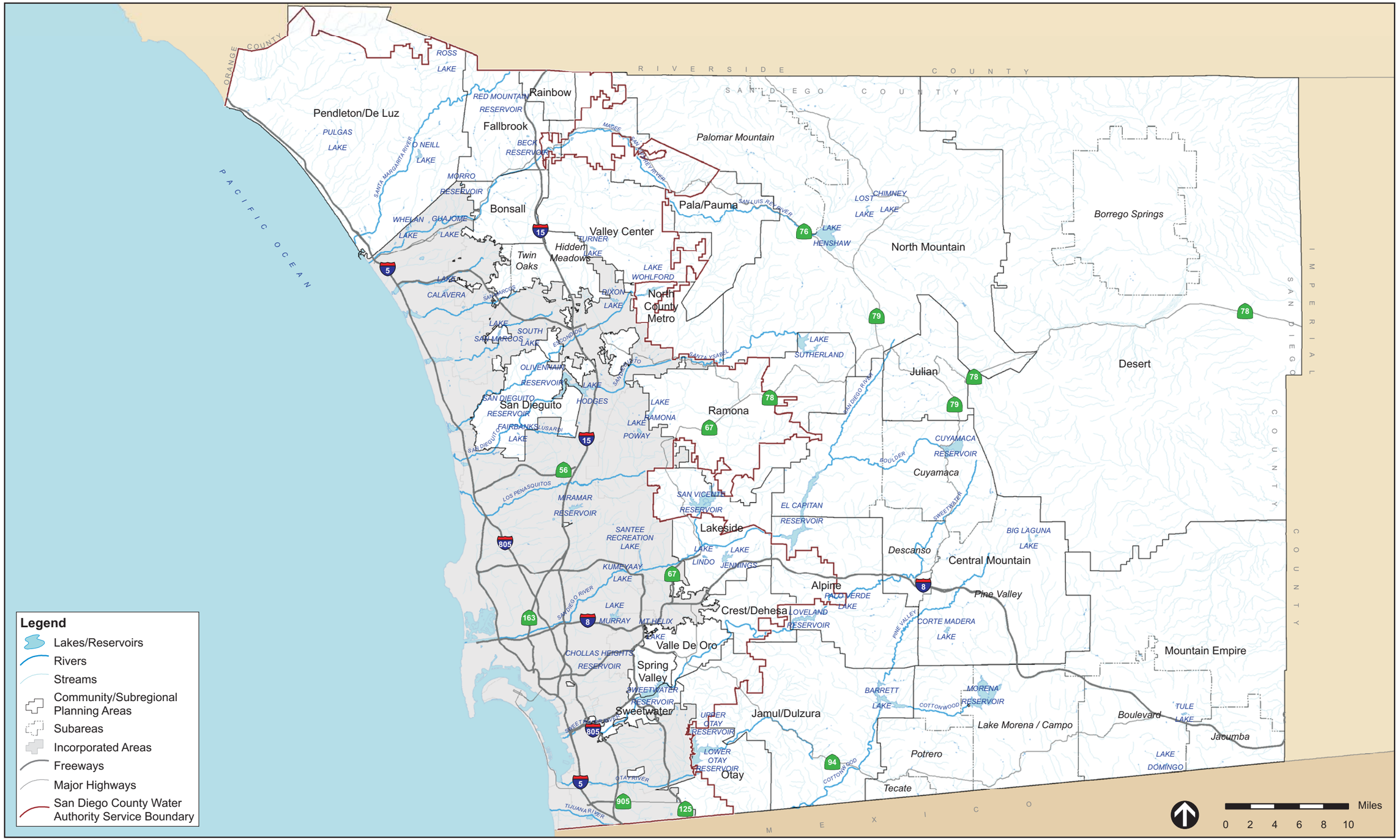
Source: County of San Diego DPLU, 2008

POTENTIAL FOR LOW WELL YIELD **FIGURE 2.8-2**



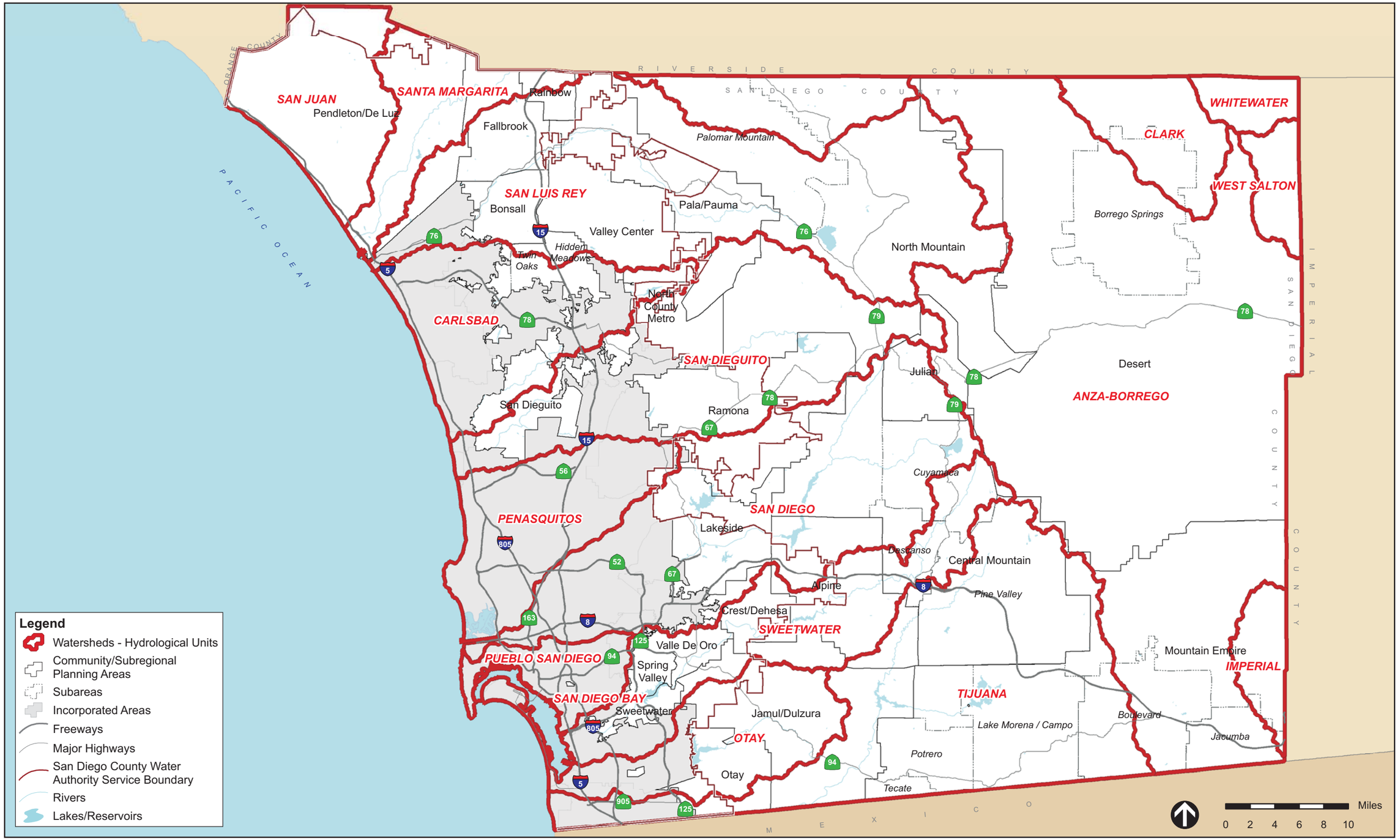
Source: County of San Diego DPLU, 2008

POTENTIAL IMPACTS FROM LARGE QUANTITY/CLUSTERED GROUNDWATER USERS **FIGURE 2.8-3**



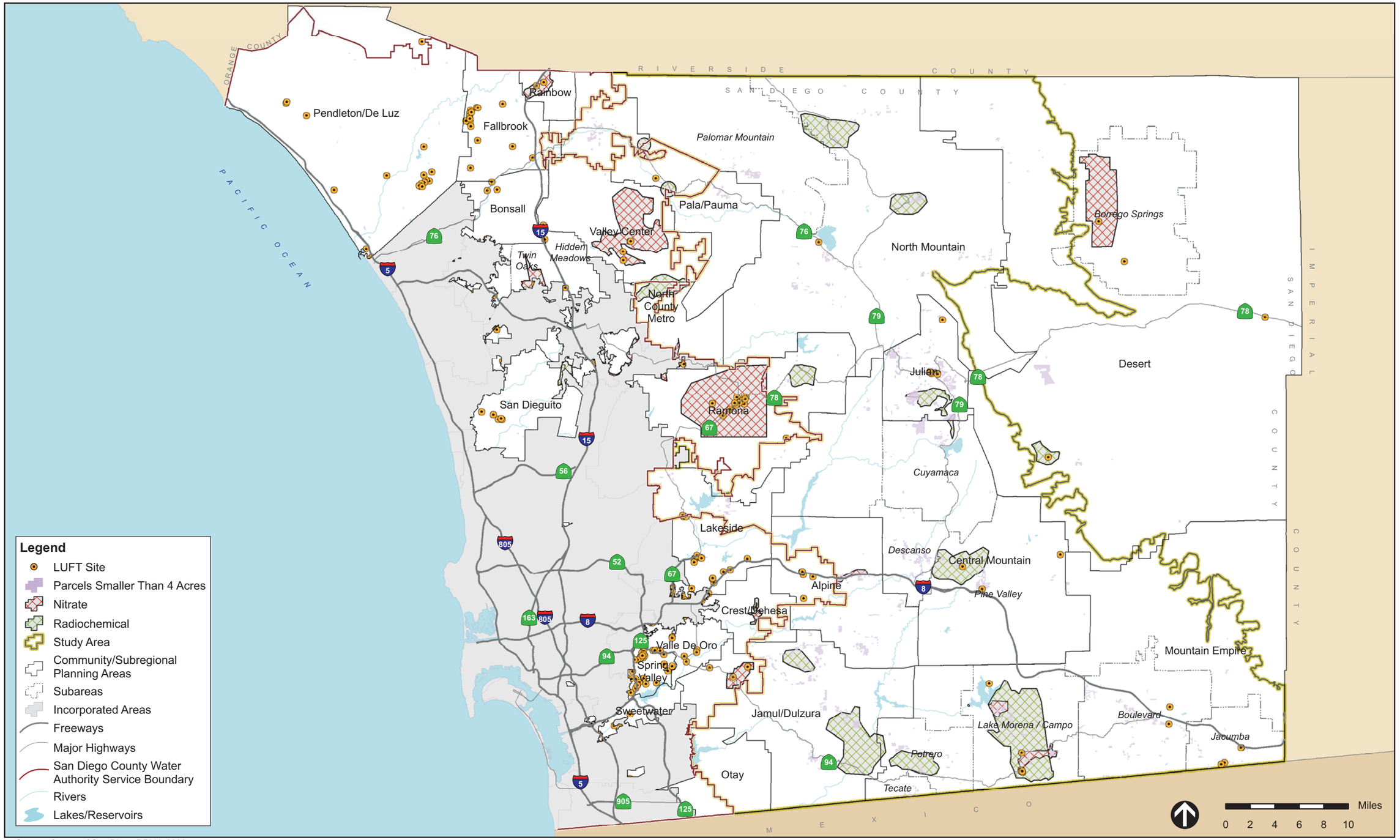
Source: County of San Diego DPLU, 2008

SURFACE WATER **FIGURE 2.8-4**

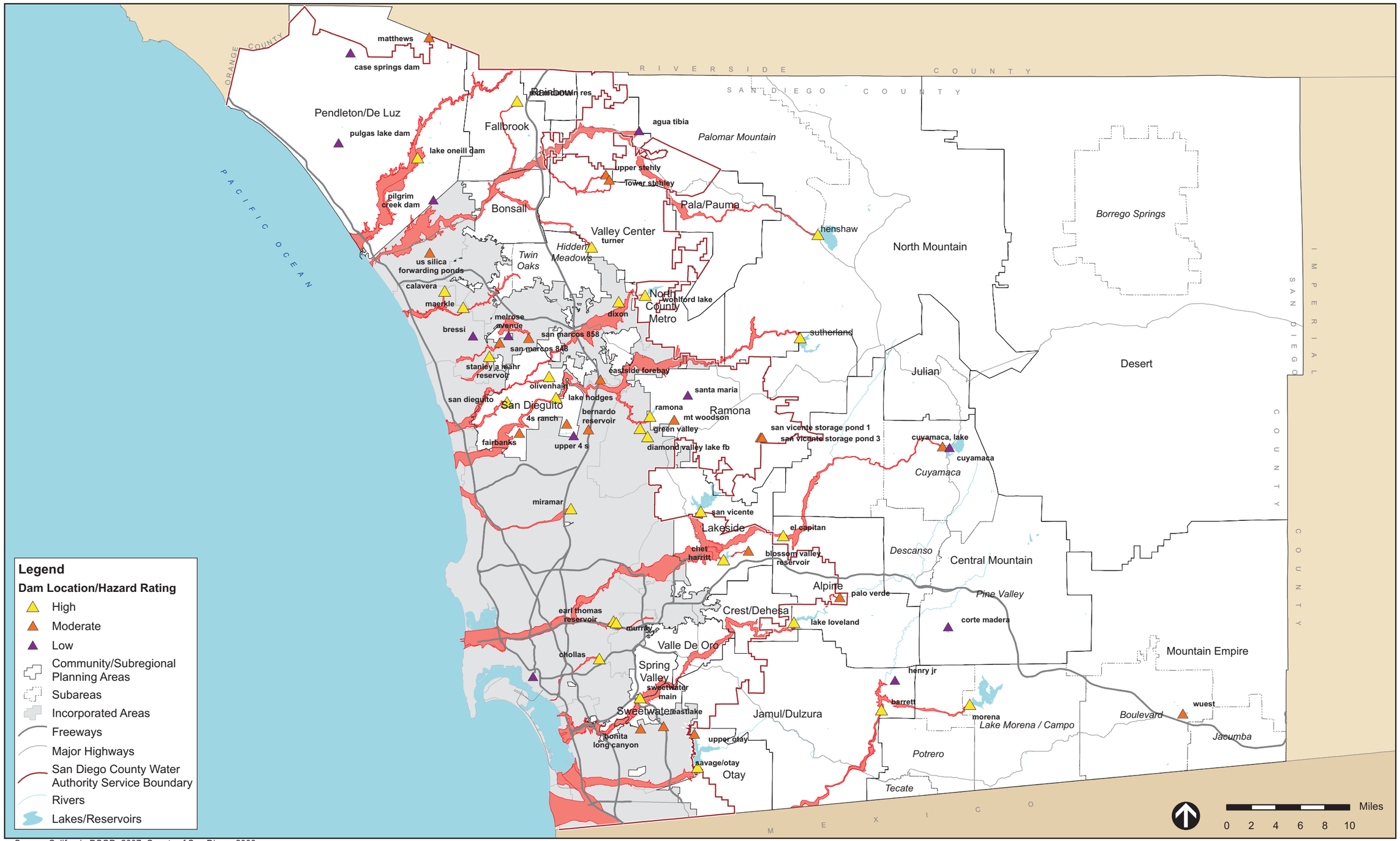


Source: County of San Diego DPLU, 2008

COUNTY HYDROLOGIC UNITS **FIGURE 2.8-5**

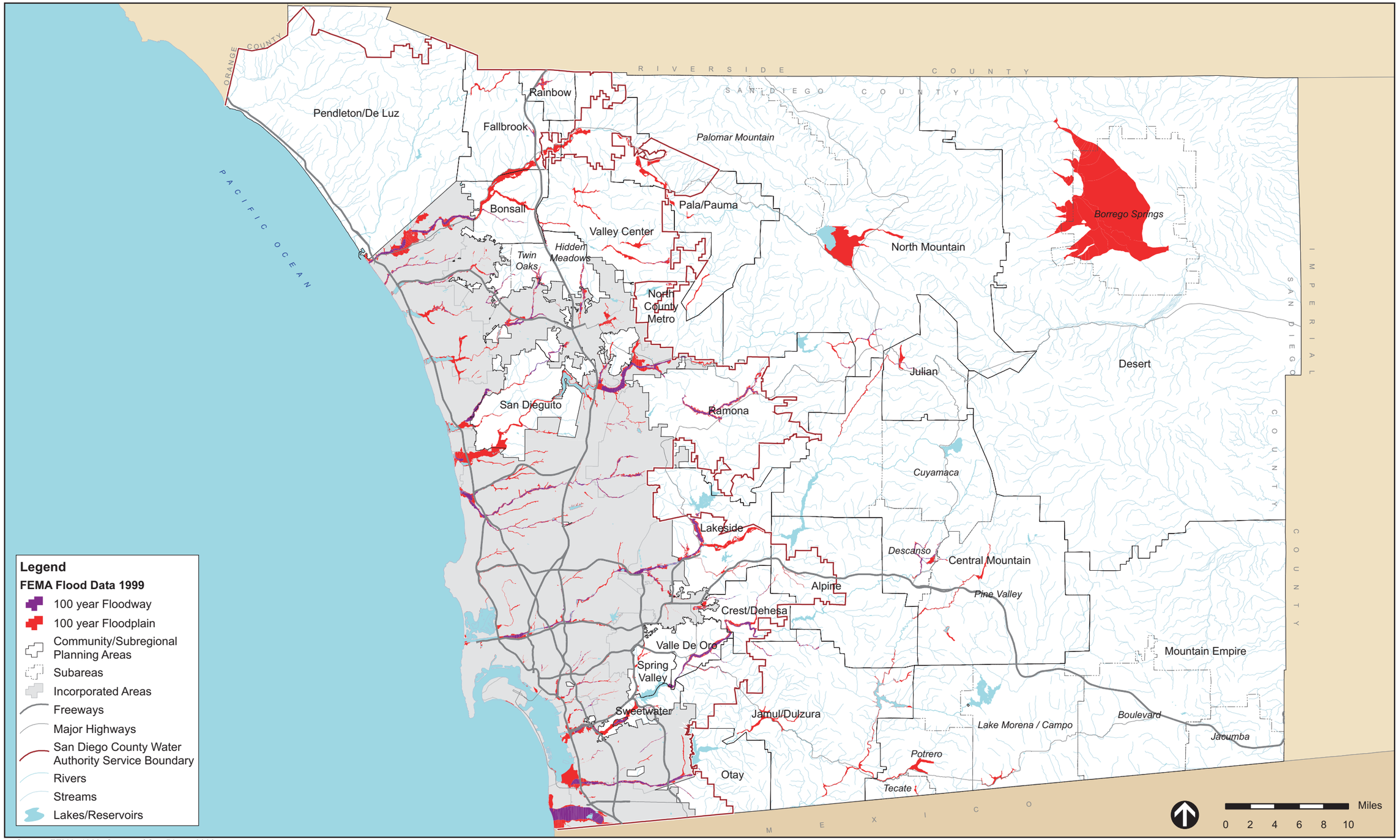


Source: County of San Diego DPLU, 2008



Source: California DSOD, 2007; County of San Diego, 2008

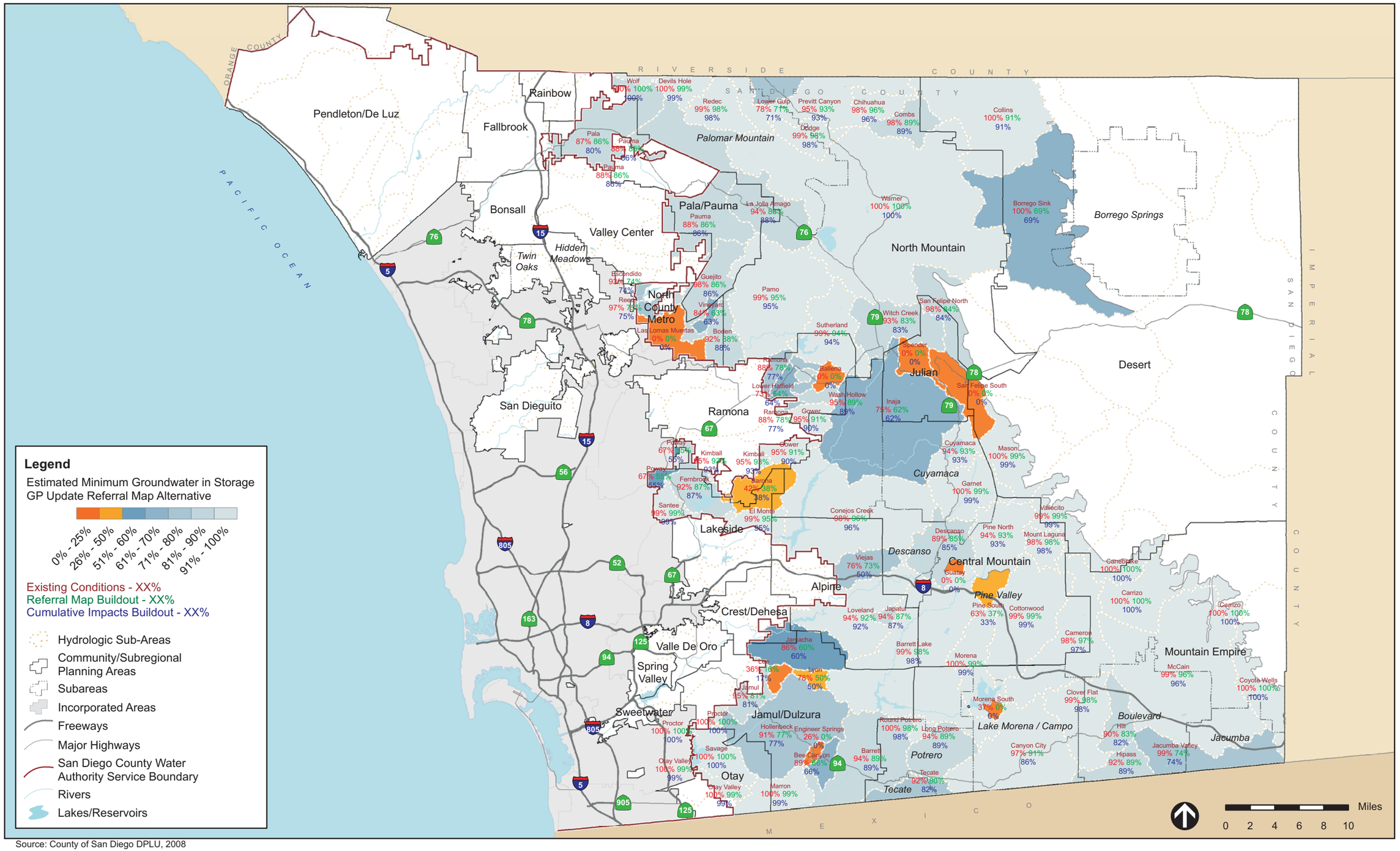
DAM INUNDATION AREAS **FIGURE 2.8-7**



Source: FEMA, 1999; County of San Diego, 2008

COUNTY FLOODPLAINS AND FLOODWAYS

FIGURE 2.8-8



Source: County of San Diego DPLU, 2008