4.10 HYDROLOGY AND WATER QUALITY

This section evaluates the hydrology and water quality impacts of the proposed Plan.

4.10.1 EXISTING CONDITIONS

HYDROLOGY

Surface Waters

Surface waters in the San Diego region include the area's ocean shoreline, bays, lagoons, lakes, reservoirs, playas/inundation areas/washes, streams, and rivers (Figure 4.10-1). Major rivers within the San Diego region include the Santa Margarita River, the San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River, Otay River, and the Tijuana River. Major coastal waterbodies include Buena Vista Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Peñasquitos Lagoon, Mission Bay, San Diego Bay, Tijuana River estuary, and the Pacific Ocean. Playas/inundation areas/washes include areas surrounding Lake Henshaw, Lake Cuyamaca, Moreno Reservoir, and Lake Hodges, as shown in Figure 4.10-1.

Watersheds and Hydrological Characteristics

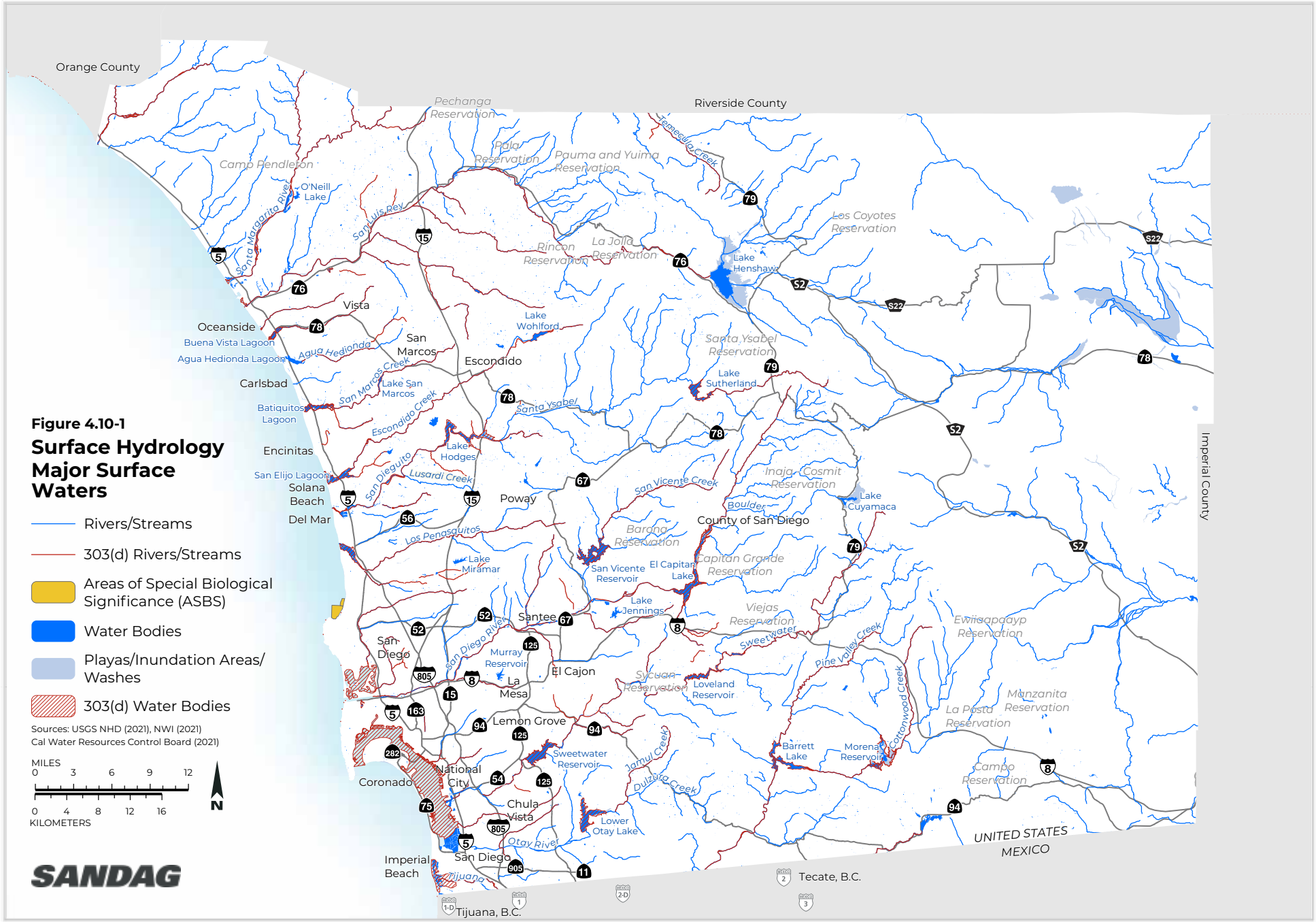
The San Diego region is divided into two hydrologic basins by the northwest-trending Peninsular Range. The San Diego Hydrologic Basin is on the gently sloping western side of the range, and the Colorado River Hydrologic Basin is on the steep eastern side.

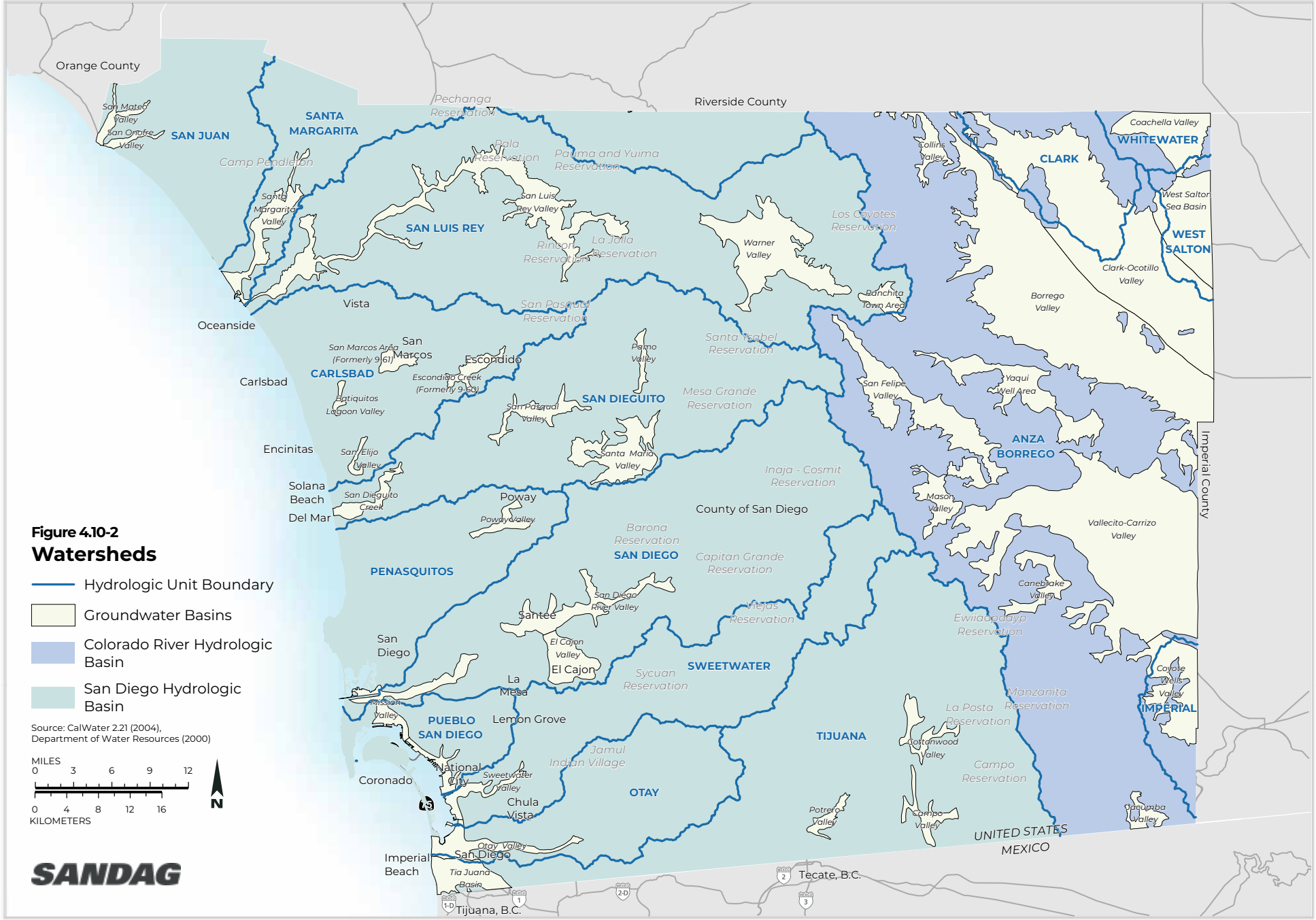
San Diego Hydrologic Basin

The San Diego Hydrologic Basin is divided into hydrologic units (HUs), which are entire watersheds made up of one or more rivers or streams. Each HU, or watershed, is divided into hydrologic areas (HAs), which are the major tributaries or major groundwater basins within the watershed. Hydrologic subareas (HSAs), which include water-bearing and non-water-bearing formations, are major subdivisions of HAs.

The San Diego Hydrologic Basin includes 11 HUs (watersheds). The Carlsbad, San Dieguito, Los Peñasquitos, San Diego, Pueblo San Diego, Sweetwater, and Otay watersheds are located entirely within the San Diego region. The San Luis Rey, San Juan, Santa Margarita, and Tijuana watersheds are located in both the San Diego region and neighboring jurisdictions: Orange County, Riverside County, and Baja California, Mexico, respectively. All 11 watersheds ultimately drain to the Pacific Ocean. Figure 4.10-2 shows the watersheds and the groundwater basins.

The major characteristics of the 11 watersheds are described below. Beneficial uses of water bodies within these watersheds are described in the *Water Quality* section that follows under *Beneficial Uses/Water Quality Objectives*.


Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Camp Pendleton
O'Neill Lake
Santa Margarita River
San Luis Rey
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
Lake Henshaw
Vista
Oceanside
Buena Vista Lagoon
Agua Hedionda Lagoon
San Marcos
Escondido
Lake Wohlford
Santa Ysabel Reservation
Lake Sutherland
Carlsbad
Lake San Marcos
San Marcos Creek
Escondido Creek
Batiquitos Lagoon
Santa Ysabel
Encinitas
Lake Hodges
San Dieguito
Lusardi Creek
San Elijo Lagoon
Solana Beach
Del Mar
Poway
San Vicente Creek
Inaja-Cosmit Reservation
Boulder
Lake Cuyamaca
County of San Diego
Los Penasquitos
Barona Reservation
Lake Miramar
San Vicente Reservoir
El Capitan Lake
Capitan Grande Reservation
Lake Jennings
Santee
Viejas Reservation
Sweetwater
Ewiiaapaayp Reservation
San Diego River
San Diego
Murray Reservoir
El Cajon
Pine Valley Creek
Sycuan Reservation
Loveland Reservoir
La Mesa
Cottonwood Creek
Manzanita Reservation
La Posta Reservation
Lemon Grove
Barrett Lake
Morena Reservoir
Sweetwater Reservoir
Jamul Creek
Dulzura Creek
Coronado
National City
Campo Reservation
Chula Vista
Lower Otay Lake
Otay River
Imperial Beach
San Diego
Tijuana
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.
Figure 4.10-1
Surface Hydrology Major Surface Waters
Rivers/Streams
303(d) Rivers/Streams
Areas of Special Biological Significance (ASBS)
Water Bodies
Playas/Inundation Areas/ Washes
303(d) Water Bodies
Sources: USGS NHD (2021), NWI (2021)
Cal Water Resources Control Board (2021)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG


Orange County
Riverside County
Imperial County
SAN JUAN
SANTA MARGARITA
SAN LUIS REY
CARLSBAD
SAN DIEGUITO
ENCINITAS
SOLANA BEACH
DEL MAR
PENASQUITOS
SAN DIEGO
PUEBLO SAN DIEGO
SWEETWATER
OTAY
TIJUANA
CLARK
WHITEWATER
WEST SALTON
IMPERIAL
ANZA BORREGO
Vista
Oceanside
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO
County of San Diego
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Sycuan Reservation
Jamul Indian Village
Inaja - Cosmit Reservation
Los Coyotes Reservation
Ewiiaapaayp Reservation
La Posta Reservation
Manzanita Reservation
Campo Reservation
Camp Pendleton
Santa Margarita Valley
San Luis Rey Valley
San Mateo Valley
San Onofre Valley
San Marcos Area (Formerly 9.61)
Escondido Creek (Formerly 9.50)
Batiquitos Lagoon Valley
San Elijo Valley
San Dieguito Creek
Poway Valley
San Pasqual Valley
Santa Maria Valley
Pamo Valley
San Diego River Valley
El Cajon Valley
Mission Valley
Sweetwater Valley
Otay Valley
Tia Juana Basin
Warner Valley
Collins Valley
Coachella Valley
West Salton Sea Basin
Clark-Ocotillo Valley
Borrego Valley
Ranchita Town Area
San Felipe Valley
Yaqui Well Area
Mason Valley
Vallecito-Carrizo Valley
Canebrake Valley
Coyote Wells Valley
Cottonwood Valley
Campo Valley
Potrero Valley
Jacumba Valley
Figure 4.10-2
Watersheds
Hydrologic Unit Boundary
Groundwater Basins
Colorado River Hydrologic Basin
San Diego Hydrologic Basin
Source: CalWater 2.21 (2004), Department of Water Resources (2000)
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

San Juan watershed (HAs 901.1 to 901.5) covers approximately 496 square miles, of which only 150 square miles lie in the northwest portion of the San Diego region. Most of the watershed lies within Marine Corps Base (MCB) Camp Pendleton in Orange and Riverside counties. Two of its hydrological areas are within the San Diego region (San Onofre [901.5] and San Mateo [901.4]). The San Onofre Hydrologic Area is completely within the boundaries of the County of San Diego. It encompasses approximately 37,500 acres near the northern border of the County, and 97 percent of it is dedicated to military uses associated with Marine Corps Base Camp Pendleton. The San Mateo Canyon Hydrologic Area is approximately 31,000 acres within San Diego County, and approximately 53 percent is incorporated into Marine Corps Base Camp Pendleton. The remaining portions are unincorporated and include some park lands and other open spaces. Major stream systems include the San Mateo Creek, San Onofre Creek, and Jardine Creek. Topography varies from Pacific Ocean coastal plains to the Santa Margarita Mountains (over 2,000 feet above mean sea level [AMSL]). Various wildlife species use the undeveloped, low-lying creeks and streambeds as corridors to range freely within MCB Camp Pendleton and eastward into higher elevations. Water quality monitoring indicates that the watershed's surface waters are high in total dissolved solids (TDS) (PCW 2018).

Santa Margarita watershed (HAs 902.1 to 902.9) encompasses approximately 750 square miles, of which only 200 square miles lie in the northern San Diego region. Most of the flow from the Santa Margarita River main stem is within the San Diego region and traverses through unincorporated areas, the community of Fallbrook, and MCB Camp Pendleton. The lower river and estuary at the Pacific Ocean coast are relatively less developed than the coastline to the south and, as a result, support abundant habitat and wildlife. The majority of the watershed is undeveloped (approximately 44 percent). Other land uses include agriculture (7 percent), military (30 percent), miscellaneous land uses (11 percent), and residential (8 percent). Presently, several waterbodies are impaired due to excessive nutrients from a variety of sources including agriculture, nursery operations, municipal wastewater discharges, urban runoff, septic systems, and golf course operations (PCW 2018). Other major characteristics of this watershed are excessive sedimentation from urban development and agricultural areas, groundwater degradation and contamination with nitrates and other salts, habitat loss, channelization, flooding, and scour (PCW 2018).

San Luis Rey watershed (HAs 903.1 to 903.3) is the third largest HU in the San Diego region (562-square-mile drainage area). Situated in the northwestern portion of the San Diego region, the basin has two major surface waters, the San Luis Rey River and Lake Henshaw, and is divided into three HAs: the lower San Luis, Monserate, and Warner Valley. Roughly 25 percent of the land area in the watershed is located west of Interstate 15 (I-15), where land uses include open space/undeveloped, residential, commercial/industrial, and agricultural. East of I-15, most of the land is owned and managed by government agencies (county, State, and federal), special districts, and tribal governments. Approximately 54 percent of the land in the watershed is vacant or undeveloped. The next largest land uses in the watershed are residential (15 percent), tribal reservations (14 percent), and agriculture (14 percent). The lower San Luis Rey River is impaired for chloride and TDS. Water quality impairments within the watershed are bacteria and nutrients (PCW 2018).

Carlsbad watershed (HAs 904.1 to 904.6), extending from the headwaters above Lake Wohlford to the Pacific Ocean, is approximately 211 square miles in area. Within the watershed there are six HAs: Buena Vista Creek, Agua Hedionda, Loma Alta, Canyon de las Encinas, San Marcos, and Escondido Creek. Each HA drains into the Pacific Ocean through creeks and rivers to discrete coastal lagoons. There are also two large water reservoirs, Lake Wohlford and Dixon Lake. The Carlsbad watershed is approximately 48 percent urbanized, and its population ranks as the third mostly densely populated in the San Diego region (PCW 2018). The dominant land uses within the watershed are residential (29 percent), freeways and roads (12 percent), agriculture (12 percent), commercial/industrial (6 percent), miscellaneous uses (9 percent) and vacant/undeveloped (32 percent) (PCW 2018). As a result of this level of urbanization, water quality impairments include excessive

coliform bacteria and sediment loading from upstream sources. The coastal lagoons are critical freshwater and estuarine habitats for numerous plant and animal species (PCW 2018).

San Dieguito watershed (HAs 905.1 to 905.5) comprises a drainage area of approximately 345 square miles in the west-central San Diego region from the Volcan Mountains to the San Dieguito lagoon at the Pacific coastline. Just over half of the land in the watershed (61 percent) is vacant or undeveloped (PCW 2018). The remaining 39 percent of the land area is being utilized as residential areas (18 percent), agriculture (14 percent), and other (7 percent). Major features within the watershed include the San Dieguito River Park, San Dieguito Lagoon, and water storage reservoirs, including Lake Hodges, Lake Sutherland, and Lake Poway. Ocean waters along the coastline at the mouth of the San Dieguito River exhibit elevated levels of coliform bacteria. San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion due to restricted or intermittent tidal flushing (PCW 2018).

Los Peñasquitos watershed (HAs 906.1 to 906.5) is composed of the Los Peñasquitos Creek watershed (HAs 906.10 to 906.20), several coastal tributaries (906.30), and the Mission Bay watershed (HAs 906.40 to 906.50). These watersheds drain a highly urbanized area located almost entirely west of I-15 in coastal parts of the San Diego region. In HAs 906.1 and 906.2 about 46 percent of the watershed remains undeveloped or has otherwise been dedicated to open space and recreational lands. The remaining 54 percent of the land area is being utilized as residential areas (27 percent), roadways and transportation (12 percent), and other uses (15 percent). The remaining "other" 15 percent includes industrial, office, commercial, and agricultural land uses. The major receiving waters, Los Peñasquitos Lagoon and Mission Bay, are both fragile systems that support diverse native fauna and flora and are especially sensitive to the effects of pollutants due to restricted or intermittent tidal flushing (PCW 2018). The Los Peñasquitos Creek watershed encompasses a land area of approximately 94 square miles including portions of the cities of San Diego, Poway, and Del Mar. Los Peñasquitos Creek discharges into Los Peñasquitos Lagoon, which is impaired for sedimentation. Functionally, the Los Peñasquitos WMA works in conjunction with the Mission Bay/La Jolla WMA to form a single hydrologic unit, or watershed. The Mission Bay watershed drains approximately 64 square miles. In HAs 906.3–906.5, about 37 percent remains undeveloped or has otherwise been dedicated to open space and recreational lands. The remaining 63 percent of the land area is being utilized as residential areas (28 percent), roadways and transportation (16 percent), office and institutional lands (7 percent), and other (12 percent). The remaining "other" 12 percent includes industrial, commercial, and agricultural land uses. Rose Creek and Tecolote Creek are the main tributaries to Mission Bay. Cudahy Creek is another tributary crucial to the WMA. Much of Mission Bay is impaired by coliform bacteria from urban runoff and sewage spills; Tecolote Creek is impaired by a host of pollutants, including coliform bacteria, trace metals, and toxicity (PCW 2018).

San Diego watershed (HAs 907.1 to 907.4) is the second largest hydrologic unit in the San Diego region (approximately 434 square miles) and hosts the highest population (approximately 520,000 residents) of the region's watersheds. Approximately 44 percent of the watershed is undeveloped, mainly in the upper, eastern portion. The lower reaches of the watershed are more urbanized with open space and park land (23 percent); residential (19 percent); transportation (6 percent); and commercial, agricultural, industrial, military, and miscellaneous land uses (2 percent) land uses predominating (PCW 2018). Five reservoirs in this watershed supply water to as many as approximately 760,000 residents in the region. The Cleveland National Forest, Mission Trails Regional Park, and the river floodplain near Lakeside are undeveloped areas that host a variety of intact habitats and endangered species (PCW 2018). Famosa Slough, near the mouth of the San Diego River, contains high quality wetland habitat (PCW 2018). Beach postings and closures from elevated bacteria levels at the mouth of the river have been attributed to urban runoff and sewage spills (PCW 2018).

Pueblo San Diego watershed (HAs 908.1 to 908.3) is the smallest hydrologic unit in the San Diego region (approximately 60 square miles) and the most densely populated (approximately 500,000 residents). It drains to San Diego Bay. This watershed is approximately 75 percent developed with urban uses, but the dominant land use remains relatively consistent between hydrologic areas. Residential areas are the primary land use in all three of its hydrologic areas, comprising 32 percent, 40 percent, and 46 percent of the total land area of the Point Loma (908.1), San Diego Mesa (908.2), and National City (908.3) HAs, respectively (PCW 2018). Also contained within the Pueblo San Diego watershed is the Point Loma Ecological Reserve, a 650-acre coastal park located near the tip of the Point Loma peninsula. The creeks in the watershed are impaired by urban runoff, and Chollas Creek and the mouth of the creek in San Diego Bay are impaired for various trace metals parameters and aquatic toxicity (PCW 2018). Five locations of San Diego Bay, which receives runoff from the Pueblo San Diego watershed, are identified as toxic hot spots by California's Bay Protection Toxic Cleanup Program (PCW 2018). Toxic hot spots are identified as areas where pollutants have accumulated in the water or sediment to levels that may pose a hazard to aquatic life, wildlife, fisheries, or human health, may impact beneficial uses, or may exceed water quality or sediment quality objectives adopted by the State Water Resource Control Board (SWRCB) or Regional Water Quality Control Board (RWQCB).

Sweetwater watershed (HAs 909.1 to 909.3) drains approximately 230 square miles. It is one of three watersheds that drain to San Diego Bay (along with Otay and Pueblo San Diego). Approximately 86 percent of the watershed is within unincorporated County of San Diego jurisdiction. Over half of the watershed is undeveloped and open space lands (60 percent). The Lower Sweetwater is the most urbanized, with residential areas leading at 44 percent, followed by transportation at 18 percent of land area. Undeveloped and open space lands dominate the majority of the area within the Middle and Upper Sweetwater Hydrologic Areas, making up 63 percent and 82 percent, respectively. Residential land uses follow in each of the hydrologic areas, with 28 percent and 12 percent of the total in each of the Middle and Upper Sweetwater Hydrologic Areas. Major characteristics include municipal water supplies and sensitive wetland and wildlife habitats (PCW 2018). The upper portion of the watershed contains large undeveloped areas within the Cleveland National Forest and Cuyamaca Rancho State Park; the unincorporated communities of Pine Valley, Descanso, and Alpine; and the Viejas Indian Reservation. The central part of the watershed consists of unincorporated rural and suburban communities, while the urbanized lower part contains portions of several cities, including San Diego, National City, Chula Vista, La Mesa, and Lemon Grove. Water quality impairments within the watershed are coliform bacteria, enterococcus, trace metals, and other toxics (PCW 2018).

Otay watershed (HAs 910.1 to 910.3) encompasses approximately 160 square miles in the southwest San Diego region and is one of the three watersheds that discharge to San Diego Bay. The watershed consists largely of unincorporated County of San Diego jurisdiction and also includes portions of the cities of Chula Vista, Imperial Beach, Coronado, National City, and San Diego. The predominant land uses in the watershed are open space (68 percent) (PCW 2018). Land uses within the Otay watershed vary extensively by HA. In the Coronado HA (910.1), military uses are 52 percent and open space and undeveloped lands only comprise three percent of the land area. In Otay Valley (910.2) and Dulzura (910.3), open spaces and undeveloped lands make up 47 percent and 83 percent of land area, respectively. In each of those HAs, residential land uses follow with 16 percent and 18 percent of land area, trailed by transportation, industrial, and institutional uses. Upper and Lower Otay Lakes provide a potable water supply, wildlife habitat, and recreational opportunities. Water quality impairments are limited to the presence of elevated coliform bacteria in the Pacific Ocean receiving waters near Coronado (PCW 2018).

Tijuana watershed (HAs 911.1 to 911.8) is the largest in the San Diego region with a drainage area of approximately 1,750 square miles (27 percent on the U.S. side of the international border and 73 percent on the Mexico side). Within the U.S.-controlled Tijuana watershed, most of the land remains undeveloped at

86 percent of the land area, followed by residential land uses at seven percent, agricultural land uses at three percent, and transportation at two percent. The Tijuana Estuary, a National Estuarine Sanctuary that supports a variety of threatened and endangered plants and animals, is threatened by inflows from the Tijuana River containing high concentrations of coliform bacteria; sediment; trace metals (copper, lead, zinc, chromium, nickel, and cadmium); polychlorinated biphenyls (PCBs); and other urban, agricultural, and industrial pollutants. Sources of these pollutants include urban runoff, sewage spills, industrial discharges, agriculture, orchards, livestock, domestic animals, and septic systems (PCW 2018).

Colorado River Hydrologic Basin

The Colorado River Hydrologic Basin has small portions of five HUs located within the eastern San Diego region. These units include the Anza-Borrego watershed, which 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 San Diego region. The Imperial watershed is located at the southeast edge of the San Diego region 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 in this area ranges from less than 3 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. The majority of the land uses within the San Diego region portion of the Colorado River Hydrologic Basin are parkland, undeveloped land, or agriculture. The remaining portions are sparsely populated with single-family residential units, and a small amount of other uses. (County of San Diego 2011)

The Colorado River Basin RWQCB divides the Colorado River Hydrologic Basin into seven major planning areas based on economic and hydrologic characteristics. Only three of these planning areas lie within the San Diego region: Coachella Valley, Anza Borrego, and Imperial Valley. The other four that fall outside of the San Diego region are Lucerne Valley, Hayfield, Salton Sea, and the East Colorado River Basin. Characteristics of each of the three Colorado River Hydrologic Basin planning areas in the San Diego region are described below:

The Anza Borrego Planning Area includes the Clark, West Salton Sea, and Anza-Borrego HUs. It comprises 1,000 square miles, mostly within the San Diego region and Imperial County, with a small segment in Riverside County. Elevations range from 230 feet below sea level at the Salton Sea to over 6,000 feet along the western boundary. The principal communities in the planning area are Salton City and Borrego Springs. Drainage flows to the Salton Sea except for two small areas of internal drainage in Clark and Borrego Valleys in the northwest corner of the planning area. Average annual precipitation ranges from less than 3 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. Perennial flow includes reaches of Coyote Creek and San Felipe Creek. (CRWQCB 2017)

The Coachella Valley Planning Area contains the Whitewater HU and the East Salton Sea HU. It lies almost entirely in Riverside County and covers 1,920 square miles in the west-central portion of the Colorado River Hydrologic Basin. Only a small area in the southernmost portion lies within the San Diego region. Elevations range from over 10,000 feet in the San Jacinto Mountains to 230 feet below sea level at the Salton Sea shoreline. The higher elevations of the San Bernardino and San Jacinto mountains have evergreen forests with perennial streams. A contrasting scene is presented on the Coachella Valley floor where the land contains desert vegetation, except where the land has been irrigated with pumped groundwater or with imported Colorado River water. Average annual precipitation ranges from less than 3 inches in the valleys to 40 inches in the San

Bernardino Mountains. Seasonal snows fall on the higher elevations in the San Bernardino and San Jacinto mountains. In the valleys, precipitation from summer thunderstorms often exceeds that of winter. Runoff resulting from rains and snowmelt at the higher elevations is the major source of groundwater replenishment. Perennial streams include the upper reaches of the San Gorgonio and Whitewater rivers, and Palm Canyon, Tahquitz, Snow, Deep Canyon, Chino, and Andreas creeks. The Whitewater River is the major drainage course in the planning area. There is perennial flow in the mountains, but because of diversions and percolation into the basin, the river becomes dry farther downstream. The constructed downstream extension of the Whitewater River channel, known as the Coachella Valley Storm Water Channel, serves as a drainage way for irrigation return flows, treated community wastewater, and storm runoff. There is one relatively large surface water impoundment. Lake Cahuilla, at the terminus of the Coachella Canal, serves as a storage reservoir to regulate irrigation water demands and is also used for recreational purposes. (CRWQCB 2017)

The Imperial Valley Planning Area comprises 2,500 square miles in the southern portion of the Colorado River Hydrologic Basin, almost all of it in Imperial County. A small portion in the southwestern part of the planning area lies within the San Diego region. The easterly and westerly boundaries are contiguous with the westerly and easterly boundaries of the East Colorado River Basin and the Anza-Borrego Planning Area, respectively. Its northerly boundary is along the Salton Sea and the Coachella Valley Planning Area and its southerly boundary follows the international border with Mexico. The planning area's central feature is the flat, fertile Imperial Valley. The principal communities are El Centro, Brawley, and Calexico. Surface waters mostly drain toward the Salton Sea. The New and Alamo rivers convey agricultural irrigation drainage water from farmlands in the Imperial Valley, surface runoff, and lesser amounts of treated municipal and industrial waste waters from the Imperial Valley. The flow in the New River also contains agricultural drainage, treated and untreated sewage, and industrial waste discharges from Mexicali, Mexico. Average annual precipitation ranges from less than 3 inches over most of the planning area to about 8 inches in the Coyote Mountains on the western border. Colorado River water, imported via the All American Canal, is the predominant water supply and is used for irrigation, industrial, and domestic purposes. (CRWQCB 2017).

Groundwater Hydrology

Groundwater supplies within the San Diego region are limited by several factors including the limited distribution of sand and gravel (alluvial) aquifers and their relatively shallow nature, lack of rainfall and associated groundwater recharge, and degraded water quality from human activities. Only a small portion of the region is underlain by permeable geologic formations that can accept, transmit, and yield appreciable amounts of groundwater, which leaves a limited amount of available groundwater.

Groundwater basins underlie about 277,000 acres (433 square miles) or about 11 percent of the region's surface, and groundwater is found in unconfined alluvial aquifers in most of the region's basins. In some larger basins, typified by those underlying the coastal plain, groundwater occurs in multiple aquifers that create confined groundwater conditions.

The San Diego region overlies three general categories of aquifers: alluvial and sedimentary aquifers, fractured rock aquifers, and desert basin aquifers (County of San Diego 2010). San Diego County is underlain primarily by fractured rock aquifers and alluvial and sedimentary aquifers. Desert basins, which underlie approximately 14 percent of the unincorporated portion of the County, are located in eastern San Diego County (County of San Diego 2010). Aquifers composed of alluvial deposits (alluvium) yield much of the groundwater production capacity in the region (San Diego IRWM Program 2019). Alluvial and sedimentary aquifers (or groundwater basins) underlay a relatively small area of the region and account for approximately 13 percent of the unincorporated areas. These groundwater basins are typically found in river and stream valleys, around

lagoons, near the coastline, and in the intermountain valleys (Figure 4.10-2 maps these groundwater basins). 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 alluvial basins have relatively high hydraulic conductivity, porosity, and storage and generally would be considered good aquifers on the basis of their hydrogeologic characteristics. However, some alluvial basins in the San Diego region have relatively thin saturated thickness and limited storage, but can be underlain by fractured rock aquifers, which can potentially provide additional storage (County of San Diego 2011). Because alluvial basins generally occur in low-lying areas of a watershed, surface water bodies and surface water runoff within alluvial basins may provide additional recharge to these basins. Alluvial and sedimentary aquifers typically have significant storage capacity, with specific yield values between 1 and 30 percent (County of San Diego 2010).

Surface water bodies within an alluvial or sedimentary aquifer may increase the recharge due to leakage from the water body into the subsurface. 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 can provide an additional recharge source to these basins (County of San Diego 2010). The San Diego County Water Authority reports that existing groundwater production produced an annual average of approximately 22,300 acre-feet per year of potable water supplies from groundwater (SDCWA 2021a). Aside from the Warner, San Luis Rey Valley, and Sweetwater Valley Basins, none of the region's alluvial aquifers exceed a storage capacity of 100,000 acre-feet. Ten alluvial aquifers, however, are estimated to exceed 50,000 acre-feet (San Diego IRWM Program 2019). The San Diego IRWM Region contains 22 separate groundwater basins, as defined by the California Department of Water Resources (DWR) Bulletin 118 (San Diego IRWM Program 2019). These groundwater basins are:

- San Mateo Valley
- San Onofre Valley
- Santa Margarita Valley
- San Luis Rey Valley
- Warner Valley
- Escondido Valley
- San Pasqual Valley
- Santa Maria Valley
- San Dieguito Creek
- Poway Valley
- Mission Valley
- San Diego River Valley
- El Cajon Valley
- San Diego Formation
- Batiquitos Lagoon Valley
- San Elijo Valley
- Pamo Valley
- Ranchita Town Area
- Cottonwood Valley
- Campo Valley
- Potrero Valley
- San Marcos Area

Significant groundwater resources have been found to exist in deeper aquifers composed of semi-consolidated or consolidated sediments. Recent field investigations indicate that one such deep aquifer, the San Diego Formation, has significant unused water storage and groundwater production potential. The San Diego

Formation has been estimated to contain approximately 270,000 to 360,000 acre-feet of groundwater (San Diego IRWM Program 2019).

Fractured rock underlies approximately 73 percent of the unincorporated area of the County. The majority of the mountainous region of the County consists of these fractured rocks, and typically have much less storage capacity than alluvial aquifers (County of San Diego 2011). Additionally, due to the low storage capacity, recharge to fractured rock aquifers can cause relatively fast rises to the water table, and similarly fast declines to the water table from groundwater pumping in years without significant recharge (County of San Diego 2010). Storage in fractured rock within the County spans several orders of magnitude from essentially zero up to 1 percent of the total volume of the aquifer. Specific yield values in San Diego County fractured rock are estimated to range from about 0.001 to 1 percent (County of San Diego 2010). In some instances wells may derive water from only one or a few water-bearing fractures. Additionally, it is very difficult to estimate potential production rates for any new well drilled, and wells drilled only a few tens of feet from one another may have significantly different water production rates. This is because water-producing fracture locations and orientations are difficult to identify and predict, and fractures intersected by one well may not be intersected by nearby wells (County of San Diego 2010).

Desert basin aquifers are found in the easternmost area of the San Diego region in residual sediments. Desert basin aquifers are characterized by extremely limited groundwater recharge and large storage capacities (County of San Diego 2011). In eastern San Diego County, most development occurs over the Borrego Valley Groundwater Basin. The Borrego Valley aquifer (Figure 4.10-2), which is completely groundwater dependent, has a well-documented groundwater overdraft condition where year after year groundwater extraction exceeds the amount of groundwater that is recharged back into the aquifer. The land uses in Borrego Valley primarily include residential, agricultural, recreational, and commercial uses. The source of recharge was estimated to come primarily from three major drainages: Coyote Creek (approximately 65 percent), Borrego Palm Canyon, and San Felipe Creek (approximately 35 percent combined). Little recharge, if any from San Felipe Creek benefits users in Borrego Springs as the majority exits Borrego Valley and flows toward Ocotillo Wells (County of San Diego 2010).

Groundwater in the coastal communities of the San Diego region is relatively shallow as a result of the proximity of the ocean and can be approximated based on the elevation of an area. In general, groundwater is encountered a few feet AMSL in Downtown San Diego. Areas close to San Diego Bay may see daily changes in groundwater level resulting from tidal variation. Groundwater levels in other areas of the San Diego region may be locally affected by temporary dewatering systems for adjacent structures under construction.

The Sustainable Groundwater Management Act (SGMA) requires basins to be sustainably managed by local public agencies (e.g., counties, cities, and water agencies) that become groundwater sustainability agencies (GSAs). The primary purpose of the GSAs is to develop and implement a Groundwater Sustainability Plan (GSP) to achieve long-term groundwater sustainability. See Section 4.18, *Water Supply*, for further discussion on this topic.

WATER QUALITY

This section describes existing groundwater and surface water quality within the region's two hydrologic basins.

Colorado River Hydrologic Basin Water Quality

The Colorado River is the primary source of the Water Authority's imported water supply. High salinity levels, uranium, and perchlorate contamination represent the primary areas of concern with the quality of Colorado River supplies. The salts in the Colorado River system are indigenous and pervasive, mostly resulting from saline sediments in the basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. Agricultural development and water diversions over the past 50 years increase the already high, naturally occurring levels of TDS. Naturally occurring uranium and arsenic are monitored by drinking water agencies. The Metropolitan Water District adopted a Perchlorate Action Plan in 2002 following detection of perchlorate contamination, which includes continued tracking, remediation, and monitoring (SDCWA 2016).

Beneficial uses identified for surface waters in the Water Quality Control Plan for the Colorado River Basin (California Water Boards 2019) for the San Diego region are:

- MUN: Municipal and Domestic Supply
- AGR: Agricultural Supply
- AQUA: Aquaculture
- IND: Industrial Service Supply
- GWR: Groundwater Recharge
- REC-1: Contact Water Recreation
- REC-2: Non-Contact Water Recreation
- WARM: Warm Freshwater Habitat
- COLD: Cold Freshwater Habitat
- WILD: Wildlife Habitat
- POW: Hydropower Generation
- RARE: Rare, Threatened, or Endangered Species

The water quality discussion for this region is focused on the Borrego Valley Groundwater Basin. The most extensive water quality monitoring data within the Borrego Springs Subbasin comes from reporting by public water supply systems to the SWRCB Division of Drinking Water for the purpose of ensuring adequate drinking water quality (BVGSA 2019). There are both anthropogenic and natural sources of the contaminates of concern (COCs) in the Borrego Springs Subbasin. Anthropogenic sources that may contribute to degradation of the current water quality in the Subbasin include agricultural use of pesticides and fertilizers, salt accumulation resulting from agricultural irrigation practices, and household septic system return flows. Natural sources of COCs in the Subbasin include the rocks and minerals that comprise the aquifer matrix material. These naturally occurring COCs contain evaporite minerals, which can dissolve and increase TDS concentration in the aquifer; silicate minerals, which can contribute arsenic to the groundwater; and sulfate minerals, which can contribute sulfate to the groundwater. All are found in differing amounts in the upper, middle, and lower aquifers. Differences in the mineralogical composition of the aquifers can result in groundwater quality differences between the aquifers. (BVGSA 2019).

In general, water quality has historically been good within Borrego Water District's wells with TDS at concentrations of less than 500 milligrams per liter. The high proportion of sulfate in the surface water of

Coyote Creek appears to dominate the character of groundwater in the northern and eastern parts of the basin. The more bicarbonate waters of Borrego Palm Canyon and Big Spring influence the groundwater along the western and southern parts of the basin. Historical issues with elevated nitrate concentrations have been noted as evidenced by wells either taken out of production or drilled deeper. High salinity, poor-quality connate water is thought to occur in deeper formational materials in select areas of the aquifer as well as shallow groundwater in the vicinity of the Borrego Sink in the southern portion of the Plan Area. Water quality impacts may occur as decreased groundwater levels could induce flow of poor quality water (i.e., unsuitable for municipal uses) found in select deeper formational materials of the aquifer. This may eventually necessitate additional expensive treatment of groundwater to make the water suitable as a drinking water supply. (BVGSA 2019)

Beneficial uses identified in the Colorado River Basin Plan (California Water Boards 2019) for groundwaters in the San Diego region are:

- MUN: Municipal and Domestic Supply
- AGR: Agricultural Supply
- IND: Industrial Service Supply

San Diego Hydrologic Basin Surface Water and Groundwater Quality

Untreated stormwater can contain a number of pollutants that may eventually flow to surface water and groundwater. A primary cause of water pollution is the discharge of inadequately treated stormwater runoff that is allowed to discharge into natural receiving waters (e.g., lakes, streams, the ocean). Growth and urbanization have placed increased pressure on water resources and resulted in local impacts on water quality, especially in the highly urbanized western portion of the San Diego region, within the San Diego RWQCB boundaries. The urbanized areas of the region exhibit a large amount of impervious surfaces, thus reducing the amount of water that would normally infiltrate into the soil and be filtered naturally. Pollutants, such as motor oil, antifreeze, sediment, metals, fertilizers and pesticides, and bacteria and viruses can be transported to surface waters and groundwater in stormwater runoff. The stormwater conveyance systems in the region are not connected with the sanitary sewer systems; therefore, urban runoff in the region typically flows directly to surface waters and groundwater basins. Current levels of pollution (or impairment) in the region's surface waters are discussed in the sections that follow.

Traditionally, groundwater supplies within the San Diego region have produced high-quality drinking water. However, naturally occurring and more recent anthropogenic sources of contamination have impacted groundwater quality in some localized areas throughout the County. Groundwater contamination from anthropogenic sources are typically associated with leaking underground storage tanks such as from gasoline stations or other industrial uses with underground storage tanks. The SWRCB maintains the GeoTracker database of several types of sites in California including permitted underground storage tanks; leaking underground storage tanks; and Spills, Leaks, Investigations, and Cleanups sites. According to GeoTracker, there are over 3,000 leaking underground storage tank listings in the San Diego region (SWRCB 2021). Not all these sites represent areas of groundwater contamination, but they do identify the potential extent of possible localized areas of contamination. While alluvial groundwater aquifers can be quickly recharged by stormwater or urban runoff, the porous nature of the aquifers render them susceptible to contamination by activities on the ground surface, such as septic tank use in rural areas within the San Diego region, contaminated stormwater infiltration, abandoned well heads, and leaking underground storage tanks. The most common contaminants in groundwater within the San Diego region are elevated nitrate, TDS, iron and manganese, and toxic organic pollutants (Regional Water Management Group 2013).

Stormwater Drainage Facilities and Management

The San Diego region includes urban development and associated infrastructure (e.g., roads, sidewalks, gutters, etc.). The conversion of undeveloped areas to urbanized uses in the region's watersheds has contributed to increased runoff rates and volumes, altered drainage patterns, and increased potential for flooding. Construction of impervious surfaces such as rooftops, roads, and driveways reduces the amount of rainfall that can infiltrate into the earth and increases runoff within a watershed. Subsequently, artificial conveyances such as gutters, storm pipes, and concrete-lining channel improvements accelerate flow rates that are directly conveyed into receiving waters (e.g., streams, rivers, reservoirs, Pacific Ocean) thereby increasing scour (erosion), promoting sediment transport, and concentrating flood risks.

The stormwater drainage system in the San Diego region comprises private and public drainage facilities other than sanitary sewers by which runoff is conveyed to receiving waters; it includes roads, streets, constructed channels, aqueducts, storm drains, pipes, street gutters, inlets to storm drains or pipes, and catch basins. The stormwater drainage system is designed to prevent flooding by transporting water away from developed areas. A vast amount of the unincorporated portion of the San Diego region is rural land that does not support or require stormwater drainage facilities. In contrast, most urban areas within the incorporated cities of the San Diego region have a range of stormwater drainage facilities that convey surface water runoff to the area's water bodies and ultimately the Pacific Ocean. (See Section 4.15, *Public Services and Utilities,* for a discussion of existing stormwater drainage facilities within the San Diego region.)

Wastewater Treatment Facilities

The San Diego region is served by over 7,935 miles of pressure and gravity sewer lines, as well as pipes, sewer laterals, and pump stations to move wastewater from its source to a wastewater treatment plant (WWTP). The treated wastewater is then released through ocean outfalls, percolation beds, or groundwater recharge.

The City of San Diego Metropolitan Wastewater Department, the largest wastewater treatment facility in the San Diego region, provides regional wastewater treatment services for the City of San Diego and 15 other cities and sanitation districts: Chula Vista, Coronado, Del Mar, El Cajon, Imperial Beach, La Mesa, National City, and Poway; the Lemon Grove Sanitation District; the Padre Dam Municipal and Otay water districts; and the County of San Diego (on behalf of the Winter Gardens Sewer Maintenance District and the Alpine, Lakeside, and Spring Valley sanitation districts). The City of San Diego Metropolitan Wastewater Department system comprises the Point Loma WWTP and Ocean Outfall, the North City Water Reclamation Plant (WRP) and South Bay WRP, and the Environmental Monitoring and Technical Services Laboratory. The Point Loma WWTP treats roughly 180 million gallons of wastewater per day (maximum capacity of 240 million gallons per day [mgd]) and discharges it through the Point Loma Ocean Outfall into the Pacific Ocean (City of San Diego 2018). Up to 30 mgd of wastewater can be treated at the North City WRP (City of San Diego 2015a). Water processed through the North City WRP is either returned to the sewer system, sent to the Point Loma WWTP, or transferred on to tertiary treatment to be used for reclaimed water purposes. The South Bay WRP has the capacity to process 15 mgd (City of San Diego 2018); water processed through the South Bay WRP can either be discharged into the ocean through the South Bay Ocean Outfall or sent on to tertiary treatment to be used for reclaimed water purposes.

The other two largest wastewater treatment facilities within the San Diego region are the Encina Water Pollution Control Facility and the City of Escondido Hale Avenue Resource Recovery Facility/Water Reclamation/Recycling Facility. The Encina Water Pollution Control Facility has the capacity to process approximately 43 mgd and treats about 22 MGD (EWA 2019); the Hale Avenue facility has the capacity to process 18 mgd and has an average daily flow of 12.7 MGD (City of Escondido 2019).

Beneficial Uses/Water Quality Objectives

Beneficial uses are defined as the uses of water necessary for the survival or well-being of humans, plants, and wildlife. Beneficial uses identified for surface waters in the Water Quality Control Plan for the San Diego Basin (Basin Plan) (San Diego RWQCB 2016) for the San Diego region are:

- MUN: Municipal and Domestic Supply
- AGR: Agricultural Supply
- IND: Industrial Service Supply
- PROC: Industrial Process Supply
- GWR: Groundwater Recharge
- FRESH: Freshwater Replenishment
- POW: Hydropower Generation
- REC-1: Contact Water Recreation
- REC-2: Non-Contact Water Recreation
- BIOL: Preservation of Biological Habitats of Special Significance
- WARM: Warm Freshwater Habitat
- COLD: Cold Freshwater Habitat
- WILD: Wildlife Habitat
- RARE: Rare, Threatened, or Endangered Species
- SPWN: Spawning, Reproduction, and/or Early Development

Beneficial uses identified in the Basin Plan (San Diego RWQCB 2016) for coastal waters are:

- IND: Industrial Service Supply
- NAV: Navigation
- REC-1: Contact Water Recreation
- REC-2: Non-Contact Water Recreation
- COMM: Commercial and Sport Fishing
- BIOL: Preservation of Biological Habitats of Special Significance
- EST: Estuarine Habitat
- WILD: Wildlife Habitat
- RARE: Rare, Threatened, or Endangered Species
- MAR: Marine Habitat
- AQUA: Aquaculture
- MIGR: Migration of Aquatic Organisms

- SPWN: Spawning, Reproduction, and/or Early Development
- SHELL: Shellfish Harvesting

Beneficial uses identified in the Basin Plan (San Diego RWQCB 2016) for groundwaters in the San Diego region are:

- MUN: Municipal and Domestic Supply
- AGR: Agricultural Supply
- IND: Industrial Service Supply
- PROC: Industrial Process Supply
- FRESH: Freshwater Replenishment

Narrative and numeric water quality objectives (WQOs) for all surface waters and groundwater within the San Diego region are established for a variety of constituents as described in the Basin Plan. Refer to Tables 3-2 and 3-3 in the Basin Plan (San Diego RWQCB 2016) for specific WQOs for each HA for inland surface waters and groundwater, respectively.

Areas of Special Biological Significance

The SWRCB's California Ocean Plan identifies 34 locations along the California coast as Areas of Special Biological Significance (ASBS). The Ocean Plan prohibits the discharge of wastes into these locations, thus barring discharges associated with industrial activities, publicly owned treatment works, and other traditional point discharges. In March 2012, the SWRCB released a Special Protections for ASBS, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges that defines design criteria for treating stormwater discharges and elimination of dry-weather discharges associated with non-stormwater sources (SWRCB 2012a). The two ASBS locations in the San Diego region (the La Jolla ASBS and San Diego-Scripps ASBS) are both within the Peñasquitos watershed. These locations are adjacent and extend from the northern bluffs of La Jolla through the University of California San Diego campus of the Scripps ~~Institute~~ Institution of Oceanography.

Clean Water Act Section 303(d) Impaired Waters

On June 9th, 2021, the U.S. Environmental Protection Agency (EPA) gave final approval to the SWRCB's 2018 California Integrated Report (CWA Section 303(d) List and 305(b) Report) (SWRCB 2021). Table 4.10-1 summarizes the impaired water segments and associated pollutants in the San Diego region, while Figure 4.10-1 illustrates the location of the region's impaired water body segments.

Table 4.10-1
2018 CWA Section 303(d) Impaired Waters in the San Diego Region

Impaired Water Body	Pollutant
Agua Hedionda Creek	Nitrogen, Manganese, Phosphorus, Indicator Bacteria, Selenium, Total Dissolved Solids, Toxicity, Benthic Community Effects, Bifenthrin, Chlorpyrifos, Cypermethrin, Malathion
Agua Hedionda Lagoon	Toxicity
Alpine Creek	Indicator Bacteria

Impaired Water Body	Pollutant
Alvarado Creek	Nitrogen, Selenium
Barrett Lake	Color, Manganese, Perchlorate, Phosphorus, Total Nitrogen as N, pH
Batiquitos Lagoon	Toxicity
Buena Creek	DDT, Indicator Bacteria, Nitrogen, Phosphorus, Nitrate and Nitrite
Buena Vista Creek	Benthic Community Effects, Bifenthrin, Selenium, Toxicity
Buena Vista Lagoon	Indicator Bacteria, Nutrients, Sedimentation/Siltation, Toxicity
Campo Creek	Indicator Bacteria
Carroll Canyon	Benthic Community Effects, Toxicity
Chocolate Creek	Nitrogen, Phosphorus, Indicator Bacteria
Chollas Creek	Bifenthrin, Chlorpyrifos, Copper, Cypermethrin, Diazinon, Indicator Bacteria, Lead, Malathion, Phosphorus, Nitrogen, Trash, Zinc
Cloverdale Creek	Nitrogen, Phosphorus, Total Dissolved Solids
Cottonwood Creek (San Marcos Creek Watershed)	Benthic Community Effects, DDT, Nitrogen, Phosphorus, Selenium, Toxicity
Cottonwood Creek (Tijuana River Watershed)	Indicator Bacteria, Selenium
Couser Canyon Creek	Cadmium, Indicator Bacteria, Selenium
Cristianitos Creek	
De Luz Creek	Iron, Manganese, Nitrogen, Sulfates
East Channel Creek	Indicator Bacteria
El Capitan Lake	Color, Manganese, Phosphorus, Total Nitrogen as N, pH
Encinitas Creek	Benthic Community Effects, Phosphorus, Selenium, Toxicity
Escondido Creek	Benthic Community Effects, Bifenthrin, DDT, Indicator Bacteria Malathion, Manganese, Nitrogen, Phosphate, Selenium, Sulfates, Total Dissolved Solids, Toxicity
Eucalyptus Hills Creek	Diazinon, Indicator Bacteria
Famosa Slough and Channel	Eutrophic
Felicita Creek	1,4-Dioxane, Aluminum, Indicator Bacteria, Trichloroethylene/TCE, Tetrachloroethylene/PCE, Total Dissolved Solids
Forester Creek	Benthic Community Effects, Indicator Bacteria, Nitrogen, Phosphorus, Selenium, Total Dissolved Solids
Gopher Creek	Indicator Bacteria
Green Canyon Creek	Indicator Bacteria
Green Valley Creek	Benthic Community Effects, Bifenthrin, Chloride, Chlorpyrifos, Manganese, PCP, Sulfates, Total Nitrogen as N
Guajome Lake	Eutrophic
Harbison Canyon	Indicator Bacteria
Hodges, Lake	Manganese, Mercury, Turbidity, pH, Color, Phosphorus, Nitrogen
Jamacha Creek	Indicator Bacteria
Jamul Creek	Toxicity
Keys Creek	Indicator Bacteria, Nitrogen, Selenium

Impaired Water Body	Pollutant
Kit Carson Creek	PCP, Total Dissolved Solids
La Zanja Canyon	Indicator Bacteria
Live Oak Creek (San Diego County)	Indicator Bacteria
Loma Alta Creek	Selenium, Toxicity, Benthic Community Effects
Loma Alta Slough	Eutrophic, Indicator Bacteria
Long Canyon Creek (Lower Sweetwater Watershed)	Indicator Bacteria
Long Canyon Creek (tributary to Murrieta Creek)	Phosphorus, Chlorpyrifos, Manganese, Iron, Nitrogen
Los Coches Creek	Indicator Bacteria, Nitrogen, Phosphorus, Selenium
Los Penasquitos Creek	Benthic Community Effects, Bifenthrin, Chlorpyrifos, Indicator Bacteria, Nitrogen, Phosphate, Total Dissolved Solids, Toxicity
Los Penasquitos Lagoon	Toxicity, Sedimentation/Siltation
Loveland Reservoir	Aluminum, Manganese, Dissolved Oxygen, pH
Mexican Canyon Creek (eastern tributary to Sweetwater River, Upper)	Indicator Bacteria
Mexican Canyon Creek (western tributary to Sweetwater River, Upper)	Indicator Bacteria
Mission Bay	PCBs, Mercury
Mission Bay (Area at Mouth of Rose Creek Only)	Eutrophic, Lead
Mission Bay (Area at Mouth of Tecolote Creek Only)	Eutrophic, Lead
Mission Bay at Quivira Basin	Copper
Mission Bay Shoreline, at Bahia Point	Indicator Bacteria
Mission Bay Shoreline, at Bonita Cove	Indicator Bacteria
Mission Bay Shoreline, at Bonita Cove (eastern shore)	Indicator Bacteria
Mission Bay Shoreline, at Campland	Indicator Bacteria
Mission Bay Shoreline, at De Anza Cove	Indicator Bacteria
Mission Bay Shoreline, at Enchanted Cove	Trash
Mission Bay Shoreline, at Fanual Park	Indicator Bacteria
Mission Bay Shoreline, at Leisure Lagoon	Indicator Bacteria
Mission Bay Shoreline, at Tecolote Shores	Indicator Bacteria
Mission Bay Shoreline, at Visitors Center	Indicator Bacteria
Moosa Canyon Creek	Nitrogen, Phosphorus, Indicator Bacteria
Moosa Canyon, South Fork	Indicator Bacteria
Morena Reservoir	Ammonia, Color, Manganese, Nitrogen, Phosphorus, pH
Oceanside Harbor	Toxicity, Copper
Otay Reservoir, Lower	pH, Ammonia, Color, Manganese, Iron, Phosphorus, Nitrogen
Pacific Ocean Shoreline, San Diego HU, at the San Diego River Outlet, at Dog Beach	Indicator Bacteria, Enterococcus, Total Coliform

Impaired Water Body	Pollutant
Pacific Ocean Shoreline, Scripps HA, at Children's Pool	Indicator Bacteria
Pacific Ocean Shoreline, Scripps HA, at Vallecitos Court at La Jolla Shores Beach	Interior Bacteria, Trash
Pacific Ocean Shoreline, Point Loma HA, at Bermuda Ave	Indicator Bacteria
Pacific Ocean Shoreline, San Luis Rey HU, at San Luis Rey River Mouth	Indicator Bacteria
Pacific Ocean Shoreline, San Mateo Canyon HA, at San Mateo Creek Outlet	Indicator Bacteria
Pacific Ocean Shoreline, Tijuana HU, at end of Seacoast Drive	Indicator Bacteria
Pacific Ocean Shoreline, Tijuana HU, at the U.S. Border	Indicator Bacteria
Paleta Creek	Copper, Lead
Paradise Creek, HSA 908.320	Phosphorus, Selenium
Poggi Canyon Creek	Nitrogen, Toxicity
Poway Creek	Nitrogen, Selenium, Toxicity
Rainbow Creek	Sulfates, Total Dissolved Solids, Aluminum, Phosphorus, Nitrogen, Iron
Rose Creek	Benthic Community Effects, Selenium, Toxicity
San Diego Bay	PCBs, Mercury, PAHs
San Diego Bay Shoreline, 32nd Street San Diego Naval Station	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, at America's Cup Harbor	Copper
San Diego Bay Shoreline, at Bayside Park (J Street)	Indicator Bacteria
San Diego Bay Shoreline, at Coronado Cays	Copper
San Diego Bay Shoreline, at Glorietta Bay	Copper
San Diego Bay Shoreline, at Harbor Island (East Basin)	Copper
San Diego Bay Shoreline, at Harbor Island (West Basin)	Copper
San Diego Bay Shoreline, at Marriott Marina	Copper
San Diego Bay Shoreline, between Sampson and 28th Streets	Mercury, PAHs, Copper, Zinc, PCBs
San Diego Bay Shoreline, at Spanish Landing	Total Coliform
San Diego Bay Shoreline, between Sampson and 28th Streets	Copper, Mercury, PAHs, PCBs, Zinc
San Diego Bay Shoreline, Chula Vista Marina	Copper

Impaired Water Body	Pollutant
San Diego Bay Shoreline, near Chollas Creek	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, near Coronado Bridge	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, Downtown Anchorage	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, G Street Pier	Indicator Bacteria
San Diego Bay Shoreline, near Sub Base	Benthic Community Effects, Toxicity
San Diego Bay Shoreline, near Switzer Creek	Chlordane, PAHs
San Diego Bay Shoreline, North of 24th Street Marine Terminal	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, Seventh Street Channel	Benthic Community Effects, Sediment Toxicity
San Diego Bay Shoreline, Tidelands Park	Indicator Bacteria
San Diego Bay Shoreline, Vicinity of B Street and Broadway Piers	Indicator Bacteria, Benthic Community Effects, Sediment Toxicity
San Diego Bay, Shelter Island Yacht Basin	Copper, Dissolved
San Diego River (Lower)	Indicator Bacteria, Benthic Community Effects, Cadmium, Dissolved Oxygen, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity
San Diego River (Upper)	Dissolved Oxygen, Indicator Bacteria, Sulfates
San Dieguito River, unnamed tributary below Hodges Dam	Indicator Bacteria
San Elijo Lagoon	Indicator Bacteria, Sedimentation/Siltation, Toxicity, Eutrophic
San Luis Rey River, Lower (West of I-15)	Benthic Community Effects, Bifenthrin, Chloride, Indicator Bacteria, Nitrogen, Phosphorus, Total Dissolved Solids, Total Nitrogen as N, Toxicity
San Luis Rey River, Upper (East of I-15)	Indicator Bacteria, Phosphorus, Total Nitrogen as N
San Marcos Creek	Benthic Community Effects, Indicator Bacteria, Phosphorus, Selenium, Toxicity
San Marcos, Lake, drain to central southwest fork of lake	Copper
San Marcos, Lake, drain to central southwest fork of lake	Indicator Bacteria
San Mateo Creek (San Diego County)	Indicator Bacteria, Invasive Species
San Vicente Creek	Indicator Bacteria, Ammonia as Nitrogen, Phosphorus, Total Nitrogen as N, Toxicity
San Vicente Reservoir	Chloride, Color, Sulfates, Nitrogen, pH
Sandia Creek	Aluminum, Ammonia (Unionized), Manganese, Nitrogen, Selenium, Silver, Iron, Total Dissolved Solids, Sulfates
Santa Margarita Lagoon	Eutrophic
Santa Margarita River (Lower)	Benthic Community Effects, Chlorpyrifos, Toxicity, Phosphorus, Nitrogen

Impaired Water Body	Pollutant
Santa Margarita River (Upper)	Indicator Bacteria, Iron, Manganese, Nitrogen, Phosphorus, Toxicity
Santa Ysabel Creek (above Sutherland Reservoir)	Toxicity
South Lake	Nutrients, Phosphorus, Ammonia as Nitrogen, Copper
Steele Canyon	Indicator Bacteria
Soledad Canyon	Sediment Toxicity, Selenium
Sutherland Reservoir	Color, Iron, Manganese, Nitrogen, Phosphorus, pH
Sweetwater Reservoir	Dissolved Oxygen
Sweetwater River, Lower (below Sweetwater Reservoir)	Benthic Community Effects, Chlorpyrifos, Indicator Bacteria, Nitrogen, Phosphorus, Selenium, Total Dissolved Solids, Toxicity
Sweetwater River, North Fork, unnamed tributary at Tavern Road	Manganese, Indicator Bacteria
Sweetwater River, Upper (above Sweetwater Reservoir)	Selenium, Indicator Bacteria, Aluminum, Total Nitrogen as N, Benthic Community Effects
Switzer Creek	Copper, Lead, Zinc
Sycamore Canyon	Dissolved Oxygen
Tecate Creek	Nitrogen, Phosphorus, Selenium
Tecolote Creek	Benthic Community Effects, Bifenthrin, Cadmium, Cypermethrin, Diazinon, Copper, Indicator Bacteria, Lead, Nitrogen, Phosphorus, Selenium, Toxicity, Turbidity, Zinc
Tecolote Creek, South Fork	Indicator Bacteria
Telegraph Canyon Creek	Nitrogen, Selenium
Temecula Creek	Chlorpyrifos, Copper, Indicator Bacteria, Total Dissolved Solids, Toxicity, Phosphorus
Tijuana River	Ammonia as Nitrogen, Eutrophic, Benthic Community Effects, Cadmium, Chlorpyrifos, Diazinon, Indicator Bacteria, Low Dissolved Oxygen, Malathion, Pesticides, Phosphorus, Sedimentation/Siltation, Selenium, Solids, Methylene Blue Active Substances (MBAS), Synthetic Organics, Total Nitrogen as N, Toxicity, Trace Elements, Trash
Tijuana River Estuary	Eutrophic, Indicator Bacteria, Lead, Low Dissolved, Oxygen, Nickel, Pesticides, Thallium, Trash, Toxicity, Turbidity

Source: SWRCB 2021.

Placement of a water body onto the 303(d) list requires the RWQCB to make further analysis of the impairment and develop Total Maximum Daily Loads (TMDLs) for addressing the impairment. Once a TMDL is established, it may impose conditions on development either through an implementation plan and schedule for the listed water, or through special conditions required of the jurisdiction affected by the numeric criteria of the TMDL. As of May 9, 2019, several 303(d) listed water body segments in the San Diego region are at various stages of TMDL development. SWRCB-approved TMDLs in the San Diego Hydrologic Basin are as follows:

- Dissolved copper for Shelter Island Yacht Basin, San Diego Bay (R9-2005-0019).
- Diazinon and metals for Chollas Creek (R9-2002-0123 and R9-2007-0043).
- Nutrients and phosphorus for Rainbow Creek (Resolution R9-2005-0036).

- Indicator bacteria for Shelter Island Shoreline Park in San Diego Bay (R9-2008-0027).
- Indicator bacteria for beaches and creeks in the San Diego Region (R9-2010-0001).
- Sediment for Los Peñasquitos Lagoon (Resolution R9-2012-0022).
- Phosphorus for Loma Alta Slough (R9-2014-0020)[1].

The following TMDLs are in progress as of May 2019:

- San Diego Bay marine sediment toxicity for Chollas Creek mouth, 7th Street Channel (Paleta) Creek, Switzer Creek mouth, B Street/Broadway Piers, and Downtown Anchorage (Pueblo Watershed).
- TMDLs for Impaired Lagoons, Adjacent Beaches, and Agua Hedionda Creek.
- Tijuana River and Estuary (Tijuana Watershed).
- Famosa Slough and channel (San Diego River Watershed)[1] Sedimentation/siltation for Los Peñasquitos Lagoon (Peñasquitos Watershed).
- Nutrients, bacteria, or sediments for Loma Alta Slough, Pacific Ocean Shoreline at Loma Alta Creek, Buena Vista Lagoon, Pacific Ocean shoreline at Buena Vista Creek, Lower Agua Hedionda Creek, San Elijo Lagoon, Pacific Ocean at San Elijo Lagoon Outlet, and San Marcos Creek/Lake San Marcos.
- Santa Margarita River and Estuary.[1]

FLOOD HAZARDS AND FLOOD CONTROL

The San Diego region's climate is semiarid 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 the San Diego region and the rest of Southern California most frequently occurs during winter storm events between November and April, and occasionally during the summer when a tropical storm makes landfall. Most flooding events occur over several days but can also develop within a matter of hours, particularly in narrow valleys (County of San Diego 2011). However, as the San Diego region averages approximately 10 inches of rainfall annually, flooding is not frequent and usually occurs around the region's coastal lagoons and estuaries, as well as in the lower reaches of rivers and creeks near the Pacific Ocean.

Dam failure inundation is flooding caused by the release of impounded water from failure or overtopping of a dam. Areas directly below the dam are at the greatest risk, and as the water moves farther downstream and its depth decreases, the magnitude of the damage and potential risk to life and property decreases. There are 25 dams within the San Diego region; failure of any of these dams would affect downstream areas. Dam owners are required to submit inundation maps to the California Office of Emergency Services (Cal OES) for review and approval in accordance with guidance issued by Cal OES. Inundation maps submitted by dam owners are provided by the California Department of Water Resources (DWR 2018a). These inundation maps delineate dam inundation zones or the areas at risk in the event of failure for each dam. The maps represent the best

[1] The TMDL investigation indicated that non-stormwater discharges from the local watershed and the stormwater conveyance system are the primary sources of nutrients. These discharges are regulated under the existing Regional MS4 Permit, and the necessary actions to reduce nutrient loading and restore beneficial uses can be tracked through the reporting requirements of the Regional MS4 Permit. Therefore, this alternative restoration plan using the existing permit was implemented instead of adopting the TMDL as a Basin Plan amendment.

estimate of where water would flow if a dam failed completely and suddenly with a full reservoir. Cal OES provides assistance and guidance to local jurisdictions on emergency planning for dam failure events. Table 4.10-2 shows the storage of surface water reservoirs and dams within the San Diego region.

Table 4.10-2
Reservoirs with Dams in San Diego Region

Lake	Storage (acre-feet)
Maerkle	219
Dixon	2,495
Wohlford	2,054
Red Mountain	429.5
Cuyamaca	455
Jennings	8,592
Poway	3,432
Morro Hill	172
Ramona	1,310
Olivenhain – CWA	18,528
Barrett	20,500
El Capitan	30,611
Hodges	11,419
Lower Otay	36,206
Miramar	5,563
Morena	5,570
Murray	4,137
San Vicente	179,706
Sutherland	10,987
San Dieguito	457
Loveland	8,055
Sweetwater	12,396
Turner	1,507
Henshaw	6,044

Source: SDCWA 2021b.
Note: Storage amounts current as of March 11, 2021.

Flooding in the San Diego region could also occur as a result of a failure of a levee. Levee Flood Protection Zone (LFPZ) maps were developed by the DWR to increase awareness of flood risks associated with State-federal levees. LFPZ maps estimate the maximum area that may be flooded if a levee fails with flows at maximum capacity that may reasonably be conveyed. No areas in the San Diego region are in a levee flood protection zone (DWR 2018b).

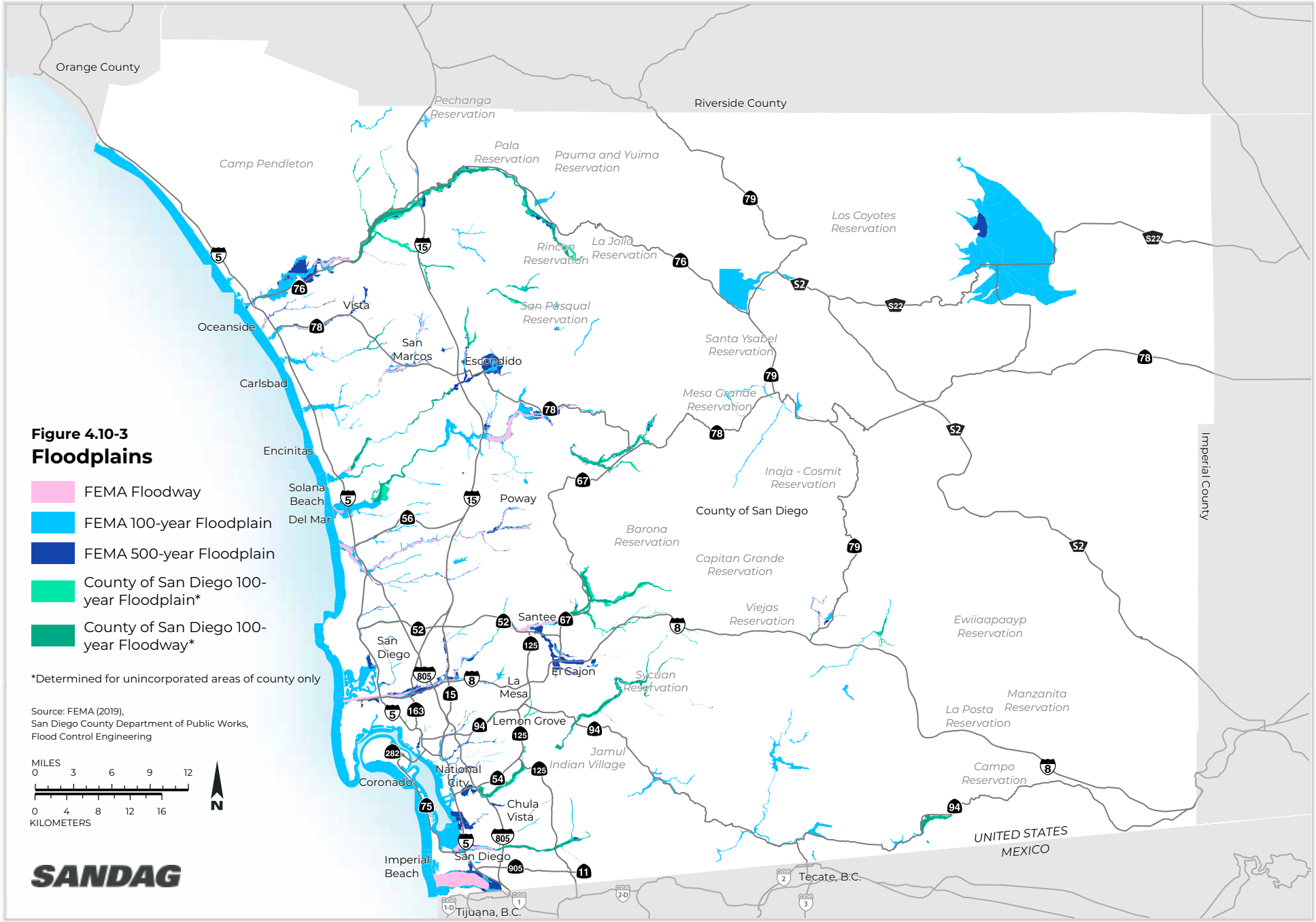
The Federal Insurance Rate Map (FIRM) is the official map created and distributed by the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP). The FIRM delineates Special Flood Hazard Areas (SFHAs): areas subject to inundation by the base flood (i.e., the flood having a 1 percent chance of being equaled or exceeded in any given year; the 100-year flood), for every county and community

that participates in the NFIP, including those in the San Diego region. FIRMs contain flood risk information based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development. Figure 4.10-3 shows FEMA floodway and floodplain areas for the San Diego region, as well as 100-year and 500-year flood zones (i.e., flood having a respective 1 and 0.2 percent chance of being equaled or exceeded in any given year). A floodway is any water channel and adjacent land areas necessary to convey floodwaters, and a floodplain includes the floodway and any land area susceptible to being inundated by floodwaters (FEMA 2011, 2020). 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 of San Diego flood maps delineate 1 percent annual chance (100-year) riverine flood boundaries and elevations for areas not studied by FEMA. The County of San Diego Mapping Program has mapped miles of rivers and streams in the unincorporated area

Seiches and Tsunamis

A seiche is an earthquake or wind-induced wave in a confined body of water such as a lake, bay, or reservoir. Waves can be up to tens of feet high. Lakes, bays, and reservoirs that could experience a seiche are shown in Figure 4.10-1. There is no historical precedence for large damaging seiches in the San Diego region (SANDAG 2015).

Tsunamis are 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. Seismic conditions and fault zones within the San Diego region are discussed in Section 4.7, *Geology, Soils, and Paleontological Resources*. The California Department of Conservation (2013) provides detailed maps showing the areas of inundation from tsunamis for the San Diego region that are used to determine whether a project footprint lies within the limits of inundation. These maps are developed for all populated areas at risk to tsunamis in California, and represent a combination of the maximum considered tsunamis for each area.


Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Camp Pendleton
Los Coyotes Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Vista
Oceanside
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
County of San Diego
Santee
San Diego
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Tecate, B.C.
Figure 4.10-3
Floodplains
FEMA Floodway
FEMA 100-year Floodplain
FEMA 500-year Floodplain
County of San Diego 100-year Floodplain*
County of San Diego 100-year Floodway*
*Determined for unincorporated areas of county only
Source: FEMA (2019), San Diego County Department of Public Works, Flood Control Engineering
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

Maps are available by quadrangle for each affected coastal area/community within the San Diego region: Del Mar, Encinitas, Imperial Beach, La Jolla, National City, Oceanside-San Luis Rey, Point Loma, and San Onofre Bluff. Tsunami hazards would be limited to the lower shoreline elevations along the Pacific coast, San Diego Bay, Mission Bay, and the five coastal lagoons. The risk of tsunamis in the San Diego region is low. In 92 years of record, at least 19 tsunamis have been recorded in the San Diego region, with most only a few tenths of a meter in height. The largest tsunami, caused by the Chilean earthquake in 1960, produced waves 1.5 meters in height causing damage to piers (Agnew 2009). The San Diego region has only experienced one tsunami caused by a local earthquake, which occurred in 1862 (Agnew 2009).

ANTICIPATED EFFECTS FROM CLIMATE CHANGE

Climate change threats to hydrology and water quality mainly include risks from flooding and changes in precipitation patterns. The San Diego region is likely to experience sea-level rise of up to 1.2 feet by 2050 and up to 4.6 feet by 2100, as well as wetter winters and more intense precipitation that can lead to increased flooding (CEP and SDF 2015, Kalansky et al. 2018, OPC 2018). More details on future climate projections are available in Appendix C.

Climate change could alter the hydrology in the San Diego region. CEP and SDF (2015) projects longer and more intense droughts, fewer rainy days, and more rainfall during the biggest rainstorms by 2050. These changes increase flooding to the region, which could lead to impacts on drainage, such as more soil erosion, mudflow, and landslides (County of San Diego 2018). Due to less snowpack and more evaporation, the San Diego region expects to see a decrease in runoff and streamflow. Thus, climate change may have a negative impact on hydrology in the San Diego region.

Climate change can also worsen water quality in a variety of the region's water resources through increased nonpoint water pollution during severe storm events, saltwater intrusion resulting from sea-level rise, sediments from increased incidence of wildfires, and higher temperatures. Heavier storms may decrease both beach and surface water quality because rainfall can cause runoff from nonpoint sources of contamination—such as trash, fertilizers, sediments, metals, sewage, and other fluids—which then drain into the ocean and streams. As a result, California health officials recommend that people stay out of beach waters for at least 3 days following rain events of at least 0.1 inch. In 2017–2018, beaches in San Diego County faced two beach closures and ten health warnings, and 24 sewage spills (totaling 187,001 gallons) reached a water body (Heal the Bay 2018). More intense rainstorms from climate change may worsen this hazardous runoff; the San Diego region may see 8 percent more precipitation during its heaviest storms (CEP and SDF 2015). Climate change could cause these incidents to increase in frequency or severity, although the extent to which that could occur has not been quantified. Along the coast, saltwater intrusion from sea-level rise can infiltrate groundwater, worsening the quality of this freshwater resource. Projected increases in wildfires across the region may also worsen water quality for surface waterways by increasing sediment flows (Meixner and Wohlgemuth 2004). Also, higher temperatures may alter rates of stratification in lakes, potentially removing dissolved oxygen and leading to excess nutrients in lakes (Melillo et al. 2014). These higher temperatures may also reduce general water quality by changing water chemistry and promoting growth of bacteria (Duran-Encalada et al. 2017), algae, and parasites (Major et al. 2011). However, the available literature has not quantified the extent to which this would affect water quality in the San Diego region.

4.10.2 REGULATORY SETTING

FEDERAL LAWS, REGULATIONS, PLANS, AND POLICIES

Clean Water Act

The federal CWA (33 USC Section 1251 et seq.) of 1972 is the basic federal law that addresses surface water quality control and protection of beneficial uses of water. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters through prevention, reduction, and elimination of pollution. The CWA applies to discharges of pollutants into waters of the U.S. The CWA establishes a framework for regulating stormwater discharges from municipal, industrial, construction, and other activities under National Pollutant Discharge Elimination System (NPDES) regulations. In California, the SWRCB administers the NPDES program. The following CWA sections are most relevant to regulation of surface water in the San Diego region.

Section 303(d) Total Maximum Daily Loads and Water Quality Standards

Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality–limited segments. Waters on the 303(d) list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that states, territories, and authorized tribes establish priority rankings for water bodies on the 303(d) list and develop action plans (i.e., TMDLs) to improve water quality. As defined by the CWA, water quality standards consist of four elements:

- Designated beneficial uses of water bodies
- Water quality criteria to protect designated uses
- An anti-degradation policy to maintain and protect existing uses and high quality waters
- General policies addressing implementation issues

Under CWA Section 303(d) (33 USC Section 1313[d]), states, territories, and authorized tribes are required to develop a list of water bodies that are considered to be "impaired" from a water quality standpoint. Water bodies that appear on this list either do not meet or are not expected to meet water quality standards, even after the minimum required levels of pollution control technology have been implemented to reduce point-source discharges. The law requires that respective jurisdictions establish priority rankings for surface water bodies on the list and develop action plans (TMDLs) to improve water quality. A TMDL is a calculation of the maximum amount of a specific pollutant that a water body can receive and still meet federal water quality standards as provided in the CWA (EPA 2017). TMDLs account for all sources of pollution, including point sources, nonpoint sources, and natural background sources.

The CWA Section 303(d) list of impaired water bodies provides a prioritization and schedule for development of TMDLs for states. The SWRCB, in compliance with CWA Section 303(d), publishes the list of water quality-limited segments in California, which includes a priority schedule for development of TMDLs for each contaminant or "stressor" affecting the water body (SWRCB 2015a).

Section 401 – Water Quality Certification

Every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain a CWA Section 401 (33 USC Section 1341) Water Quality Certification for the proposed activity and

must comply with state water quality standards prescribed in the certification. The SWRCB and RWQCBs are responsible for issuing Section 401 Water Quality Certifications. Most certifications are issued in connection with CWA Section 404 U.S. Army Corps of Engineers (USACE) permits for dredge and fill material discharges.

Section 402 – NPDES Program

CWA Section 402 (33 USC Section 1342) sets forth regulations that prohibit the discharge of pollutants into waters of the U.S. from point or nonpoint sources without first obtaining an NPDES Permit. The SWRCB and nine RWQCBs administer the NPDES Permit program. The SWRCB implements the NPDES and the state's water quality programs by regulating discharges of pollutants to surface waters to protect their beneficial uses. To comply with the CWA water quality regulations, nine RWQCBs in California develop and enforce water quality objectives and implementation plans, issue Waste Discharge Requirements (WDRs) that integrate NPDES permit requirements, take enforcement action, and monitor water quality within their hydrologic areas.

To regulate runoff-related (nonpoint source) discharges, the SWRCB developed a variety of general NPDES Permits for controlling industrial, construction, and municipal stormwater discharges (general permits for each category described separately under *State Laws, Regulations, Plans, and Policies*, below). Stormwater discharges are permitted under the NPDES program. Section 402(p) of the CWA requires that municipal Stormwater Management Programs be developed and implemented for municipalities to meet the requirements for stormwater discharges from municipal permits. Stormwater Management Programs limit, to the maximum extent practicable, the discharge of pollutants from storm sewer systems. A single agency or a coalition, often consisting of more than one municipality (such as cities and counties), may implement these programs. Each program includes best management practices (BMPs) intended to reduce the quantity and improve the quality of stormwater discharged to the stormwater system. Discharges to storm sewer systems must comply with the Stormwater Management Program's requirements.

Section 404 – Discharge of Dredge or Fill Material

CWA Section 404 (33 USC Section 1344) establishes a permit program, administered by USACE with EPA oversight, regulating discharge of both dredged and/or fill materials into waters of the U.S. (as defined at 33 CFR 328.3(a), including wetlands. *Dredged material* means material that is excavated or dredged from waters of the U.S. *Fill material* means material placed in waters of the U.S. where the material has the effect of replacing any portion of a waters of the U.S. with dry land or changing the bottom elevation of waters of the U.S. Examples of fill material include rock, sand, soil, clay, plastics, woodchips, concrete, and materials used to create any structure or infrastructure in waters of the U.S. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. Under CWA Section 404(e), USACE can issue general permits to authorize activities that have minimal individual and cumulative adverse environmental effects. General permits can be issued for a period of no more than 5 years. USACE can issue nationwide permits, which is a general permit that authorizes activities across the country, unless revoked by a district or division commander. Nationwide permits authorize a wide variety of activities such as linear transportation projects, residential development, commercial and industrial developments, utility lines, road crossings, bank stabilization activities, wetland and stream restoration activities, and certain maintenance activities. Four new nationwide permits were added in 2021. Two of the four provide appropriate mechanisms for an efficient process to authorize structures in navigable waters for finfish and seaweed mariculture activities. The other two provide appropriate processes to enable project proponents to obtain authorization to discharge dredged or fill material or to construct structures or do work in regulated waters associated with the construction and maintenance of electric utility

lines and telecommunication activities or with the construction and maintenance of utility lines for water or other substances. (USACE 2021).

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act, administered by USACE, prohibits the creation of any obstruction, excavation, or fill, or any alteration or modification of any navigable water of the U.S. unless the work has been permitted by USACE (33 USC Section 403). Permits for activities including excavation and dredging or deposition of material, or any obstruction or alteration to a navigable water which could impact water quality, are regulated under both Section 404 (CWA) and Section 10 (Rivers and Harbors Act), and are processed simultaneously by the USACE.

Federal Antidegradation Policy

The federal antidegradation policy (40 CFR Section 131.12) has been in existence since 1968. The policy protects existing uses, water quality, and national water resources. It directs states to adopt a statewide policy that includes the following primary provisions:

- Maintain and protect existing instream uses and the water quality necessary to protect those uses.
- Where existing water quality is better than necessary to support fishing and swimming conditions, maintain and protect water quality unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, maintain and protect that water quality.

Executive Order 11988 – Floodplain Management

An amendment to Executive Order (EO) 11988 was issued on January 28, 2015, and includes revised guidelines for implementing EO 11988. Amended EO 11988 directs federal agencies to avoid, to the extent practicable and feasible, short- and long-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever a practicable alternative exists. Each federal agency is responsible for reducing the risk of flood loss, minimizing the impact of floods on human safety, health, and welfare, and restoring and preserving natural and beneficial values served by flood plains. In addition, amended EO 11988 advises agencies to use a higher flood elevation and expanded flood hazard area than the base flood previously described in EO 11988 to ensure that climate change and other future changes are more adequately accounted for in agency decisions.

National Flood Insurance Act of 1968

The National Flood Insurance Act of 1968 established the NFIP. The NFIP is a federal program administered by the Flood Insurance Administration of the FEMA. It enables individuals who have property within the 100-year floodplain to purchase insurance against flood losses. Community participation and eligibility, flood hazard identification, mapping, and floodplain management aspects are administered by state and local programs and support directorate within FEMA. FEMA works with the states and local communities to identify flood hazard areas and publishes a flood hazard boundary map of those areas.

The basic tools for regulating construction in potentially hazardous floodplain areas are local zoning techniques and FEMA floodplain mapping. FIRM is the official map created and distributed by FEMA and the NFIP that delineates SFHAs—areas that are subject to inundation by a 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. For projects that would affect the hydrologic or hydraulic characteristics of a flooding source and modify an existing regulatory floodway, effective Base Flood Elevations, or an SFHA, a conditional letter of map revision would need to be approved by FEMA.

STATE LAWS, REGULATIONS, PLANS, AND POLICIES

California Ocean Plan

The California Ocean Plan (SWRCB 2015) implements standards for ensuring consistency between water quality control plans and policies. In the adoption and amendment of water quality control plans, each plan provides for the attainment and maintenance of the water quality standards of downstream waters. To the extent there is a conflict between a provision of the California Ocean Plan and a provision of another statewide plan or policy, or a regional water quality control plan (basin plan), the more stringent provision shall apply except where pursuant to Chap. III.J of the California Ocean Plan (SWRCB 2015).

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act; Water Code Section 13000 et seq.) implements and augments federal protections under the CWA via regulation of the waters of the state, which include surface, ground, and ocean water as well as point sources and nonpoint sources.

The Porter-Cologne Act is California's comprehensive water quality control law and is a complete regulatory program, designed to protect water quality and beneficial uses of the state's waters. It requires the nine RWQCBs to adopt water quality control plans (basin plans) for watersheds within their regions. These basin plans are reviewed triennially and amended as necessary by the RWQCBs.

Each basin plan establishes water quality standards for specified surface waters and groundwater, which consist of beneficial uses and water quality objectives. Water quality objectives may be numeric or narrative

Where waste discharges could affect the quality of the waters of the state, the discharger must obtain a WDR permit. The SWRCB and RWQCBs have issued General WDRs governing certain categories of discharges. WDRs typically include effluent limitations, monitoring, and plan submittals that are to be implemented for protecting water quality.

State Antidegradation Policy (Resolution 68-16)

The State's antidegradation policy restricts degradation of surface and ground waters. This policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. The State policy establishes two conditions that must be met before the quality of high-quality waters may be lowered by waste discharges.

1. The State must determine that lowering the quality of high-quality waters:
    - Will be consistent with the maximum benefit to the people of the state,

- Will not unreasonably affect present and anticipated beneficial uses of such water, and
- Will not result in water quality less than that prescribed in State policies (e.g., water quality objectives in Water Quality Control Plans).

2. Any activities that result in discharges to high-quality waters are required to:

    - Meet WDRs that will result in the best practicable treatment or control of the discharge necessary to avoid pollution or nuisance, and
    - Maintain the highest water quality consistent with the maximum benefit to the people of the state.

The discharge would not be allowed under Resolution 68-16 if the discharge, even after treatment, would unreasonably affect beneficial uses or would not comply with applicable provisions of water quality control plans.

Cobey-Alquist Flood Plain Management Act

The Cobey-Alquist Flood Plain Management Act (Water Code Sections 8400 et seq.) encourages local governments to plan, adopt, and enforce land use regulations to accomplish floodplain management, in order to protect people and property from flooding hazards. This act also provides State financial assistance for flood control projects.

California Fish and Game Code Section 1602

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by the California Department of Fish and Wildlife (CDFW), pursuant to the Fish and Game Code Section 1602.

Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first submitting a complete Notification of Lake or Streambed Alteration to CDFW:

- Substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake.
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A Lake or Streambed Alteration Agreement must be obtained from CDFW for any activity that may substantially adversely affect an existing fish or wildlife resource.

Municipal Stormwater Permit

Section 402(p) of the CWA requires that stormwater discharges are permitted under the NPDES program for Municipal Separate Storm Sewer Systems (MS4s). As part of the NDPES MS4 Permit process, Stormwater Management Programs must be developed and implemented for municipalities to meet the requirements for stormwater discharges listed in MS4 permits. Stormwater Management Programs limit, to the maximum extent practicable, the discharge of pollutants from storm sewer systems. A single State agency or a coalition, often

consisting of more than one municipality (such as cities and counties), may implement these programs. Each program includes BMPs intended to reduce the quantity and improve the quality of stormwater discharged to the stormwater system. Discharges to storm sewer systems must comply with the Stormwater Management Program's requirements.

In 1990, the EPA promulgated regulations establishing NPDES regulations for MS4s serving "medium" and "large" MS4s of 100,000 population or greater. These regulations, known as Phase I regulations, require operators of medium and large MS4s to obtain and comply with NPDES stormwater permits to reduce or eliminate the discharge of pollutants.

On December 8, 1999, EPA promulgated regulations, known as Phase II regulations, requiring operators of small MS4s to obtain and comply with NPDES stormwater permits for small MS4s under the authority of the CWA section 402(p)(6). On February 5, 2013, the SWRCB adopted Water Quality Order No. 2013-0001-DWQ, NPDES General Permit No. CAS000004 (as amended by Orders 2015-0133_EXEC, WQ 2016-0069-EXEC, WQ 2018-0001-EXEC, and 2018-0007-EXEC), Waste Discharge Requirements for Storm Water Discharges from Small MS4 (Phase II General Permit) to comply with CWA section 402(p)(6). The Phase II General Permit became effective on July 1, 2013.

In compliance with this requirement, the county and cities in San Diego County developed Stormwater Management Programs, which are discussed in more detail under *Regional and Local Laws, Regulations, Plans, and Policies*, below.

California Department of Transportation NPDES Permit

Under the California Department of Transportation (Caltrans) statewide NPDES permit (Order 2012-0011-DWQ, as amended by Order WQ 2014-0006-Exec, Order WQ 2014-0077-DWQ, and Order WQ 2015-0036-Exec), Caltrans is required to regulate nonpoint-source discharges from its properties, facilities, and activities (SWRCB 2012b), such as the following.

- Stormwater discharges from all Caltrans-owned municipal separate stormwater sewer systems.
- Stormwater discharges from Caltrans' vehicle maintenance, equipment cleaning, and operations facilities, and any other nonindustrial facilities with activities that have the potential to generate significant quantities of pollutants.
- Certain categories of non-stormwater discharges, as listed under Provision B in Order 2012- 0011-DWQ.

Order 2012-0011-DWQ does not regulate stormwater discharges from Caltrans-owned batch plants or any other industrial facilities. Caltrans must obtain coverage for stormwater discharges associated with industrial activities under the Statewide Industrial General Permit for these discharges, and must comply with the applicable requirements. Although Order 2012-0011-DWQ does not regulate stormwater discharges associated with industrial activities, it does impose contractor requirements for certain industrial facilities.

Order 2012-0011-DWQ also does not regulate discharges from Caltrans construction activities, including dewatering effluent discharges from construction projects. Instead, Caltrans must obtain coverage for stormwater discharges associated with construction activities under Order 2009-0009-DWQ (as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ), the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (SWRCB 2009).

Construction General Permit

Dischargers whose projects disturb 1 or more acres of soil, or less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the SWRCB's Order 2009-0009-DWQ (as amended by Orders 2010-0014-DWQ and 2012- 0006-DWQ), the Construction General Permit (SWRCB 2009). Construction and demolition activities subject to this permit include clearing, grading, grubbing, and excavation, or any other activity that results in a land disturbance equal to or greater than one acre.

Permit applicants are required to submit a Notice of Intent to the SWRCB and to prepare a Storm Water Prevention Pollution Plan (SWPPP). The SWPPP must identify BMPs that are to be implemented to reduce construction impacts on receiving water quality based on potential pollutants. The SWPPP also must include descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases are completed at a site (post-construction BMPs). The Construction General Permit also includes requirements for risk-level assessment for construction sites, a stormwater effluent monitoring and reporting program, rain event action plans, and numeric action levels for pH and turbidity.

Industrial General Permit

Industrial facilities are subject to the requirements of SWRCB Water Quality Order 2014-0057-DWQ (as amended by Order 2015-0122-DWQ), NPDES General Permit for Storm Water Discharges Associated with Industrial Activities Excluding Construction Activities (Industrial General Permit). These regulations prohibit discharges of industrial stormwater to waters of the U.S. and state from a broad range of industrial activities, including mining, manufacturing, disposal, recycling, and transportation, unless such discharges comply with a site-specific NPDES permit. On April 1, 2014, the SWRCB adopted Order 2014-0057-DWQ, with an effective date of July 1, 2015.

Special Protections for Areas of Special Biological Significance

On March 20, 2012, the SWRCB approved Resolution No. 2012-0012 approving an exception to the Ocean Plan prohibition against discharges to ASBS for certain nonpoint source discharges and NPDES-permitted municipal stormwater discharges. State Water Board Resolution No. 2012-0012 requires monitoring and testing of marine aquatic life and water quality in several ASBS to protect California's coastline during storm discharges into coastal waters. Specific terms, prohibitions, and special conditions were adopted to provide special protections for marine aquatic life and natural water quality in ASBS. The City of San Diego's municipal stormwater discharges to the San Diego Marine Life Refuge in La Jolla are subject to terms and conditions of State Water Board Resolution No. 2012-0012. The Special Protections are contained in Attachment B to Resolution No. 2012-0012.

California Coastal Act

Section 30231 of the California Coastal Act establishes a policy of maintaining and restoring the biological productivity and water quality of coastal waters, streams, wetlands, estuaries, and lakes within the Coastal Zone. Section 30236 addresses flood control projects for the protection of existing structures in the floodplain. Section 30253, part (a) establishes a policy that that new development must minimize risks to life and property in areas of high flood hazard.

REGIONAL AND LOCAL LAWS, REGULATIONS, PLANS, AND POLICIES

San Diego Regional Water Quality Control Board

As described above, the Porter-Cologne Act requires that RWQCBs adopt water quality control plans (basin plans) for watersheds within their jurisdiction. These plans establish water quality standards for particular surface water bodies and groundwater resources.

The San Diego RWQCB (Region 9), a State agency, is responsible for the basin plan for the San Diego Basin. The RWQCB implements management plans to modify and adopt standards under provisions set forth in Section 303(c) of the CWA and California Water Code (Division 7, Section 13240). In addition to basin plan requirements, the RWQCB issues water quality certifications under CWA Section 401. The RWQCB also regulates discharges to surface waters and groundwater through the issuance of WDRs. WDRs are issued for discharges that specify limitations relative to the Basin Plan (San Diego RWQCB 2016).

2019 Final San Diego Integrated Regional Water Management Plan

The Final 2019 San Diego Integrated Regional Water Management (IRWM) Plan (San Diego IRWM Program 2019) was prepared under the direction of a Regional Water Management Group consisting of the San Diego County Water Authority, the County of San Diego, and the City of San Diego. The IRWM Plan builds on local water and regional management plans within the San Diego region and is aimed at developing long-term water supply reliability, improving water quality, and protecting natural resources. The Statewide IRWM Program is supported by bond funding provided by DWR to fund competitive grants for projects that improve water resources management. IRWM Plan goals are to:

- Improve the reliability and sustainability of regional water supplies.
- Protect and enhance water quality.
- Protect and enhance our watersheds and natural resources.
- Enhance resiliency to climate change for local water resources.
- Promote and support sustainable integrated water resource management.

Water Quality Control Plan for the San Diego Basin (Basin Plan)

The preparation and adoption of basin plans is required by the California Water Code (Section 13240) as prescribed by the CWA. According to Section 13050 of the Water Code, basin plans include designation or establishment of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives for the waters within a specified area. Basin plans satisfy both State and federal regulatory requirements for water quality control.

Water Quality Objectives

The San Diego RWQCB Basin Plan sets narrative and numerical water quality objectives that must be attained or maintained to protect beneficial uses and conform to the State's antidegradation policy. The water quality objectives are the levels of water quality constituents that must be met to protect the beneficial uses (San Diego RWQCB 2016). Table 4.10-3 includes a summary list of these water quality constituents that received narrative or numerical concentration objectives. A complete and detailed list of water quality objectives can be found in

the Basin Plan. Each water quality constituent may result in varied objectives conditional on the beneficial use of the waters.

Table 4.10-3
Water Quality Constituents

Bacteria – Total coliform, fecal coliform, E. Coli, and enterococci Biostimulatory Substances Boron Chlorides Color Dissolved Oxygen Floating Material Fluoride Inorganic Chemicals[1] Iron Manganese Methylene Blue–Activated Substances Nitrate Oil and Grease Organic Chemicals Pesticides	pH Phenolic Compounds Radioactivity Secondary Drinking Water Standards[2] Sediment Sodium Sulfate Suspended and Settleable Solids Tastes and Odors Temperature Total Dissolved Solids Toxicity Toxic Pollutants[3] Trihalomethanes Turbidity Un-Ionized ammonia

Source: San Diego RWQCB 2016.
[1] Waters designated for use as domestic or municipal supply (MUN) cannot contain concentrations of inorganic chemicals in excess of the maximum contaminant levels set forth in California Code of Regulations, Title 22, Table 64431-A of Section 64431 (Inorganic Chemicals), which is incorporated by reference into the Basin Plan. Inorganic chemicals include aluminum, antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrate+nitrite, nitrite, selenium, and thallium.
[2] Water designated for use as domestic or MUN cannot contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in / 64449-A of Section 64449 of Title 22 of the California Code of Regulations (Secondary Maximum Contaminant Levels, Consumer Acceptance Limits), which is incorporated by reference into the Basin Plan. Includes aluminum, color, copper, corrosivity, foaming agents, iron, manganese, methyl tert-butyl ether (MTBE), odor threshold, silver, thiobencarb, turbidity and zinc.
[3] EPA promulgated a final rule prescribing water quality criteria for toxic pollutants in inland surface waters, enclosed bays, and estuaries in California on May 18, 2000 (The California Toxics Rule or "CTR" [40 CFR 131.38]). CTR criteria constitute applicable water quality criteria in California. In addition to the CTR, certain criteria for toxic pollutants in the National Toxics Rule [40 CFR 131.36] constitute applicable water quality criteria in California as well. The Shelter Island Yacht Basin portion of San Diego Bay is designated as an impaired water body for dissolved copper pursuant to CWA Section 303(d). A TMDL has been adopted to address this impairment.

San Diego Regional Municipal Storm Water Permit

The San Diego Regional Municipal Storm Water Permit (Order R9-2013-0001 [as amended by Order No. R9-2015-0001 and R9-2015-0100]) (Municipal Permit) regulates the conditions under which stormwater and non-stormwater discharges into and from MS4s are prohibited or limited. The 18 cities, County of San Diego government, ~~County of~~ San Diego County Regional Airport Authority, and San Diego Unified Port District each owns or operates an MS4, through which it discharges stormwater and non-stormwater into waters of the U.S. within the San Diego region. These entities are the County of San Diego Copermittees (Copermittees) which, along with the applicable Orange County and Riverside County Copermittees, are subject to the requirements of the permit. The Caltrans stormwater system is regulated separately under the Caltrans NPDES permit.

The Municipal Permit is a framework for protecting water quality and designated beneficial uses of waters of the state from adverse impacts resulting from MS4 discharges. The Municipal Permit requires that each jurisdiction covered under the permit implement a Jurisdictional Urban Runoff Management Program to control the contribution of pollutants to and the discharges from the MS4. The goal of the jurisdictional runoff management programs is to implement water quality improvement strategies and runoff management programs that effectively prohibit non-stormwater discharges into the Copermittees' MS4s and reduce pollutants in stormwater discharges from the Copermittees' MS4s to the maximum extent practicable.

The Municipal Permit requires that the Copermittees develop a Water Quality Improvement Plan for each of ten Watershed Management Areas in the San Diego region. These plans identify the highest priority water quality conditions within each watershed and specific goals, strategies, and schedules to address those priorities, including numeric goals and action levels, and requirements for water quality monitoring and assessment. The Copermittees implement strategies through their jurisdictional runoff management programs to achieve the goals of the Water Quality Improvement Plans.

In accordance with the provisions of the Municipal Permit, the County of San Diego developed a BMP Design Manual (County of San Diego 2019) to identify design requirements and related post-construction requirements to protect stormwater quality for new development and significant redevelopment within the incorporated cities and unincorporated areas of the San Diego region. The BMP Design Manual establishes a series of source control, site design, and treatment control BMPs that are to be implemented by all Priority Development Projects (PDPs). PDPs include new development, redevelopment projects that create, add, or replace 5,000 square feet, and pollutant generating projects. A PDP should refer to the local agency that has jurisdiction for the project for guidance on the source control, site design, and treatment control BMPs for stormwater pollutants. All future projects implementing the proposed Plan must adhere to these regulations.

Under the Municipal Permit, Copermittees are required to implement stormwater management requirements and controls, which include construction and post-construction requirements for stormwater BMPs. These requirements include implementing low impact development (LID) BMPs for development and significant redevelopment to reduce pollutants in stormwater runoff from sites through more natural processes such as infiltration and biofiltration.

The County of San Diego developed an LID handbook for guidance in the BMP selection process (County of San Diego 2014), which integrates current research on LID implementation in the San Diego region. Design techniques include minimizing impervious areas, conserving natural areas, and utilizing vegetation and landscaping for water quality treatment benefits.

Copermittees are also required to comply with hydromodification management requirements to mitigate the potential for increased erosion due to increased runoff rates and durations caused by development and increased impervious surfaces. The Municipal Permit requires Copermittees to implement Hydromodification Management Requirements to manage increases in runoff discharge rates and durations from PDPs to minimize erosion of channel beds and banks, sediment pollutant generation, or other impacts on beneficial uses and stream habitat. The Hydromodification Management Requirements are found Chapter 6 in the BMP Design Manual. The Hydromodification Management Requirements require PDPs to implement hydrologic control measures so that post-project runoff flow rates and durations do not exceed pre-development flow rates and durations.

Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems

On June 19, 2012, the SWRCB adopted Resolution No. 2012-0032, adopting the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of OWTS Policy. This Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements and sets the level of performance and protection expected from OWTS (SWRCB 2012).

In accordance with Water Code Section 13290 et seq., the Policy sets standards for OWTS that are constructed or replaced, that are subject to a major repair, that pool or discharge waste to the surface of the ground, and that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or other public nuisance condition. The OWTS Policy also includes minimum operating requirements for OWTS that may include siting, construction, and performance requirements; requirements for OWTS near certain waters listed as impaired under Section 303(d) of the Clean Water Act; requirements authorizing local agency implementation of the requirements; corrective action requirements; minimum monitoring requirements; exemption criteria; requirements for determining when an existing OWTS is subject to major repair; and a conditional waiver of waste discharge requirements.

On April 15, 2015, the San Diego RWQCB adopted a Basin Plan amendment that changed water quality objectives for nitrate in groundwater basins. The Basin Plan Amendment also incorporates the State Water Quality Control Policy for Siting, Designing, Operation, and Maintenance of Onsite Wastewater Treatment Systems and made updates related to implementation of waste discharge requirements and adopted resolutions (Gorham 2015). The Basin Plan Amendment incorporates the OWTS Policy into the Basin Plan and amends the criteria to be used by the San Diego Water Board and local agencies to regulate OWTS in the San Diego region (San Diego RWQCB 2015).

Metropolitan Transit System

Metropolitan Transit System (MTS) is regulated under Resolution No. R9-2017-0006 for compliance with SWRCB Order 2013-0001-DWQ NPDES Permit No. CAS000004 (February 8, 2017). MTS was established as a special district in California and is authorized to operate public mass transit within the Cities of Chula Vista, Coronado, El Cajon, Imperial Beach, La Mesa, Lemon Grove, National City, Poway, San Diego, and Santee, as well as the unincorporated areas of the County of San Diego not served by the North County Transit District (NCTD). In accordance with the Resolution, the San Diego RWQCB requested an Amendment to include MTS as a Non-traditional Small MS4. MTS applied for coverage under the Phase II General Permit. The SWRCB adopted Order WQ 2018-007-EXEC amending WQ Order 2013-0001-DWQ on March 13, 2018 to add MTS as a non-traditional permittee.

North County Transit District

NCTD has been regulated under SWRCB Water Quality Order No. 2013-0001-DWQ NPDES Permit No. CAS000004 since July 1, 2013. The jurisdiction boundary of the permit extends from the southern Orange County border on Marine Corps Base Camp Pendleton (Mile Post [MP] 207.4) to south Del Mar (MP 245.7). MTS owns the City of San Diego portion of the rail corridor in San Diego County from MP 245.7 to MP 267.5, including the San Diego trolley light rail and bus system. The Stormwater Management Plan serves as the stormwater compliance document for all of the NCTD right-of-way, maintenance facilities, transit stations, and centers. All projects that create and/or replace between 2,500 and 5,000 square feet of impervious surface must implement one or more site design measures. NCTD regulates all development projects that create and/or replace 5,000

square feet or more of impervious surface (Regulated Projects). NCTD requires these Regulated Projects to implement measures for site design, source control, runoff reduction, stormwater treatment, and baseline hydromodification management as defined in this MS4 General Permit.

Dewatering Permit

Discharges from specified groundwater extraction activities (such as construction dewatering) must be permitted either by the San Diego RWQCB under the General Order R9-2015-0013 for groundwater waste discharges to surface waters, or authorized by the agency with jurisdiction if discharged to an MS4. Discharge via either of these mechanisms must meet applicable water quality objectives, constituent limitations, and pretreatment requirements.

County of San Diego Multi-jurisdictional Hazard Mitigation Plan

The federal Disaster Mitigation Act of 2000 requires all local governments to create a disaster plan in order to qualify for hazard mitigation funding. The Multi-Jurisdictional Hazard Mitigation Plan is a countywide plan that identifies risks and ways to minimize damage by natural and human-made disasters. The plan is a comprehensive resource document that serves many purposes such as enhancing public awareness, creating a decision tool for management, promoting compliance with State and federal program requirements, enhancing local policies for hazard mitigation capability, and providing inter-jurisdictional coordination.

Each of the 18 cities in the County participated in the planning process, as well as the Alpine Fire Protection District, Rancho Santa Fe Fire Protection District, and Padre Dam Municipal Water District. Based on its review of jurisdictional-level hazard maps, the central and eastern portions of San Diego County are most susceptible to flash floods where mountain canyons, dry creek beds, and high deserts are the prevailing terrain. In regions such as San Diego, without extended periods of below-freezing temperatures, floods usually occur during the season of highest precipitations or during heavy rainfalls after long dry spells (County of San Diego, 2017).

Approximately 134,000 people may be at risk from the 100-year flood hazard. In addition, special populations at risk that may be impacted by the 100-year flood hazard in San Diego County include 8,424 low-income households and 15,144 elderly persons. Approximately 215,000 people are at risk from the 500-year flood hazard. In addition, special populations at risk that may be impacted by the 500-year flood hazard in San Diego County include 13,689 low-income households and 24,316 elderly persons (County of San Diego, 2017).

County of San Diego Floodplain Management Plan

The County of San Diego Floodplain Management Plan (FMP) (County of San Diego 2007) assesses the flooding hazards within the unincorporated areas of the County of San Diego, summarizes current County of San Diego programs, describes potential mitigation strategies, and presents a plan for future action. It was prepared with input from County residents, responsible officials, and consultants, and with the support of the State of California Office of Emergency Services and Security and the Federal Emergency Management Agency. The FMP discusses a series of flood hazard issues and presents follow-up actions and recommendations for risk reduction. Based on the findings and recommendations in each of these areas, the County developed a Mitigation Action Plan (MAP). The County's Hazard MAP identifies mitigation activities, the priority assigned to implementing each activity, a responsible lead department or staff position, and deadline.

County and City General Plans and Flood Ordinances

Local general plans address flood hazards through policies in their land use and safety elements. In addition, local floodplain management ordinances (e.g., the County of San Diego Flood Damage Prevention Ordinance) promote public health, safety, and general welfare, and minimize public and private losses due to flood conditions. Flood ordinances restrict uses that are dangerous to health, safety, and property due to erosion or water hazards; require uses vulnerable to floods to be protected against flood damage at the time of construction; control the alteration of natural floodplains; control filling, grading, or dredging that may increase flood damage; and prevent construction of flood barriers that divert flood waters or increase flood hazards in other areas. Flood ordinances also include design standards for abutments to prevent collapse or lateral movement during a 100-year flood. Goals of floodplain management and flood ordinances within the San Diego region include:

- Reduce or eliminate existing flood hazards.
- Prevent future flood hazards from developing.
- Reduce the economic losses associated with flooding events.
- Provide for expanded recreational and aesthetic opportunities in the County of San Diego.
- Restore, preserve, and enhance environmental quality wherever possible.
- Improve the quality of life in the San Diego region.

The County of San Diego General Plan, Safety Element (Chapter 7) discusses potential risks of flooding, dam failure, safety procedures, involved agencies, and current and future action policies. The Safety Element (Chapter 7) introduces safety considerations for planning and decision-making to reduce the risk of injury, loss of life, and property damage associated with various hazards identified in the element, including flooding. The Safety Element also proposes policies and recommendations aimed at enhancing public safety through prevention as well as response preparation. Chapter 7 of the Safety Element provides goals and polices related to emergency response for natural or human-induced disasters in the region.

County of San Diego Local Agency Management Program for Onsite Wastewater Treatment Systems

The Local Agency Management Program (LAMP) (County of San Diego, 2015) allows the continued use of onsite wastewater treatment systems (OWTS) within the jurisdiction of San Diego County and expands the local program to permit and regulate alternative OWTS while protecting water quality and public health. The LAMP also applies to OWTS on federal, State, and tribal lands to the extent authorized by law or agreement. The LAMP includes minimum standards for the treatment and ultimate disposal of sewage though the use of OWTS in San Diego County and is designed to protect groundwater sources and surface water bodies from contamination through the proper design, placement, installation, maintenance, and assessment of individual OWTS.

4.10.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines provides criteria for determining the significance of a project's environmental impacts, in the form of Initial Study checklist questions. Unless otherwise noted, the significance criteria specifically developed for this EIR are based on the CEQA Guidelines Appendix G checklist questions. In some cases, SANDAG has combined checklist questions, edited their wording, or changed their location in the document in an effort to develop significance criteria that reflect the programmatic level of analysis in this EIR, and the unique characteristics of the proposed Plan.

Checklist questions for hydrology and water quality impacts are provided in Section X of CEQA Guidelines Appendix G. For purposes of this EIR, the CEQA Guidelines Appendix G, Section X questions have been combined and modified as follows.

- Question (a) regarding water quality standards, waste discharge requirements, and degradation of surface water and groundwater quality; the portion of question (c)(iii) regarding substantial additional sources of polluted runoff; and question (e) regarding conflicts with implementation of a water quality control plan are all addressed in HWQ-1.
- Question (b) addressing decreases in groundwater supplies and substantial interference with groundwater recharge and the portion of question (e) addressing impediments to sustainable management of groundwater basins and the conflict with or obstruction of implementation of a sustainable groundwater management plan have been incorporated into significance criterion WS-2 in Section 4.18, *Water Supply.*
- Question (c), including (c)(i), addressing substantial drainage pattern alterations is included in HWQ-2. The portion of question (c)(iii) regarding the creation or contribution of runoff water in excess of existing or planned stormwater drainage system capacity is addressed in significance criterion U-1 in Section 4.15, *Public Services and Utilities.*
- Question (c), including (c)(ii) and (c)(iv), addressing flooding is included in HWQ-3.
- Question (d) addressing risk of pollutant release in a flood hazard, tsunami, or seiche zone is included as HWQ-4.

For purposes of this EIR, implementation of the proposed Plan would have a significant hydrology or water quality impact if it would:

HWQ-1	Substantially degrade surface water or groundwater quality, including in violation of any water quality standards or waste discharge requirements or in conflict with a water quality control plan or its implementation. ‘
HWQ-2	Substantially alter the existing drainage pattern of an area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site.
HWQ-3	Substantially alter the existing drainage pattern of an area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would (i) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site or (ii) impede or redirect flood flows.
HWQ-4	Substantially increase risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone.

4.10.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

HWQ-1 SUBSTANTIALLY DEGRADE SURFACE WATER OR GROUNDWATER QUALITY, INCLUDING IN VIOLATION OF ANY WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS OR IN CONFLICT WITH A WATER QUALITY CONTROL PLAN OR ITS IMPLEMENTATION

ANALYSIS METHODOLOGY

The analysis identifies and maps the existing impaired (i.e., 303(d)-listed) water bodies and the locations where land development from forecasted regional growth and changes to land uses and planned transportation

network improvements would occur for each time horizon. The analysis evaluates if the proposed Plan would result in significant discharges of a pollutant for which a waterbody is already impaired, which could further exacerbate an existing water quality standard violation and result in a significant impact or result in a new discharge that could impair water quality. Construction and operation (i.e., post-construction) of development projects and transportation network improvements are analyzed to determine whether they would contribute substantial additional sources of pollutants found in stormwater runoff from these types of projects and improvements, and would substantially degrade water quality in violation of any water quality standards or WDRs, or would conflict with or obstruct implementation of a water quality control plan. Projects that comply with the construction general permit and local MS4 Permit requirements and implement BMPs to the maximum extent practicable would generally not conflict with or obstruct implementation of the water quality control plan. In addition, the analyses will evaluate if those additional sources of pollutants have the potential to infiltrate into and adversely affect groundwater quality. The operational analysis of transportation network improvements focuses on improvements that would create new impervious surface that would collect pollutants from vehicles, including but not limited to new managed lanes, general purpose lanes, regional arterial projects, and transit centers with parking areas. Active transportation projects and new transit services or transit service improvements would not be major sources of new pollutants during operation and are not analyzed in detail in this section for operational water quality impacts.

The analysis also considers that construction and post-construction activities would be required to adhere to various federal, State, and regional water quality standards, such as the Municipal Permit, Industrial General Permit, and Construction General Permit. As such, runoff volumes and pollutants leaving sites during construction and post-construction operations would be substantially reduced through source control, site design, and/or treatment-control BMPs mandated by these permits. Erosion and sediment controls identified for construction in project-specific SWPPPs would substantially reduce the amount of soil disturbance, erosion and sediment transport into receiving waters, and pollutants in site runoff during construction. Impacts from the proposed Plan would be considered significant if the proposed Plan contributes substantial additional sources of pollutants leading to water quality standards or waste discharge requirements being violated, conflicts with the water quality control plan, or substantially degrades water quality due to implementation of the forecasted regional growth and land use change and planned transportation network improvements.

Water quality impacts from wastewater discharge from wastewater treatment facilities (e.g., Point Loma WWTP and Ocean Outfall; the North City WRP and South Bay WRP) are analyzed. Forecasted regional growth and land use change would generate additional wastewater, which would be treated by regional wastewater treatment facilities. Information from Section 4.15 is used to identify planned capacity of wastewater treatment facilities and future expansion needs of the facility. The analysis determines whether additional demand for wastewater treatment from forecasted regional growth and land use change would contribute to violation of water quality standards or WDRs for wastewater treatment facilities. Transportation network improvements and programs would not generate additional demand for wastewater treatment, and therefore are not analyzed for a contribution to violation of WDRs for wastewater treatment facilities. Impacts on groundwater quality also are analyzed for forecasted regional growth and land use change in areas without sewer systems that are reliant on septic tanks or other alternative wastewater systems.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change

Construction activities associated with regional growth and land use change under the proposed Plan would generate pollutants, such as sediment, soil stabilization residues, oil and grease, and trash and debris. Construction-related earth disturbing activities would result in short-term water quality impacts associated with soil erosion and subsequent sediment transport to adjacent properties or watercourses via storm drains. Development under the proposed Plan would also increase the amount of impervious surface area in the region, such as new buildings and paved areas. The new impervious surface areas would collect common urban pollutants such as sediment, oil and grease, metals, nutrients, and trash and debris. Development under the proposed Plan would also increase the amount of managed landscaping areas in the region that would provide sources of nutrients, herbicides, and irrigation runoff.

Most development by 2025 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. Approximately 78.8 percent of forecasted population growth by 2025 would occur in the City of San Diego (57.9 percent), City of Chula Vista (12.1 percent), and City of Escondido (8.8 percent). Infill and redevelopment would incrementally increase the amount of impervious surface area in existing urban and suburban communities. Conversely, the limited development forecasted on vacant land, open space, and agricultural land would cause greater increases in impervious surfaces (and associated polluted runoff) than infill and redevelopment.

Generally, increases in the amount of impervious surfaces and landscaped areas would result in the accumulation, exposure, and transport of additional pollutants. Runoff during storm events and non-stormwater flows (such as over-irrigation) would transport pollutants through the storm drain system and adversely affect surface water quality if not properly managed. Several creeks and coastal lagoons have existing water quality impairments, therefore any increase in pollutant concentrations from new development would impact water quality, particularly for waterbodies listed as impaired under CWA Section 303(d). However, pollutant types and concentrations in runoff would depend on numerous site and location specific factors, including but not limited to land use type, presence of source control and structural BMPs, site drainage conditions, intensity and duration of rainfall, and climatic conditions preceding a rainfall event.

Compliance with regional, State, and federal water quality regulations would ensure that the increased runoff volume and pollutants generated from development are addressed. Development associated with forecasted growth and land use change under the proposed Plan would be subject to regulatory requirements that substantially reduce surface water quality impacts during construction and post-construction. Construction BMPs that reduce erosion and subsequent sediment transport such as silt fences, fiber rolls, sandbags, berms, and drainage inlet protection would be implemented during construction activities in compliance with the Construction General Permit. For any ground disturbances greater than 1 acre a SWPPP would be implemented. The SWPPP would identify sources of pollutants and erosion and pollution control BMPs that would be implemented during construction to minimize pollutants in stormwater runoff. Implementation of water quality control measures and BMPs would ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the Water Quality Control Plan for the San Diego Basin (basin plan).

During operation and maintenance of development projects, practices would be implemented to reduce stormwater pollution and prevent water quality degradation as required by applicable regulation such as the Municipal Stormwater Permit. Development projects would be required to maintain pre-development hydrology in compliance with enforced hydromodification requirements (Municipal Stormwater Permit, Order R9-2013-0001). Post-construction BMPs would include but are not limited to the following permanent stabilization designs and stormwater quality treatment measures:

- Reestablishment of native vegetation to control erosion.
- LID designs that reduce, treat, infiltrate, and mange stormwater runoff and facilitate groundwater recharge (i.e. detention basins, bioretention systems, infiltration areas, porous paving).
- Runoff conveyance designs that provide adequate storage capacity and overland flow, detention, and infiltration before runoff reaches culverts or detention systems.
- In-line systems such as oil and sediment separators or absorbent filter systems to provide stormwater filtration prior to discharge.
- Hydromodification measures that ensure post-project stormwater runoff does not exceed the pre-development flow and duration.
- Regular street cleaning, litter control, and catch basin cleaning.

Regional Growth and land use change associated with the proposed Plan would also contribute additional demand for wastewater treatment in 2025. As a result, wastewater discharges (primarily residential, commercial, and industrial) from regional wastewater treatment plants such as the Point Loma WWTP and Ocean Outfall, the North City WRP, and South Bay WRP) would increase. Treated wastewater from regional wastewater treatment plants are discharged to surface waters, including the Pacific Ocean. Discharges of water from wastewater treatment plants to surface waters would be in compliance with NPDES permit requirements.

While population growth would result in an increase in the amount of wastewater generated, especially in the cities of San Diego and Chula Vista, the existing wastewater treatment plants would have sufficient capacity to serve forecasted growth through 2025 (see Section 4.15). However, smaller treatment plants throughout the region would need to be expanded to ensure adequate capacity, while also protecting surface, ground, and marine water resources. Development in existing communities would require expansion or upsizing of existing collection and treatment systems, while development in new areas would require installation of new collection and treatment systems. Wastewater treatment facility/infrastructure expansions would be required to comply with ongoing point-source discharge NPDES permits, as well as applicable NPDES general permits and assorted local regulations to minimize impacts on receiving waters.

Marine water quality is regularly monitored by the City of San Diego Environmental Monitoring and Technical Services Laboratory to ensure that the wastewater discharge does not negatively affect water quality or harm aquatic health. This monitoring program would continue, and likely be expanded, relative to new regulatory permit requirements for evaluating and ensuring compliance.

Compliance with applicable regulatory requirements outlined above and in Section 4.10.2, *Regulatory Setting,* would require that pre-development hydrology be maintained after construction is completed; runoff would be treated to remove or substantially reduce pollutants before discharging to surface waters. For projects that discharge to 303(d)-listed impaired water bodies, mandatory BMPs would be implemented to substantially lessen the quantity of pollutants causing the impairment from leaving the site and entering the impaired water body. Wastewater discharges would be in compliance with applicable NPDES permit requirements. Therefore,

regional growth and land use change associated with the proposed Plan would not substantially degrade water quality in violation of water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is less than significant.

Transportation Network Improvements and Programs

Transportation infrastructure would contribute to water quality impacts during construction and operations. Construction activities associated with transportation network improvements would increase erosion and subsequent sediment transport to adjacent properties, roadways, or watercourses via storm drains. Construction activities would also generate pollutants, such as sediment, soil stabilization residues, oil and grease, and trash and debris, that could contaminant runoff or receiving waters. In addition, bridge and roadway modification across water courses would be required. Construction disturbances and dredging would have an adverse impact on turbidity affecting water quality, particularly for receiving waters listed as impaired for sediment and/or siltation.

Transportation network improvements under the proposed Plan would also increase the amount of impervious surface area in the region, including new paved areas. New impervious surfaces including freeways, roadways, and parking lots would convey common urban pollutants to landscaped areas. The primary source of water pollution from transportation infrastructure is vehicles and associated oil and grease, metals, sediment, hydrocarbons, trash and debris accumulated on paved surfaces. The main pollutants associated with railway are polycyclic aromatic hydrocarbons (PAHs), heavy metals, and herbicides. The main source of PAHs in railway areas is from machine grease, fuel oils and transformers oils, as well as creosote (railway ties). Sources of heavy metals include rail material abrasion, fuel combustion in diesel-electric locomotives, trolley wires, and cargo leakage. Runoff during storm events and non-stormwater flows (such as over-irrigation) would transport these pollutants through the local storm drain systems. If not properly managed, pollutants in runoff discharged from local storm drain systems could adversely affect surface water quality (particularly CWA Section 303(d) impaired water bodies). In general, bicycle improvements and other active transportation projects do not collect the same type of pollutants as transportation facilities used by vehicles, and therefore runoff from such improvements would not discharge similar vehicle-related pollutants into storm drains and receiving waters.

As shown in Table 4.10-4, a variety of transportation network improvements proposed for 2025 cross 303(d)-listed water bodies. Most improvements would occur in areas that are already highly developed with impervious surfaces. By 2025, most projects that would cross 303(d) waters would either be active transportation projects or local improvements to the regional arterial system (RAS), streets, or road with a more limited potential to introduce large acreages of new impervious surface area. While these facilities are primarily developed urban areas, they also cross 303(d)-listed waters including rivers, creeks, and lagoons. Transportation network improvements in semi-rural and rural areas would result in greater increases in impervious surface area and collection of pollutants relative to existing conditions.

Table 4.10-4
Planned Transportation Network Improvements Crossing 303(d)-listed Water Bodies by 2025

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Active Transportation	Inland Rail Trail: Phase 4	Buena Vista Creek	18070303
Active Transportation	San Diego River Trail: Carlton Oaks Segment	Forester Creek	18070304

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Active Transportation	San Diego River Trail: Carlton Oaks Segment	San Diego River (Lower)	18070304
Local Improvements – RAS	El Camino Real and Cannon Road	Agua Hedionda Creek	18070303
Local Improvements – RAS	El Camino Real Widening – La Costa Avenue to Arenal Road	San Marcos Creek	18070303
Local Improvements – RAS	Citracado Parkway II	Escondido Creek	18070303
Local Improvements – RAS	College Boulevard Improvements from Avenida de la Plate to Waring Road	Loma Alta Creek	18070303
Local Improvements – RAS	San Marcos Creek Specific Plan – Discovery Street Widening and Flood Control Improvements #88265	San Marcos Creek	18070303
Local Improvements – Street and Road	Grand Avenue Bridge and Street Improvements	San Marcos Creek	18070303
Local Improvements – Street and Road	Via Vera Cruz Bridge and Street Improvements #88264	San Marcos Creek	18070303
Ops/Maintenance – Highway Bridge Program	El Camino Real	San Dieguito River	18070304

As discussed in the Regional Growth and Land Use Change section above, specific regulations, such as the statewide Construction General Permit, are in place to substantially reduce the water quality impacts of construction activities on receiving waters, including 303(d)-listed waters; the Caltrans Statewide Storm Water Program and Management Plan sets forth requirements to substantially reduce or eliminate the discharge of pollutants from construction activities for Caltrans facilities. The need for and design of BMPs would be dictated by the project-related SWPPP and the presence of surrounding sensitive resources. During the SWPPP development process, BMPs would be selected that target the construction-phase pollutant(s) of concern relative to adjacent impaired 303(d)-listed water bodies; operation-phase BMPs would be evaluated during the development of drainage designs. Construction BMPs aimed at reducing erosion and subsequent sediment transport, such as silt fence and/or fiber rolls, sandbag barrier, and slope stabilization, would be implemented during construction activities to substantially reduce or eliminate the discharge of pollutants into receiving waters, including 303(d)- listed water bodies. Implementation of BMPs would also ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the basin plan.

During operations and maintenance of transportation network improvement projects, operational BMPs would be implemented and maintained to substantially lessen the flow of stormwater pollutants into receiving waters, including 303(d)-listed water bodies, to prevent substantial water quality degradation in compliance with applicable stormwater runoff discharge permits (i.e., Municipal Stormwater Permit). Post-construction BMPs would consider factors such as permanent stabilization of disturbed soil and natural stormwater quality treatment and would include LID, hydromodification measures, and erosion control/revegetation efforts. A statewide permit establishes requirements to substantially reduce or eliminate the discharge of pollutants from Caltrans right-of-way to storm drain systems and receiving waters.

Compliance with applicable regulatory requirements outlined above and in Section 4.10.2 would require that pre-development hydrology be maintained after construction and treatment of runoff to substantially reduce

or eliminate the discharge of pollutants to storm drain systems and receiving waters. For projects that discharge to 303(d)-listed impaired water bodies, BMPs would be required that target the removal of the pollutants causing the impairment. Transportation network improvements and programs associated with the proposed Plan would not substantially degrade water quality in violation of applicable water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is therefore less than significant.

2025 Conclusion

Implementation of regional growth and land use changes and transportation network improvements associated with the proposed Plan would not substantially degrade water quality in violation of existing standards and WDRs or conflict with a water quality control plan or its implementation because compliance with detailed existing and evolving regulatory requirements would substantially lessen or eliminate the discharge of pollutants into receiving waters, including 303(d)-listed waters, during construction and operations. Therefore, this impact (HWQ-1) in the year 2025 is less than significant.

2035

Regional Growth and Land Use Change

As discussed in the 2025 analysis, construction activities associated with regional growth and land use change under the proposed Plan would generate pollutants, such as sediment, soil stabilization residues, oil and grease, and trash and debris. Construction-related earth disturbing activities could result in short-term water quality impacts associated with soil erosion and subsequent sediment transport to adjacent properties or watercourses via storm drains. Development under the proposed Plan would also increase the amount of impervious surface area in the region, such as new buildings and paved areas. The new impervious surface areas would collect common urban pollutants such as sediment, oil and grease, metals, nutrients, and trash and debris. Development under the proposed Plan would also increase the amount of managed landscaping areas in the region that would provide a source of nutrients, herbicides, and irrigation runoff.

Most development by 2035 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. Approximately 78 percent of the forecasted regional population increase between 2026 and 2035 is in the City of San Diego (70.9 percent) and City of National City (7.3 percent). Similarly, these two jurisdictions accommodate approximately 73 percent of new housing units and 60 percent of new jobs between 2026 and 2035. Infill and redevelopment would incrementally increase the amount of impervious surface area in existing urban and suburban communities. Conversely, the limited development forecasted on vacant land, open space, and agricultural land would cause greater increases in impervious surfaces (and associated polluted runoff) than infill and redevelopment.

Generally, increases in the amount of impervious surfaces and landscaped areas would result in the accumulation, exposure, and transport of additional pollutants. Runoff during storm events and non-stormwater flows would transport pollutants via storm drain systems and adversely affect surface water quality if not properly managed. Several creeks and coastal lagoons have existing water quality impairments; therefore, any increase in pollutant concentrations from new development would impact their water quality, particularly for waterbodies listed as impaired under CWA Section 303(d). However, pollutant types and concentrations in runoff would depend on numerous site- and location-specific factors, as described in the 2025 analysis. Compliance with regional, State, and federal water quality regulations would ensure that the

increased runoff volume and pollutant generation from development are addressed. Development associated with forecasted regional growth and land use change under the proposed Plan would be subject to regulatory requirements that substantially reduce surface water quality impacts during construction and post-construction. Construction BMPs that reduce erosion and subsequent sediment transport (e.g., silt fence, fiber rolls, sandbag barrier, gravel bag berm, drainage inlet protection) would be implemented during construction activities in compliance with the SWPPP and Construction General Permit. Implementation of BMPs would ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the basin plan.

During operations and maintenance of development projects, post-construction practices would be implemented and maintained to substantially reduce stormwater pollution and prevent substantial water quality degradation as required by applicable regulations such as the Municipal Stormwater Permit. Post-construction BMPs are listed in the 2025 analysis.

As discussed in the 2025 analysis, regional growth and land use change associated with the proposed Plan would also contribute additional demand for wastewater, which would increase wastewater discharges (i.e., residential, commercial, and industrial) from regional wastewater treatment plants (e.g., Point Loma WWTP and Ocean Outfall, North City WRP, and South Bay WRP). Treated wastewater from regional wastewater treatment plants is discharged to surface waters, including the Pacific Ocean. NPDES permits govern the discharge of water from wastewater treatment plants to surface waters.

Treatment demands would lead to unwanted wastewater discharges to surface waters (including 303(d) impaired waters) if existing infrastructure is not collaboratively upgraded. The Point Loma WWTP has applied for an NPDES permit renewal per CWA Sections 301(h) and 301(j)(5) under the proposed Pure Water San Diego concept that involves new and improved joint water/wastewater facilities. Upon full implementation of all proposed facilities, approximately 83 mgd of potable reuse water would be ultimately produced from the plant's wastewater stream by the end of 2035 (City of San Diego 2015a). Although the proposed Pure Water San Diego program calls for new potable water reclamation to reduce capacity at treatment facilities, smaller wastewater treatment plants and collection systems throughout the region would need to be expanded to ensure adequate capacity (see Section 4.15), while also protecting surface, ground, and marine water resources (i.e., outfall discharge areas). Development in existing communities would require expansion or upsizing of existing collection and treatment systems, while development in new areas would require installation of new collection and treatment systems. These wastewater treatment facility/infrastructure expansion actions would be required to comply with evolving point-source discharge NPDES permits, as well as applicable NPDES general permits and assorted local regulations to minimize impacts on receiving waters. Ongoing marine water quality monitoring programs would ensure water quality and aquatic health are not adversely impacted by wastewater discharges.

Compliance with applicable regulatory requirements outlined above and in Section 4.10.2 would require that pre-development hydrology be maintained after construction is completed; runoff would be treated to remove or substantially reduce pollutants before discharging to surface waters. For projects that discharge to 303(d)-listed impaired water bodies, mandatory BMPs would be implemented to substantially lessen the quantity of pollutants causing the impairment from leaving the site and entering the impaired water body. Wastewater discharges would be in compliance with applicable NPDES permit requirements. Therefore, regional growth and land use change associated with the proposed Plan would not substantially degrade water quality in violation of water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is less than significant.

Transportation Network Improvements and Programs

As discussed in the 2025 analysis, transportation infrastructure contributes to water quality impacts during construction and operations. Construction activities associated with transportation network improvements would increase erosion and subsequent sediment transport to adjacent properties, roadways, or watercourses via storm drains. Construction activities would also generate pollutants, such as sediment, soil stabilization residues, oil and grease, and trash and debris, that could contaminant runoff or receiving waters. In addition, bridges and roadways modifications across water courses would be required. Construction disturbances and dredging would have an adverse impact on turbidity, affecting receiving water quality, particularly for receiving waters listed as impaired for sediment/siltation.

Transportation network improvements under the proposed Plan would also increase the amount of impervious surface area in the region, such as new paved areas. New impervious surfaces including freeways, roadways, and parking lots would convey common urban pollutants to landscaped areas. The primary source of water pollution from transportation infrastructure is vehicles and associated oil and grease, metals, sediment, hydrocarbons, trash and debris. The main pollutants associated with railway are PAHs, heavy metals, and herbicides. Runoff would transport pollutants via local storm drain systems. If not properly managed, pollutants in runoff discharged from local storm drain systems could adversely affect surface water quality. In general, bicycle improvements projects would not collect the same type of pollutants as transportation facilities used by vehicles. Therefore, runoff from such improvements would not discharge vehicle-related pollutants into storm drains and receiving waters.

As shown in Table 4.10-5, a variety of transportation network improvements proposed for 2035 cross 303(d)-listed water bodies. Most improvements would occur in areas that are already highly developed with impervious surfaces or are improvements to existing facilities, including the addition of managed lanes (ML) and managed lane connectors (MLC) to the I-5, I-15, and I-805, among others, each of which cross one or more 303(d)-listed water bodies. The 2035 phase also includes a major new commuter rail line (Route 582) between National City and Sorrento Mesa, which crosses four 303(d)-listed water bodies. Other improvements include a number of active transportation improvements on existing streets in urban areas and along rivers and creeks listed as impaired on the 303(d) list.

Compliance with applicable regulatory requirements described in the 2025 analysis and in Section 4.10.2 would require that pre-development hydrology be maintained after construction and treatment of runoff to substantially reduce or eliminate the discharge of pollutants to storm drain systems and receiving waters. Although these regulations would evolve and change, compliance would ensure impacts on surface water are less than significant as each project is designed, analyzed, and permitted for construction. For projects that discharge to 303(d)-listed impaired water bodies, BMPs would be required that target the removal of the pollutants causing the impairment. Implementation of BMPs would also ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the basin plan. Transportation network improvements and programs associated with the proposed Plan would not substantially degrade water quality in violation of applicable water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is therefore less than significant.

Table 4.10-5
Planned Transportation Network Improvements Crossing 303(d)-listed Water Bodies by 2035

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Complete Corridor: ML/Goods Movement	I-5 (SR 905 to H Street)	Telegraph Canyon Creek	18070304
Complete Corridor: ML/Goods Movement	I-5 (H Street to Pacific Highway)	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		San Diego River (Lower)	18070304
Complete Corridor: ML/Goods Movement	I-805 (Palm Avenue to H Street)	Telegraph Canyon Creek	18070304
Complete Corridor: ML/Goods Movement	I-5 (Pacific Highway to SR 52)	Rose Creek	18070304
		Tecolote Creek	18070304
Complete Corridor: ML/Goods Movement	I-5 (SR 52 to I-805)	Rose Creek	18070304
		Tecolote Creek	18070304
Complete Corridor: ML/Goods Movement	I-5 (SR 52 to I-805)	Rose Creek	18070304
		Tecolote Creek	18070304
Complete Corridor: ML/Goods Movement	I-15 (I-5 to I-805)	Chollas Creek	18070304
Complete Corridor: ML/Goods Movement	I-15 (I-8 to SR 163)	San Diego River (Lower)	18070304
Complete Corridor: ML/Goods Movement	I-805 (H Street to I-15)	Paleta Creek	18070304
		Telegraph Canyon Creek	18070304
Complete Corridor: ML/Goods Movement	I-805 (I-15 to I-8)	San Diego River (Lower)	18070304
Complete Corridor: ML/Goods Movement	I-805 (Balboa Avenue to NB Bypass Lane)	Carroll Canyon	18070304
		Rose Creek	18070304
Complete Corridor: ML	SR 78 (I-5 to Twin Oaks)	Buena Creek	18070303
		Buena Vista Creek	18070303
		San Marcos Creek	18070303
Complete Corridor: ML	SR 163 (I-8 to I-805)	San Diego River (Lower)	18070304
Complete Corridor: ML	SR 52 (I-15 to Mast Boulevard)	Forester Creek	18070304
		San Diego River (Lower)	18070304
Complete Corridor: MLC	I-5 (I-805)	Los Penasquitos Creek	18070304
		Soledad Canyon	18070304
Complete Corridor: MLC	I-5 (SR 15)	Chollas Creek	18070304
Complete Corridor: MLC	I-805 (I-8)	San Diego River (Lower)	18070304
Transit Leap	Commuter Rail 582	Carroll Canyon	18070304
		Paleta Creek	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Transit Leap/Goods Movement	Commuter Rail 398	San Luis Rey River, Lower (west of Interstate 15)	18070303
Transit Leap	LRT 399	Buena Creek	18070303
		Buena Vista Creek	18070303
		Escondido Creek	18070303
		Loma Alta Creek	18070303
		San Marcos Creek	18070303
Transit Leap/Goods Movement	LRT 510	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		Telegraph Canyon Creek	18070304
Active Transportation	Coastal Rail Trail Del Mar	San Dieguito River	18070304
Active Transportation	Coastal Rail Trail Oceanside – Alta Loma Marsh bridge	Loma Alta Creek	18070303
		Loma Alta Slough	18070303
Active Transportation	Coastal Rail Trail San Diego – Carmel Valley to Roselle via Sorrento	Los Penasquitos Creek	18070304
		Soledad Canyon	18070304
Active Transportation	Coastal Rail Trail San Diego – Mission Bay (Clairemont to Tecolote)	Tecolote Creek	18070304
Active Transportation	I-15 Bikeway – Camino del Rio South to Rancho Mission Road	San Diego River (Lower)	18070304
Active Transportation	Inland Rail Trail: Oceanside	Loma Alta Creek	18070303
Active Transportation	San Diego River Bikeway Connections	San Diego River (Lower)	18070304
Active Transportation	San Diego River Trail – Mast Park to Lakeside baseball park	San Diego River (Upper)	18070304
Active Transportation	San Diego River Trail – Rancho Mission Road to Camino Del Rio North	San Diego River (Lower)	18070304
Active Transportation	Santee – El Cajon Corridor	Forester Creek	18070304
Local Improvements – RAS	College Boulevard Reach A	Agua Hedionda Creek	18070303
Local Improvements – RAS	Palm Avenue/Interstate 805 Interchange	Poggi Canyon Creek	18070304

2035 Conclusion

Implementation of regional growth and land use changes and transportation network improvements associated with the proposed Plan would not substantially degrade water quality in violation of existing standards and WDRs or conflict with a water quality control plan or its implementation because compliance with detailed existing and evolving regulatory requirements would substantially lessen or eliminate the discharge of pollutants into receiving waters, including 303(d)-listed waters, during construction and operations. Therefore, this impact (HWQ-1) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

As discussed in the 2025 and 2035 analyses, construction associated with regional growth and land use change under the proposed Plan would generate pollutants. Construction-related earth disturbing activities would result in short-term water quality impacts associated with soil erosion and subsequent sediment transport to adjacent properties or watercourses via storm drains. Development under the proposed Plan would also increase the amount of impervious surface area in the region, such as new building rooftops and paved areas. The new impervious surface areas would collect common urban pollutants such as sediment, oil and grease, metals, nutrients, and trash and debris. Development under the proposed Plan would also increase the amount of managed landscaping areas in the region that would provide a source of nutrients, weed abatement herbicides, and irrigation runoff.

Most development by 2050 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. Approximately 78 percent of the forecasted regional population increase between 2036 and 2050 is in the City of San Diego (37 percent), the City of Chula Vista (28 percent), and the City of San Marcos (13 percent). Similarly, these three jurisdictions accommodate approximately 89 percent of new housing units and 72 percent of new jobs between 2036 and 2050. Infill and redevelopment would incrementally increase the amount of impervious surface area in existing urban and suburban communities. Conversely, the limited development forecasted on vacant land, open space, and agricultural land would cause greater increases in impervious surfaces (and polluted runoff) than infill and redevelopment.

Increases in the amount of impervious surfaces and landscaped areas would generally result in the accumulation, exposure, and transport of additional pollutants. Runoff during storm events and non-stormwater flows would transport pollutants via storm drain systems and could adversely affect surface water quality if not properly managed. Several creeks and coastal lagoons have existing water quality impairments, therefore any increase in pollutant concentrations from new development would impact water quality, particularly for waterbodies listed as impaired under CWA Section 303(d). However, pollutant types and concentrations in runoff would depend on numerous site and location-specific factors, as described in the 2025 analysis.

Compliance with regional, State, and federal water quality regulations would ensure that the increased runoff volume and pollutant generation from development are addressed. Development associated with forecasted regional growth and land use change under the proposed Plan would be subject to regulatory requirements that substantially reduce surface water quality impacts during construction and post-construction. Construction BMPs that reduce erosion and subsequent sediment transport such as silt fences, fiber rolls, sandbags, gravel bag berm, and drainage inlet protection would be implemented during construction activities in compliance with the SWPPP and Construction General Permit. Implementation of BMPs would also ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the basin plan.

During operations and maintenance of development projects, post-construction practices would be implemented and maintained to substantially reduce stormwater pollution and prevent substantial water quality degradation as required by applicable regulations including the Municipal Stormwater Permit). Post-construction BMPs are listed in the 2025 analysis.

As discussed in the 2025 and 2035 analyses, regional growth and land use change associated with the proposed Plan would also contribute additional demand for wastewater treatment, which would increase wastewater discharges (i.e., residential, commercial, and industrial) from regional wastewater treatment plants (e.g., Point Loma WWTP and Ocean Outfall, North City WRP, and South Bay WRP). Treated wastewater from regional wastewater treatment plants is discharged to surface waters, including the Pacific Ocean. NPDES permits govern the discharge of water from wastewater treatment plants to surface waters. As discussed earlier, the recent NPDES permit renewal for the Point Loma WWTP under the proposed Pure Water San Diego concept specifies new and improved joint water/wastewater facilities that would divert approximately 83 mgd of wastewater from the plant's wastewater stream in the form of potable reuse water by the end of 2035 (City of San Diego 2015a). Although the proposed Pure Water San Diego program calls for new potable water reclamation to reduce capacity concerns, smaller regional collection systems and treatment facilities in areas of increased growth would require expansion to ensure adequate capacity in 2050 (see Section 4.15), while also protecting surface, ground, and marine water resources (i.e., outfall discharge areas). Development in existing communities would require expansion or upsizing of existing collection and treatment systems, while development in new areas would require installation of new collection and treatment systems. These wastewater treatment facility/infrastructure expansion actions would be required to comply with evolving point-source-discharge NPDES permits, as well as applicable NPDES general permits and assorted local regulations to minimize impacts on receiving waters. Ongoing marine water quality monitoring programs would ensure water quality are not adversely impacted by wastewater discharges.

Compliance with applicable regulatory requirements outlined above and in Section 4.10.2 would require that pre-development hydrology be maintained after construction is completed; runoff would be treated to remove or substantially reduce pollutants before discharging to surface waters. For projects that discharge to 303(d)-listed impaired water bodies, mandatory BMPs would be implemented to substantially lessen the quantity of pollutants causing the impairment from leaving the site and entering the impaired water body. Wastewater discharges would be in compliance with applicable NPDES permit requirements. Therefore, regional growth and land use change associated with the proposed Plan would not substantially degrade water quality in violation of water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is less than significant.

Transportation Network Improvements and Programs

As described in the 2025 and 2035 analyses, transportation infrastructure contributes to water quality impacts during construction and operations. Construction activities associated with transportation network improvements would increase erosion and subsequent sediment transport to adjacent properties, roadways, or watercourses via storm drains. Construction activities could also generate pollutants that could contaminant impact runoff or receiving waters. In addition, as bridges and roadways modifications across water courses would be required. Construction disturbances and dredging would have an adverse impact turbidity, affecting receiving water quality, particularly receiving waters listed as impaired for sediment/siltation.

Transportation network improvements under the proposed Plan would also increase the amount of impervious surface area in the region, such as new paved areas. New impervious surfaces including freeways, roadways, and parking lots would convey common urban pollutants to landscaped areas. The primary source of water pollution from transportation infrastructure is vehicles and associated oil and grease, metals, sediment, hydrocarbons, trash and debris. The main pollutants associated with railway are PAHs, heavy metals, and herbicides. Runoff would transport pollutants via local storm drain systems. If not properly managed, pollutants in runoff discharged from local storm drain systems could adversely affect surface water quality. In general, bicycle improvements projects would not collect the same type of pollutants as transportation facilities

used by vehicles. Therefore, runoff from such improvements would not discharge vehicle-related pollutants into storm drains and receiving waters.

As shown in Table 4.10-6, several planned transportation network improvements by 2050 cross 303(d)- listed water bodies. Most improvements would occur in areas that are already highly developed with impervious surfaces or are improvements to existing facilities, including the addition of managed lanes to the I-5, I-805, SR 52, SR 54, and SR 125, each of which cross multiple 303(d)-listed water bodies. Transit Leap improvements such as new Commuter Rail routes from National City to the U.S. Border (Route 582 [Extension]) and the Central Mobility Hub to the U.S. Border (Route 583) would also cross 303(d)-listed water bodies. Finally, like other phase years, a number of active transportation improvements would be located on existing streets in urban areas and along rivers and creeks listed as impaired on the 303(d) list.

Compliance with applicable regulatory requirements described in the 2025 analysis and in Section 4.10.2 would require that pre-development hydrology be maintained after construction and treatment of runoff to substantially reduce or eliminate the discharge of pollutants to storm drain systems and receiving waters. Although these regulations would evolve and change, compliance would ensure impacts on surface water are less than significant as each project is designed, analyzed, and permitted for construction. For projects that discharge to 303(d)-listed impaired water bodies, BMPs would be required that target the removal of the pollutants causing the impairment. Implementation of BMPs would also ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater, as defined in the basin plan. Transportation network improvements and programs associated with the proposed Plan would not substantially degrade water quality in violation of applicable water quality standards or WDRs or conflict with a water quality control plan or its implementation. This impact is therefore less than significant.

Table 4.10-6
Planned Transportation Network Improvements Crossing 303(d)-listed Water Bodies by 2050

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Complete Corridor: ML/Goods Movement	I-5 (Cassidy Street to Harbor Drive)	Loma Alta Creek	18070303
		San Luis Rey River, Lower (west of Interstate 15)	18070303
Complete Corridor: ML/Goods Movement	I-5 (Harbor Drive to County Line)	San Mateo Creek	18070301
		Santa Margarita River (Lower)	18070302
Complete Corridor: ML/Goods Movement	I-5 (SR 56 to Via de La Valle)	Batiquitos Lagoon	18070303
		Buena Vista Creek	18070303
		Buena Vista Lagoon	18070303
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		San Marcos Creek	18070303
Complete Corridor: ML/Goods Movement	I-5 (Via de La Valle to La Costa)	Batiquitos Lagoon	18070303
		Buena Vista Creek	18070303
		Buena Vista Lagoon	18070303
		San Dieguito River	18070304

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
		San Elijo Lagoon	18070303
		San Marcos Creek	18070303
Complete Corridor: ML/Goods Movement	I-5 (La Costa to Cassidy Street)	Batiquitos Lagoon	18070303
		Buena Vista Creek	18070303
		Buena Vista Lagoon	18070303
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		San Marcos Creek	18070303
Complete Corridor: ML/Goods Movement	I-805 (SR 905 to Palm Avenue)	Poggi Canyon Creek	18070304
Complete Corridor: ML/Goods Movement	I-805 (Palm Avenue to H Street)	Poggi Canyon Creek	18070304
Complete Corridor: ML/Goods Movement	I-15 (Valley Parkway to SR 76)	Keys Creek	18070303
		Moosa Canyon Creek	18070303
		Rainbow Creek	18070302
		San Luis Rey River, Upper (east of Interstate 15)	18070303
Complete Corridor: ML	SR 52 (I-5 to I-805)	Rose Creek	18070304
Complete Corridor: ML	SR 125 (SR 905 to SR 54)	Poggi Canyon Creek	18070304
		Sweetwater River, Lower (below Sweetwater Reservoir)	18070304
		Telegraph Canyon Creek	18070304
Complete Corridor: MLC	I-805 (I-8)	San Diego River (Lower)	18070304
Complete Corridor: MLC	I-805 (I-8)	San Diego River (Lower)	18070304
Complete Corridor: Connector	I-5 (I-8)	San Diego River (Lower)	18070304
Transit Leap	Commuter Rail 583	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		San Diego Bay	18070304
		San Diego Bay Shoreline, Downtown Anchorage	18070304
		Telegraph Canyon Creek	18070304
Transit Leap/Goods Movement	Commuter Rail 398	Los Penasquitos Creek	18070304
		Soledad Canyon	18070304
Transit Leap/Goods Movement	LRT 510	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		Telegraph Canyon Creek	18070304

Improvement Type	Description	Impaired Water Body	Hydrologic Unit #
Transit Leap	Commuter Rail 582	Paradise Creek, HSA 908.320	18070304
		Telegraph Canyon Creek	18070304
Active Transportation	Encinitas to San Marcos Corridor – Double Peak Drive to San Marcos Boulevard	San Marcos Creek	18070303
Active Transportation	Encinitas to San Marcos Corridor – Leucadia Boulevard to El Camino Real	Encinitas Creek	18070303
Active Transportation	I-15 Bikeway – Murphy Canyon Road to Affinity Court	Carroll Canyon	18070304
		Rose Creek	18070304
Active Transportation	San Luis Rey River Trail	Green Canyon Creek	18070303
		Keys Creek	18070303
		San Luis Rey River, Lower (west of Interstate 15)	18070303
Active Transportation	SR 125 Connector – Bonita Road to U.S.–Mexico Border	Poggi Canyon Creek	18070304
		Telegraph Canyon Creek	18070304
Active Transportation	SR 52 Bikeway – I-5 to Santo Road	Rose Creek	18070304
Active Transportation	SR 52 Bikeway – SR 52/Mast Drive to San Diego River Trail	San Diego River (Lower)	18070304

2050 Conclusion

Implementation of regional growth and land use changes and transportation network improvements associated with the proposed Plan would not substantially degrade water quality in violation of existing standards and WDRs or conflict with a water quality control plan or its implementation because compliance with detailed existing and evolving regulatory requirements would substantially lessen or eliminate the discharge of pollutants into receiving waters, including 303(d)-listed waters, during construction and operations. Therefore, this impact (HWQ-1) in the year 2050 is less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change impacts in the San Diego region related to surface water and groundwater quality as described in Section 4.10.1, the proposed Plan would not exacerbate climate change effects on surface water and groundwater quality if development and transportation projects implementing the proposed Plan remain in compliance with existing and evolving regulatory requirements.

HWQ-2 SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF AN AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER OR THROUGH THE ADDITION OF IMPERVIOUS SURFACES, IN A MANNER WHICH WOULD RESULT IN SUBSTANTIAL EROSION OR SILTATION ON- OR OFF-SITE

ANALYSIS METHODOLOGY

If an alteration occurred in a manner that would result in substantial erosion or siltation on- or off site, implementation of the proposed Plan would result in a significant impact. The implementation of land use changes leading to future development and transportation network improvement projects under the proposed Plan would alter existing topography and drainage patterns and could increase stormwater runoff volume and rates as a result of increased impervious area. The proposed Plan would be qualitatively evaluated for adherence to maintaining pre-development hydrology, properly minimizing and treating project runoff, and appropriate incorporation of LID site design are analyzed to assess resulting impacts associated with erosion and siltation. Implementation of the proposed Plan would have a significant impact related to the existing drainage pattern if implementation were to substantially increase erosion or siltation on- or off site.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change

Regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural (i.e., undeveloped) landscape. From 2016 to 2025, the region is forecasted to increase by 161,338 people (4.8 percent), 97,661 housing units (8 percent), and 115,328 jobs (7 percent). Approximately 78.8 percent of the 2025 population growth would occur within the City of San Diego, City of Chula Vista, and City of Escondido. Most development between 2016 and 2025 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. Infill and redevelopment would incrementally increase the amount of impervious surface area in existing urban and suburban communities. However, development forecasted on vacant land, open space, and agricultural land, mainly in rural areas in San Diego County, would cause greater increases in impervious surfaces than infill and redevelopment, resulting in alterations to existing drainage patterns. Forecasted regional growth and land use change in the coastal areas of the region, including parts of the City of San Diego, would be located on soils that are unstable or that may become unstable making them more susceptible to erosion as a result of the development. Forecasted regional growth and land use change in the desert portion of the region, including parts of San Diego County and extending into Imperial and Riverside Counties would be located on undeveloped land with soils susceptible to erosion as a result of the development. In addition, development under the proposed Plan would occur on or adjacent to steep slopes, which would increase erosion and sediment discharge if disturbed slopes are unstable.

Such changes would be closely regulated by the federal, State, and local laws described earlier. Impacts resulting from construction would be primarily addressed through compliance with the Construction General Permit as discussed in Impact HWQ-1. A SWPPP would be implemented for any ground disturbance greater than one acre and would identify the sources of pollutants that may affect the quality of stormwater and would include construction site BMPs to control erosion and minimize pollutants (e.g., sedimentation/siltation) in runoff.

During operations and maintenance, development projects would maintain pre-development hydrology in compliance with current hydromodification requirements of the Municipal Stormwater Permit (Order R9- 2013-0001). Although these regulations would evolve over time, their intent would remain in effect and serve to mitigate or otherwise control increased stormwater flows and erosion in an effort to maintain pre-

development hydrology. Therefore, any additional runoff volumes and peak flow discharges from impervious areas, such as new building rooftops and paved areas, must be attenuated such that drainage or conveyance capacities are not adversely impacted. As a result, runoff for post-construction operations would be required to be mitigated and treated through LID, onsite design, and/or offsite structural BMPs. Detailed hydrologic and hydraulic calculations for proposed stormwater treatment measures, such as storm drains and for sizing of rock riprap energy dissipaters at storm drains to reduce storm runoff to non-erosive velocities, would be required. LID and incorporation of natural spaces, such as detention basins, infiltration strips, and porous paving, that reduce, infiltrate, and manage stormwater runoff flows would be required for all new developments. These measures would be required to be properly sized and engineered to substantially lessen runoff from development thereby avoiding substantial erosion or siltation on- or off site.

By incorporating these prescriptive design standards in compliance with regulatory requirements into development projects associated with regional growth and land use change, surface runoff patterns and erosive flows would be controlled. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns such that erosion or siltation on- or off site would increase by 2025. This impact is less than significant.

Transportation Network Improvements and Programs

The proposed transportation network improvements (e.g., highway, arterial, transit, and bicycle) would result in alterations to drainage patterns without the incorporation of the appropriate BMPs. By 2025, additional transportation network improvements and programs would be developed, including new Managed Lanes on I-5 from Manchester Avenue to Vandegrift, new toll lanes on SR 11 to the Otay Mesa Port of Entry (POE), Interchange and Arterial Operational improvements at SR 94 and SR 125, Otay Mesa POE Commercial Vehicle Enforcement Facility (CVEG) modernization, pilot programs for streamlining commercial vehicle operations for reducing wait times at the Otay Mesa POE, improvements to the Otay Mesa POE southbound truck route, including Otay Truck Route and La Media Road, and tolling equipment and Regional Border Management System investments on SR 11. There also would be over 25 improvements to local arterial streets at locations throughout the region, including widenings and extensions of existing roadways, new or replaced bridges, and realignments. Major Transit Leap improvements would include double- tracking at certain locations on the Los Angeles–San Diego–San Luis Obispo (LOSSAN) rail corridor along with a station addition in the Gaslamp Quarter, San Diego. Some of these improvements and programs may involve major grading or earthwork resulting in temporary changes to existing drainage patterns during construction. Grading and recontouring would be dependent on project alignments, existing topography, and the size/extent of runoff conveyance systems. While most of the transportation network improvements would occur in already urbanized areas, some improvements, mainly in San Diego County, would occur on vacant land and would cross natural drainage areas. Impacts on both upstream and downstream resources result from alterations to streams, rivers, and floodways, such as increases in impervious areas and the construction of bridge pilings. The introduction of new or expanded bridge pilings can cause scouring and changes in the transportation and deposition of sediment both upstream and downstream. Impervious areas increase stormwater flow volume and/or velocity, thereby increasing scouring and erosion in channels. As with regional growth and land use changes, the transportation network improvements in place by 2025 that are located in, on, or near hills, coastal areas, canyons, and other places with steep slopes or unstable soils, including parts of the City of San Diego, would increase the potential for erosion.

Current design practices employed in accordance with local hydromodification management plans (HMPs); Caltrans standards; and other related regulations and programs, including Federal Highway Administration

(FHWA), Federal Transit Administration (FTA), and Caltrans policies on adapting to climate change, sea-level rise, and flooding, require that engineered conveyances (whether hardscaped or soft bottom) integrate energy dissipation protection, streambank erosion protection, bridge pier scour protection, and other suitable design controls to eliminate or substantially reduce erosion and transport of sediment or silt to downstream areas. By incorporating these standard engineering practices and complying with regulatory requirements such as the Construction General Permit, Municipal Stormwater Permit, and the Caltrans NPDES Permit, on- and offsite erosion would be avoided or substantially reduced.

In areas with highly erosive soils, additional site design controls would be used to ensure stabilization under a variety of storm intensities. By incorporating these types of prescriptive design standards in compliance with regulatory requirements, surface runoff patterns, and erosive flows associated with transportation network improvements would be controlled. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion or siltation would increase by 2025. This impact is less than significant.

2025 Conclusion

Compliance with regulatory requirements and implementation of similar design measures described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion or siltation would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff such that on- or offsite flooding would not occur. Therefore, this impact (HWQ-2) in the year 2025 is less than significant.

2035

Regional Growth and Land Use Change

Similar to 2025, regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural, undeveloped landscape. Most development by 2035 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. From 2026 to 2035, the region is forecasted to increase by 149,500 people (4.3 percent), 121,650 housing units (9.4 percent), and 159,728 jobs (9 percent). Approximately 78 percent of the 2035 population growth would occur in the City of San Diego and City of National City. Infill and redevelopment would incrementally increase the amount of impervious surface area in existing urban and suburban communities. Conversely, development forecasted on vacant land, open space, and agricultural land, mainly in the County of San Diego, would cause greater increases in impervious surfaces than infill and redevelopment. Impacts would be greater by 2035 than by 2025 as more development or redevelopment activities would occur in coastal communities, desert portions of the region, or near areas with canyons and hills, including parts of the City of San Diego.

Such changes would be closely regulated by the federal, State, and local laws described earlier. Plan related projects would need to comply with a variety of regulatory requirements for controlling erosion and siltation, depending upon the type of project, and design standards and other applicable regulations would serve to reduce impacts. Altered surface runoff drainage patterns would require adequate controls for scour protection

and other drainage stabilization needs. Construction impacts would generally be addressed through compliance with the Construction General Permit. A SWPPP would be implemented for any ground disturbance greater than one acre. The SWPPP requires implementation of construction site BMPs to minimize temporary changes to existing drainage patterns and to properly control and minimize runoff.

Following construction completion, development projects would be required to maintain pre-development hydrology in compliance with hydromodification requirements similar to those currently prescribed in the Municipal Stormwater Permit (Order R9-2013-0001). Runoff for operations would be required to be mitigated and treated through recommended LID, site design, and/or structural BMPs. As with 2025 requirements, LID measures such as detention basins, infiltration strips, and porous paving for development projects would be mandatory to mitigate stormwater runoff impacts. These measures would reduce or avoid hydromodification effects, and erosion impacts. By incorporating these prescriptive design standards in compliance with regulatory requirements into development projects associated with regional growth and land use change, surface runoff patterns and erosive flows would be controlled. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns such that erosion and siltation would increase by 2035. This impact is less than significant.

Transportation Network Improvements and Programs

Similar to the 2025 analysis, the proposed transportation network improvements would result in alterations to drainage patterns without the incorporation of appropriate BMPs. Some of these improvements and programs may involve major grading or earthwork resulting in temporary or permanent changes to existing drainage patterns. While most of the transportation network improvements would occur in already urbanized areas, some improvements, mainly in the County of San Diego, would occur on vacant land, increasing impervious surface areas, stormwater flow volume and/or velocity, and scouring and erosion in channels. Transportation network improvements, such as the addition of Managed Lanes and general purpose lanes, would occur in areas of unstable soils, particularly improvements located in hilly or coastal areas, such as the Managed Lanes along the I-5, making these areas more susceptible to erosion. Specific transportation facilities located in areas prone to unstable soils include coastal projects or expansion of rail through coastal areas or canyons. The Central Mobility Hub and San Ysidro Mobility Hub projects are not expected to be located in areas prone to unstable soils. Transportation network improvements in place by 2035 are shown in Figures 2-16 and 2-19. Required design standards for transportation development would apply. By incorporating the required design standards and complying with all applicable regulations, changes to surface runoff patterns, drainage patterns, and runoff flows would be substantially lessened. Required design practices (e.g., municipal HMPs, Caltrans standards, FHWA, FTA) mandate that engineered conveyances (whether hardscaped or soft bottom) integrate energy dissipation protection, streambank erosion protection, bridge pier scour protection, and other suitable design controls to eliminate or substantially lessen erosion and the transport of sediment or silt to downstream areas.

By incorporating these types of prescriptive design standards in compliance with regulatory requirements, surface runoff patterns and erosive flows associated with transportation network improvements would be controlled. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion and siltation would increase by 2035. This impact is less than significant.

2035 Conclusion

Compliance with regulatory requirements and implementation of similar design measures described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion and siltation would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff. Therefore, this impact (HWQ-2) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

Similar to the 2025 and 2035 analyses, regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural, undeveloped landscape. Most development by 2050 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. From 2036 to 2050, the region is forecasted to increase by 125,725 people (3.4 percent), 61,433 housing units (4.3 percent), and 164,843 jobs (8.5 percent). Approximately 78 percent of the 2050 population growth would occur in the City of San Diego, City of Chula Vista, and City of San Marcos. Infill and re-development would incrementally increase the amount of impervious surface area in existing urban and suburban communities. Conversely, development forecasted on vacant land, open space, and agricultural land, mainly in the County of San Diego, would cause greater increases in impervious surfaces than infill and redevelopment. Forecasted regional growth and land use change in the coastal areas of the region or near areas with canyons and hills, including parts of the City of San Diego, would increase erosion and sediment discharge if disturbed slopes are unstable. However, Plan related projects would need to comply with a variety of regulatory requirements for controlling erosion, siltation, and floodwater, as well as design standards and other applicable regulations to reduce impacts. Construction impacts would generally be addressed through compliance with the Construction General Permit. For projects disturbing more than 1 acre, a SWPPP and associated BMPs would be implemented to control and minimize runoff.

Operations and maintenance for development projects would be required to maintain pre-development hydrology in compliance with enforced hydromodification requirements, similar to requirements in the Municipal Stormwater Permit (Order R9-2013-0001), which would require LID, onsite design, and/or offsite structural BMPs. These measures would substantially reduce runoff rates and volumes such that impacts associated with erosion would be avoided or minimized.

By incorporating design standards in compliance with regulatory requirements into development projects associated with regional growth and land use change, surface runoff patterns, and erosive flows would be controlled. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns such that erosion and siltation would increase by 2050. This impact is less than significant.

Transportation Network Improvements and Programs

Similar to 2025 and 2035 analyses, the proposed transportation network improvements by 2050 would result in impacts on drainage patterns without the incorporation of the appropriate BMPs. Transportation facilities that would alter existing drainage patterns include improvements near the coast, and improvements to highways that would involve grading. While most of the transportation network improvements would occur in already urbanized areas, some improvements, mainly in the County of San Diego, would occur on vacant land, increasing impervious surface areas, stormwater flow volume and/or velocity, and scouring and erosion in channels. Similar to the 2025 and 2035 analyses, transportation network improvements would occur in areas with unstable soils, particularly improvements located in hilly or coastal areas such as the Coastal Rail Trail improvements, making these areas more susceptible to erosion. Transportation network improvements in place by 2050 are shown in Figures 2-17 and 2-20. Transportation network improvements and programs proposed under the proposed Plan would be required to conform to and comply with water quality protection regulations and, as such, would employ necessary erosion protection and siltation control into their respective designs. Changes to surface runoff patterns, drainage patterns, and flows would be substantially less as a result. Required design practices (e.g., municipal HMPs, Caltrans standards, FHWA, FTA) would be implemented to eliminate or substantially reduce increased risk of erosion and siltation.

By incorporating design standards in compliance with regulatory requirements, surface runoff patterns, and erosive flows associated with transportation network improvements would be controlled. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion and siltation would increase by 2050. This impact is less than significant.

2050 Conclusion

Compliance with regulatory requirements and implementation of similar design measures described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns such that erosion and siltation would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff. Therefore, this impact (HWQ-2) in the year 2050 is less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change impacts related to alteration of drainage patterns as described in Section 4.10.1, the proposed Plan would not exacerbate climate change effects on drainage patterns if development and transportation projects implementing the proposed Plan remain in compliance with existing and evolving regulatory requirements controlling erosion and siltation, as well as design standards (i.e., hydromodification and LID measures) and other applicable regulations to reduce impacts.

HWQ-3 SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF AN AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER OR THROUGH THE ADDITION OF IMPERVIOUS SURFACES, IN A MANNER WHICH WOULD (I) SUBSTANTIALLY INCREASE THE RATE OR AMOUNT OF SURFACE RUNOFF IN A

MANNER WHICH WOULD RESULT IN FLOODING ON- OR OFF-SITE OR (II) IMPEDE OR REDIRECT FLOOD FLOWS

ANALYSIS METHODOLOGY

If an alteration occurred in a manner that would result in substantial flooding on- or off site or in the impediment or redirection of flood flows, implementation of the proposed Plan would result in a significant impact. The land use changes leading to future development and transportation network improvement projects under the proposed Plan would alter existing topography and drainage patterns and could increase stormwater runoff volume and rates due to increased impervious area. Land use development generally alters drainage patterns by redistributing runoff that is discharging to waterbodies (hydromodification) while linear transportation projects can result in direct modifications to waterbodies through new and modified water crossing structures (e.g., bridges and culverts). Therefore, hydromodification and increased flood risks from modified water crossings or impeded or redirected flood flows would be qualitatively evaluated for impacts under the proposed Plan. The proposed Plan is qualitatively evaluated for maintaining pre-development hydrology, properly minimizing and treating project runoff, and incorporating LID site design, and then analyzed to assess any resulting impacts associated with flooding. Implementation of the proposed Plan would have a significant impact related to the existing drainage pattern if it were to substantially increase flooding on- or off site or cause the impediment or redirection of flood flows.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change

As discussed in Impact HWQ-2, regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural (i.e., undeveloped) landscape. Development forecasted on vacant land, open space, and agricultural land, mainly in rural areas in San Diego County, would cause greater increases in impervious surfaces than infill and redevelopment, resulting in alterations to existing drainage patterns and an increase in potential for flooding, impeded, or redirected flood flows.

Potential flooding impacts resulting from construction would be primarily addressed through compliance with the Construction General Permit and the requirement to develop a SWPPP as discussed in Impact HWQ-1. These would require the implementation of BMPs during construction to minimize runoff from the construction site and reduce the potential for any on- or offsite flooding. During operations and maintenance, development projects would maintain pre-development hydrology in compliance with current hydromodification requirements of the Municipal Stormwater Permit (Order R9- 2013-0001) as discussed in Impact HWQ-2. Runoff from post-construction operations would be required to be mitigated and treated through LID, onsite design, and/or offsite structural BMPs. LID and incorporation of natural spaces, such as detention basins, infiltration strips, and porous paving that reduce, infiltrate, and manage stormwater runoff flows, would be required for all new developments. These measures would be required to be properly sized and engineered to substantially lessen runoff from development, thereby avoiding adverse hydromodification and flooding impacts. In addition, the contractor would comply with the minimum construction BMPs identified in the Regional MS4 Permit and implement construction BMPs to manage stormwater runon and runoff from individual construction sites. Therefore, the proposed Project would not result in construction impacts associated with impeding or redirecting flood flows.

By incorporating these prescriptive design standards in compliance with regulatory requirements into development projects associated with regional growth and land use change, surface runoff patterns and flooding would be controlled. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology and would not substantially or impede or redirect flood flows. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns such that flooding on- or off site would increase by 2025. This impact is less than significant.

Transportation Network Improvements and Programs

As discussed in Impact HWQ-2, transportation network improvements (e.g., highway, arterial, transit, and bicycle) would result in alterations to drainage patterns without the incorporation of the appropriate BMPs. Some of these improvements and programs may involve major grading or earthwork, resulting in temporary changes to existing drainage patterns during construction. Grading and recontouring would be dependent on project alignments, existing topography, and the size/extent of runoff conveyance systems. While most of the transportation network improvements would occur in already urbanized areas, some improvements, mainly in San Diego County, would occur on vacant land and would cross natural drainage areas. Impacts on both upstream and downstream resources result from alterations to streams, rivers, and floodways, such as increases in impervious areas and the construction of bridge pilings. Impervious areas increase stormwater flow volume and/or velocity, thereby increasing the risk of flooding. However, no other structures apart from bridge pilings are anticipated to be added associated with transportation network improvements that could redirect or exacerbate existing flood flows. In addition, the contractor would comply with the minimum construction BMPs identified in the Regional MS4 Permit and implement construction BMPs to manage stormwater runon and runoff from individual construction sites. Therefore, transportation network improvements would not result in impacts associated with impeding or redirecting flood flows.

Current design practices are employed in accordance with local HMPs; Caltrans standards; and other related regulations and programs, including FHWA, FTA, and Caltrans policies on adapting to climate change, sea-level rise, and flooding. Similar engineering standards exist for properly controlling and conveying surface runoff and surface waters when drainage modifications are necessary for project implementation. Caltrans drainage designs would conform to the Highway Design Manual (Caltrans 2019), which requires the following design flood criteria:

- Roadway storm drain system and the freeway shoulder must be able to safely drain the 25-year return interval storm.
- Culverts must be designed to convey the 10-year interval storm (without causing the headwater elevation to rise above the inlet top of the culvert); and convey the 100-year interval storm without headwaters rising above an elevation that would cause objectionable backwater depths or outlet velocities.

The County of San Diego requires transportation projects in unincorporated areas to be designed to convey 50-year design storm peak runoff volumes within the project drainage system and to be capable of conveying 100-year floodwaters without exceeding curb height or damaging structures along the right-of-way (County of San Diego 2014b). In addition, HMP regulations as well as the Municipal Stormwater Permit (Order R9-2013-0001) require that priority development projects maintain pre-development hydrology. As a result, additional runoff volumes and peak flow discharges from impervious areas, such as freeways, must be attenuated to maintain hydrological conditions and not exceed stormwater conveyance capacities. LID is commonly applied to achieve this requirement. By incorporating these types of prescriptive design standards in compliance with regulatory requirements, surface runoff patterns and flooding associated with transportation network

improvements would be controlled. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase by 2025. This impact is less than significant.

2025 Conclusion

Compliance with regulatory requirements and implementation of similar design measures, as described above and in Section 4.10.2, would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff. Therefore, this impact (HWQ-3) in the year 2025 is less than significant.

2035

Regional Growth and Land Use Change

Similar to the 2025 analyses and as discussed in Impact HWQ-2, regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural, undeveloped landscape. Development forecasted on vacant land, open space, and agricultural land, mainly in rural areas in San Diego County, would cause greater increases in impervious surfaces and impeded or redirected flood flows than infill and redevelopment. Impacts would be greater by 2035 than by 2025 as more development or redevelopment activities would occur in coastal communities, desert portions of the region, or near areas with canyons and hills, including parts of the City of San Diego.

Such changes would be closely regulated by the federal, State, and local laws described earlier such as the Construction General Permit, which would require the implementation of BMPs during construction to minimize runoff from the construction site and reduce the potential for any on- or offsite flooding or impeded or redirected flood flows. Following construction completion, development projects would be required to maintain pre-development hydrology in compliance with hydromodification requirements similar to those currently prescribed in the Municipal Stormwater Permit (Order R9-2013-0001). Runoff from operation of future development would be required to be mitigated and treated through recommended LID, site design, and/or structural BMPs. As with 2025 requirements, LID measures such as detention basins, infiltration strips, and porous paving for development projects would be mandatory to mitigate stormwater runoff impacts. These measures would reduce or avoid hydromodification effects and flooding impacts. By incorporating these prescriptive design standards in compliance with regulatory requirements into development projects associated with regional growth and land use change, surface runoff patterns and flooding would be controlled. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase by 2035. This impact is less than significant.

Transportation Network Improvements and Programs

Similar to the 2025 analyses and as discussed in Impact HWQ-2, the proposed transportation network improvements would result in alterations to drainage patterns without the incorporation of appropriate BMPs. Some of these improvements and programs may involve major grading or earthwork, resulting in temporary or permanent changes to existing drainage patterns. By incorporating the required design standards and complying with all applicable regulations, changes to surface runoff patterns, drainage patterns, and runoff flows would be substantially lessened. No structures apart from bridge pilings are anticipated to be added associated with transportation network improvements that could redirect or exacerbate existing flood flows. Required design practices (e.g., municipal HMPs, Caltrans standards, FHWA and FTA policies) mandate that engineered conveyances (whether hardscaped or soft bottom) integrate energy dissipation protection and other suitable design controls to eliminate or substantially lessen flooding risk. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase by 2035. This impact is less than significant.

2035 Conclusion

Compliance with regulatory requirements and implementation of similar design measures, as described above and in Section 4.10.2, would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff such that on- or offsite flooding would not occur. Therefore, this impact (HWQ-3) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

Similar to the 2025 and 2035 analyses and as discussed in Impact HWQ-2, regional growth and land use change associated with the proposed Plan would change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural, undeveloped landscape. Plan-related projects would need to comply with a variety of regulatory requirements for controlling floodwater, as well as design standards and other applicable regulations to reduce flooding impacts. Construction-related flooding impacts would generally be addressed through compliance with the Construction General Permit. For projects disturbing more than 1 acre, a SWPPP and associated BMPs would be implemented to control and minimize runoff, thereby reducing the potential for on- or offsite flooding or impeded or redirected flood flows.

Operations and maintenance for development projects would be required to maintain pre-development hydrology in compliance with enforced hydromodification requirements, similar to requirements in the Municipal Stormwater Permit (Order R9-2013-0001), which would require LID, onsite design, and/or offsite structural BMPs. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain pre-development hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase by 2050. This impact is less than significant.

Transportation Network Improvements and Programs

Similar to the 2025 and 2035 analyses, and as discussed in Impact HWQ-2, the proposed transportation network improvements by 2050 would result in alterations to drainage patterns without the incorporation of the appropriate BMPs. Transportation network improvements and programs proposed under the proposed Plan would be required to conform to and comply with water quality protection regulations and, as such, would employ necessary flood control measures into their respective designs. Changes to surface runoff patterns, drainage patterns, and flows would be substantially less as a result. No structures apart from bridge pilings are anticipated to be added associated with transportation network improvements that could redirect or exacerbate existing flood flows. Required design practices (e.g., municipal HMPs, Caltrans standards, FHWA and FTA policies) would be implemented to eliminate or substantially reduce increased risk of flooding.

By incorporating design standards in compliance with regulatory requirements, surface runoff patterns and flooding associated with transportation network improvements would be controlled. Through the various hydromodification requirements that would be in place, the transportation network improvements would maintain pre-development hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impeded or redirected flood flows such that flood risk would increase by 2050. This impact is less than significant.

2050 Conclusion

Compliance with regulatory requirements and implementation of similar design measures, as described above and in Section 4.10.2, would ensure that regional growth and land use changes as well as transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns or impede or redirect flood flows such that flood risk would increase. Through the various requirements to incorporate hydromodification and LID measures, the proposed Plan would maintain pre-development hydrology, and would reduce, infiltrate, and properly manage stormwater runoff such that on- or offsite flooding would not occur. Therefore, this impact (HWQ-3) in the year 2050 is less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change impacts related to alteration of drainage patterns as described in Section 4.10.1, the proposed Plan would not exacerbate climate change effects on drainage patterns if development and transportation projects implementing the proposed Plan remain in compliance with existing and evolving regulatory requirements controlling surface runoff patterns and floodwater, as well as design standards (i.e., hydromodification and LID measures) and other applicable regulations to reduce impacts, assuming that these requirements incorporate consideration of future climate change projections.

HWQ-4 SUBSTANTIALLY INCREASE RISK OF POLLUTION RELEASE DUE TO INUNDATION OF A FLOOD HAZARD, TSUNAMI, OR SEICHE ZONE.

ANALYSIS METHODOLOGY

Pursuant to the Supreme Court case decision in *California Building Industry Association v. Bay Area Air Quality Management District (2015)* 62 Cal. 4th 369, CEQA generally does not require an analysis of how the existing environmental conditions would affect a project's residents or users unless the project would exacerbate those conditions, such as possible project impacts from an area prone to flooding from tsunami or seiche. If a project would potentially exacerbate the hazard, then factual determination must be whether the exacerbation would or would not be significant, incrementally or cumulatively.

This section analyzes areas proposed for growth and land use change and transportation network improvements that occur near the San Diego region's coastline, which would be subjected to hazards resulting from flooding, tsunamis, or seiches. In addition, this section analyzes inland areas proposed for growth and land use change and transportation network improvements that occur near surface water resources, such as streams and rivers, that are subject to flooding. Flooding, tsunami, and seiche hazard areas from local general plans or other data sources are referenced in this section such that the proposed Plan can be evaluated to determine if any forecasted regional growth and land use change or planned transportation network improvements or programs would occur within the hazard areas identified. Hazard areas associated with seiches include large enclosed or partially enclosed water bodies, such as reservoirs, coastal bays and lakes. Tsunami hazard areas occur along the coastline; however, some areas are protected by the coastal formations and offshore islands. In addition, surface water streams and rivers are also subject to flooding and inundation. Where proposed Plan components may occur within flood, tsunami or seiche zones, appropriate precautions, design standards, and other methods to protect the public and structures are referenced and discussed. Implementation of the proposed Plan would have a significant impact related to flooding, tsunami, and seiche hazard areas if forecasted regional growth and land use change or planned transportation network improvements under the proposed Plan exacerbates the potential for flooding or inundation conditions, resulting in an increased risk of pollutants being released due to inundation.

Seiches and tsunamis are rare events that are typically caused by geologic factors such as earthquakes. As such, it would be rare for a project to exacerbate the issue and result in inundation. A new project that might result in the risk of pollutant release due to inundation would likely be limited to industrial projects that use significant amounts of chemicals in industrial processes or store chemical outdoors that could be washed away in the event of flooding from tsunami or seiche. This section will evaluate the potential for these proposed land use changes to be inundated by flooding and potential risk of release of pollutants. Forecasted regional growth and planned transportation network improvements and programs would not result in an increased risk of pollutants being released due to inundation given that pollutants are unlikely to be stored in large quantities that would result in release during inundation, and therefore are not analyzed further.

IMPACT ANALYSIS

2025

Regional Growth and Land Use Change

Approximately 78.8 percent of the 2016 to 2025 population growth would occur within the City of San Diego, City of Chula Vista, and City of Escondido. Development with project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the Cities of San Diego and Chula Vista. Tsunami inundation areas occur along the entire coastline from the California-Mexico border to north of Oceanside (California Department of Conservation 2013). However, as described in Section 4.10.1, *Existing Conditions,* the risk of tsunamis in the San Diego region is low. In 92 years of record, at least 19 tsunamis have been recorded in the San Diego region, with most only a few tenths of a meter in height. (Agnew 2009). There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of seiches affecting regional growth and land use change development projects would be expected to be low.

Although the risk of tsunami and seiche and the associated risk of pollution release is considered low in the San Diego region, development under the proposed Plan would occur in areas subject to these hazards. During construction activities, stormwater BMPs would be implemented, as required by federal, State, county, and local policies to minimize degradation of water quality associated with stormwater runoff or construction-

related pollutants. Compliance with regional, State, and federal water quality regulations would ensure that the increased runoff volume and pollutant generation from development are addressed. Construction activities and operation would comply with local stormwater ordinances, stormwater requirements established by the Municipal Stormwater Permit, and regional waste discharge requirements. Prior to flood events, measures such as sandbag barriers and gravel bag berms would be implemented and maintained to reduce the risk of pollutant release. Post-construction BMPs and measures to reduce the risk of pollutants in a storm event are discussed under Impact HWQ-1 in the 2025 analysis. Further, runoff for post-construction operations would be managed through LID, onsite design, and/or offsite structural BMPs. As discussed under Impact HWQ-2, LID and incorporation of natural spaces, such as detention basins, infiltration strips, and porous paving, that reduce, infiltrate, and manage stormwater runoff flows would be required for all new developments. These measures would be required to substantially lessen runoff from development thereby avoiding adverse hydromodification and flooding impacts.

Compliance with enforced planning and design standards, regulations, and safety ordinances would serve to address and minimize the release of pollutants due to inundation in a flood hazard, tsunami, or seiche zone. Planning and design of development projects would be required to incorporate safety policies from the County of San Diego General Plan Seismic Safety Element to reduce the risk associated with tsunami or seiche hazards. State planning and zoning law requires a Seismic Safety Element (City of San Diego 2015b) of all City and County General Plans that identifies and appraises hazards including the effects of seismically-induced waves such as tsunamis and seiches. The Seismic Safety Element serves to reduce the risk of hazard resulting from future seismic and related events. The magnitude of seismic risk and associated release of pollutants is related to local seismic conditions as well as implementation of effectiveness measures and practices to reduce the risk of pollutant release. The Seismic Safety Element identifies seismic and other geologic hazards, while offering land-use–related guidelines related to seismic risk zones.

The regional growth and land use changes associated with the proposed Plan that are located within the existing floodplains, including the Cities of San Diego and Chula Vista and the County of San Diego, would be impacted by a 100-year flood if appropriate design measures are not incorporated. Table 4.10-7 shows the land use types within each municipality in the San Diego region that encroach upon the 100-year floodplain for 2025. Each land use type included in the table reflects a parcel whose land use type is proposed to change in the proposed Plan by 2025.

Table 4.10-7
2025 Land Use Types in the 100-year Floodplain

Land Use Type	Municipality
Agriculture	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Commercial and Office	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Education and Institutions	Carlsbad, Chula Vista, El Cajon, Encinitas, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista
Heavy and Light Industry	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista
Military	Coronado, Imperial Beach, National City, County of San Diego, San Diego

Land Use Type	Municipality
Mixed Use	Carlsbad, Chula Vista, Coronado, Del Mar, Escondido, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista
Mobile Homes	Carlsbad, Chula Vista, El Cajon, Escondido, La Mesa, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Vista
Multi-Family Residential	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Open Space Parks	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Marcos, Santee, Solana Beach, Vista
Recreation	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Single Family Residential	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Spaced Rural Residential	Carlsbad, Chula Vista, Del Mar, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista
Transportation, Communications, Utilities	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Under Construction	Carlsbad, Chula Vista, Coronado, Encinitas, Imperial Beach, National City, Oceanside, County of San Diego, San Diego, Santee, Vista
Vacant	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Water	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, Santee, Solana Beach

Source: FEMA 2019.

All drainage designs would be required to conform to the flood control requirements of the applicable jurisdiction. Public drainage facilities in unincorporated areas would be designed to convey the peak discharge of the 50-year flood event within the underground piping and the 100-year flood event to the top of the curb without damage to property adjacent to the right-of-way (County of San Diego 2014a). Culverts in public roads would be designed to convey the peak discharge from the 100-year flood event. Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance) and water quality requirements (e.g. regional waste discharge requirements) would be required for all development projects to minimize flood hazards and associated release of pollutants. Flood ordinances include requirements for reducing flood losses, including restricting uses that 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 floodplains; controlling filling, grading, or dredging that may increase flood damage; and preventing construction of flood barriers that will divert flood waters or increase flood hazards in other areas. Flood ordinances also include design standards for abutments to prevent collapse or lateral movement during a 100-year flood.

Development under the proposed Plan would occur in areas subject to inundation hazards from failure of a dam or levee, including coastal areas within the City of San Diego and areas downstream of Lake Murray, Sweetwater Reservoir, and Lower Otay Lake. Planning and design of development projects would be required to incorporate safety policies from the County of San Diego General Plan Safety Element to reduce the risk of damage associated with dam or levee failure.

Project designs and review approvals would include reference to the Seismic Safety Element, California Department of Conservation maps (California Department of Conservation 2013) showing tsunami inundation areas, FEMA maps, and other pertinent resources to determine at-risk areas such that proposed projects are safely designed in coastal and rough terrain areas. By incorporating the required design standards and complying with all applicable regulations and safety ordinances outlined above and in Section 4.10.2, storm flows would be controlled, substantially reducing flood hazards. Mandatory BMPs would be implemented to manage and substantially reduce pollutant release in a flood event. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the risk of pollutant release due to inundation by flood hazard, tsunami, or seiche would be minimized. Therefore, the regional growth and land use change would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. This impact is less than significant.

Transportation Network Improvements and Programs

Similar to regional growth and land use changes, the transportation network improvements in place by 2025 are located in or near coastal areas. Project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the City of San Diego. However, the risk of tsunamis in the San Diego region is low. There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of seiches and associated risk of pollutant release affecting transportation network improvements would be low. Although the risk of tsunami and seiche is low in the San Diego region, projects would be designed to convey 100-year flood waters, which would also sufficiently convey seiche or tsunami flows within these design parameters. In addition, planning and design of transportation network improvements would be required to incorporate safety policies from the Seismic Safety Element to reduce the risk of property damage associated with tsunami and seiche hazards. Project designs and review approvals would include reference to the Seismic Safety Element, California Department of Conservation maps showing tsunami inundation areas, FEMA maps, and other pertinent resources to determine at-risk areas such that proposed projects are safely designed in coastal areas.

Transportation network improvements within 100-year flood hazard areas, including mostly local roadway and arterial improvements, would be exposed to flood hazards without the appropriate design measures. Table 4.10-8 shows the transportation network improvements planned for 2025 that would encroach upon 100-year floodplains. Design standards and protocols (defined in Section 4.10.2 above) require analysis of floodplain exposure and impacts on people and structures, including flooding that may result from climate change. Design practices employed in accordance with the local HMP; Caltrans standards; and other related regulations and programs, including FHWA, FTA, and Caltrans policies on adapting to climate change, sea-level rise, and flooding, would be required. Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance) would be required for all transportation network improvement projects to minimize public and private losses due to flood conditions. Flood ordinances would include requirements for reducing flood hazards, including restricting uses that are dangerous to health, safety, and property due to erosion or water hazards; requiring uses vulnerable to floods and associated pollutant release to be protected against flood damage at the time of construction; controlling the alteration of natural floodplains; controlling filling, grading, or dredging that may increase flood damage and adverse water quality

impacts; and preventing construction of flood barriers that will divert flood waters or increase flood hazards and conveyance of pollutants to other areas. Flood ordinances also include design standards for abutments to prevent collapse or lateral movement during a 100-year flood.

Any additional runoff and associated pollutants from new or improved transportation facilities would be conveyed to downstream flood control structures while protecting associated waterbodies from adverse water quality impacts. Prior to flood events, measures such as sandbag barriers and gravel bag berms would be implemented and maintained to reduce the risk of pollutant release. Post-construction BMPs would consider natural stormwater quality treatment and would include LID, hydromodification measures, and revegetation efforts. In addition, construction and operations would comply with local stormwater ordinances, stormwater requirements established by the Municipal Stormwater Permit, and regional waste discharge requirements.

Table 4.10-8
2025 Transportation Network Improvements in the 100-year Floodplain

Improvement Type	Improvement
Active Transportation	Inland Rail Trail: Phase 4
Local Improvements – RAS	San Diego River Trail: Carlton Oaks Segment
Local Improvements – RAS	Citracado Parkway II
Local Improvements – RAS	College Boulevard Improvements from Avenida de la Plate to Waring Road
Local Improvements – RAS	Discovery St. from Craven to Twin Oaks #ST007
Local Improvements – RAS	El Camino Real and Cannon Road
Local Improvements – RAS	El Camino Real Widening – La Costa Avenue to Arenal Road
Local Improvements – RAS	Plaza Blvd Widening
Local Improvements – RAS	San Marcos Creek Specific Plan – Discovery Street Widening and Flood Control Improvements #88265
Local Improvements – Street and Road	Grand Avenue Bridge and Street Improvements
Local Improvements – Street and Road	San Marcos Creek Specific Plan: Creekside Drive and Pad Grading #88505
Local Improvements – Street and Road	Via Vera Cruz Bridge and Street Improvements #88264
Ops/Maintenance – Highway Bridge Program	El Camino Real
Ops/Maintenance – Highway Bridge Program	Heritage Road Bridge
Ops/Maintenance – Highway Bridge Program	West Mission Bay Drive Bridge

Transportation network improvements under the proposed Plan would also occur in areas subject to inundation hazards from failure of a dam or levee. Though more dams exist in the region, these are large reservoirs that would produce large volumes of water if a dam were to fail. Cal OES dam inundation maps and LFPZ maps would be reviewed for all projects associated with transportation network improvements of the proposed Plan to determine the extent of inundation for at-risk areas in the event of a dam or levee failure, respectively. Planning and design of transportation network improvements would be required to incorporate safety policies from the County of San Diego General Plan Safety Element to reduce the risk of dam or levee failure hazards and associated pollutant release.

By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, impacts associated with release of pollutants due to inundation of a flood hazard, tsunami, or seiche zone would be minimized. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, runoff would be controlled and flooding hazards would be substantially reduced and the risks associated with tsunami and seiche hazards would be minimized. Safety policies from the Seismic Safety Element would reduce the risk of property damage associated with tsunami and seiche hazards. Therefore, the transportation network improvements would not substantially increase the risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. This impact is less than significant.

2025 Conclusion

Compliance with applicable regulatory requirements and implementation of design measures, safety ordinances, and water quality requirements described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements would minimize the release of pollutants due inundation of a flood hazard, tsunami, or seiche zone. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the proposed Plan would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. Therefore, this impact (HWQ-3) in the year 2025 is less than significant.

2035

Regional Growth and Land Use Change

Approximately 78 percent of the 2026 to 2035 population growth would occur in the City of San Diego (71 percent) and City of National City (7 percent). Development with project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the Cities of San Diego and Chula Vista (tsunami inundation areas occur along the entire coastline from the California-Mexico border to north of Oceanside [California Department of Conservation 2013]). However, the risk of tsunamis in the San Diego region is low. In 92 years of record, at least 19 tsunamis have been recorded in the San Diego region (Agnew 2009). There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of seiches affecting regional growth and land use change development projects would be expected to be low.

Although the risk of tsunami and seiche and the associated risk of pollution release is considered low in the San Diego region, development under the proposed Plan would occur in areas subject to these hazards. During construction activities, stormwater BMPs would be implemented, as required by federal, State, county, and local policies to minimize degradation of water quality associated with stormwater runoff or construction-related pollutants. Compliance with regional, State, and federal water quality regulations would ensure that the increased runoff volume and pollutant generation from development are addressed. Construction activities and operation would comply with local stormwater ordinances, stormwater requirements established by the Municipal Stormwater Permit, and regional waste discharge requirements. Prior to flood events, measures such as sandbag barriers and gravel bag berms would be implemented to reduce the risk of pollutant release. Post-construction BMPs and measures to reduce the risk of pollutants and mange runoff in a storm event are discussed under Impact HWQ-1 and HWQ-2 in the 2025 analysis, respectively. Runoff for post-construction operations would be managed through LID, which is required for all new developments, onsite design, and/or offsite structural BMPs. These measures would be required to

substantially lessen runoff from development thereby avoiding adverse hydromodification and flooding impacts.

Compliance with enforced planning and design standards, regulations, and safety ordinances would serve to address and minimize the release of pollutants due to inundation in a flood hazard, tsunami, or seiche zone. Planning and design of development projects would be required to incorporate safety policies from the County of San Diego General Plan Seismic Safety Element to reduce the risk associated with tsunami and seiche hazards. State planning and zoning law requires a Seismic Safety Element (City of San Diego 2015b) of all City and County General Plans that identifies and appraises hazards including the effects of seismically-induced waves such as tsunamis and seiches.

The regional growth and land use changes associated with the proposed Plan that are located within the existing floodplains, including the Cities of San Diego and Chula Vista and the County of San Diego, would be impacted by a 100-year flood if appropriate design measures are not incorporated. Table 4.10-9 shows the proposed land use types that encroach upon the 100-year floodplain through 2035. Additional development would occur in coastal areas under the proposed Plan and these areas are most susceptible to flooding. However, as discussed in the 2025 analysis, drainage designs would be made to conform to the flood control requirements of the applicable jurisdiction, including any applicable information regarding flooding resulting from climate change that would occur in the long term (e.g., the year 2050). Design practices employed in accordance with the local HMPs, Caltrans standards, and other related regulations and programs related to flooding, would be required. Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance) and water quality requirements (e.g. regional waste discharge requirements) would be required for all development projects to minimize hazards due to flood conditions and associated release of pollutants.

Table 4.10-9
2035 Land Use Types in the 100-year Floodplain

Land Use Type	Municipality
Airstrip	County of San Diego
Arterial Commercial	Carlsbad, Chula Vista, Coronado, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego. San Marcos, Santee, Solana Beach, Vista
Automobile Dealership	Chula Vista, El Cajon, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Bay or Lagoon	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Imperial Beach, National City, Oceanside, San Diego, Solana Beach
Beach – Active	Carlsbad, Coronado, Encinitas, Imperial Beach, Oceanside, County of San Diego, San Diego, Solana Beach
Beach – Passive	Carlsbad, Coronado, Del Mar, Encinitas, Imperial Beach, Oceanside, San Diego, Solana Beach
Casino	County of San Diego
Cemetery	County of San Diego, San Diego
Commercial	Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Commercial Recreation	Oceanside, County of San Diego, San Diego, San Marcos

Land Use Type	Municipality
Commercial Under Construction	National City, Vista
Communications and Utilities	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Escondido, National City, Oceanside, County of San Diego, San Diego, San Marcos, Vista
Community Shopping Center	Chula Vista, Encinitas, Escondido, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Convention Center	San Diego
Dormitory	San Diego
Elementary School	Chula Vista, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, Santee
Extractive Industry	Chula Vista, Coronado, Imperial Beach, National City, Poway, County of San Diego, San Diego, Santee
Field Crops	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Fire/Police Station	Chula Vista, Escondido, Oceanside, Poway, County of San Diego, San Marcos, Vista
Freeway	Carlsbad, Chula Vista, Coronado, El Cajon, Encinitas, Escondido, La Mesa, Lemon Grove, National City, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
General Aviation Airport	El Cajon, Oceanside, County of San Diego
Golf Course	Carlsbad, Chula Vista, Coronado, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee
Golf Course Clubhouse	Chula Vista, National City, County of San Diego, San Diego
Government Office/Civic Center	County of San Diego, San Diego
Group Quarters	San Diego
Heavy Industry	National City, San Diego
Hospital – General	San Diego
Hospitals	Chula Vista, San Diego
Hotel/Motel (High-Rise)	San Diego
Hotel/Motel (Low-Rise)	Carlsbad, Chula Vista, Del Mar, El Cajon, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Vista
Hotel/Motel/Resort	Carlsbad, National City, San Diego
Industrial Park	Carlsbad, Chula Vista, El Cajon, Escondido, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Industrial Under Construction	County of San Diego, San Diego
Intensive Agriculture	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Jail/Prison	Santee
Junior College	Escondido, San Diego
Junior High School or Middle School	Carlsbad, El Cajon, Escondido, Oceanside County of San Diego, San Diego
Junkyard/Dump/Landfill	Chula Vista, Oceanside, County of San Diego, San Diego

Land Use Type	Municipality
Lake/Reservoir/Large Pond	Chula Vista, Escondido, National City, Oceanside, Poway, S.D. County, San Diego, Santee
Landscape Open Space	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, S.D. County, San Diego, San Marcos, Santee, Solana Beach, Vista
Library	National City, S.D. County
Light Industry	Chula Vista, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, S.D. County, San Diego, San Marcos, Vista
Light Industry – General	Chula Vista, Del Mar, Lemon Grove, National City, Oceanside, S.D. County, San Diego, San Marcos, Santee, Vista
Marina	Chula Vista, Coronado, National City, Oceanside, San Diego
Marine Terminal	National City, San Diego
Military Training	County of San Diego, San Diego
Military Use	Coronado, County of San Diego, Imperial Beach, National City, San Diego
Mission	Oceanside
Mixed Use	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Mobile Home Park	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, La Mesa, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Multi-Family Residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Multi-Family Residential Without Units	Chula Vista, County of San Diego Escondido, Imperial Beach, National City, Oceanside, San Diego
Neighborhood Shopping Center	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Office	County of San Diego, El Cajon, Escondido, San Diego, San Marcos
Office (Low-Rise)	Carlsbad, Chula Vista, County of San Diego, El Cajon, Encinitas, Escondido, La Mesa, Lemon Grove, National City, Poway, San Diego, San Marcos, Solana Beach, Vista
Open Space Park Or Preserve	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Orchard Or Vineyard	County of San Diego, Escondido, Oceanside, Poway, San Diego, San Marcos
Other Group Quarters Facility	County of San Diego, El Cajon, Escondido, Oceanside, San Diego, Santee, Vista
Other Health Care	Chula Vista, County of San Diego, Escondido, San Diego, Vista
Other Public Services	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, Poway, San Diego, Vista
Other Recreation – High	Carlsbad, Chula Vista, Coronado, County of San Diego, El Cajon, Encinitas, Imperial Beach, National City, Oceanside, Poway, San Diego, Vista
Other Recreation – Low	County of San Diego, San Diego, Vista
Other Retail Trade And Strip	Chula Vista, Coronado, County of San Diego, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Other School	County of San Diego, Escondido, National City, Poway, San Diego, San Marcos

Land Use Type	Municipality
Other Transportation	Carlsbad, Chula Vista, County of San Diego, Del Mar, Imperial Beach, Oceanside, San Diego
Other University Or College	San Diego
Park – Active	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Park And Ride Lot	Chula Vista, Escondido, Oceanside
Parking Lot – Structure	San Diego
Parking Lot – Surface	Coronado, Del Mar, Escondido, National City, Oceanside, San Diego, San Marcos, Vista
Parks	Chula Vista, Coronado, National City, Oceanside, Poway, San Diego, San Marcos
Post Office	County of San Diego, El Cajon, Escondido, Oceanside, San Diego
Public Services	Carlsbad, Chula Vista, County of San Diego, San Diego
Public Storage	Chula Vista, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Vista
Racetrack	County of San Diego, Del Mar, San Diego
Rail Station/Transit Center	County of San Diego, Oceanside, San Diego
Railroad Right Of Way	Carlsbad, Chula Vista, County of San Diego, Del Mar, El Cajon, Encinitas, National City, Oceanside, San Diego, San Marcos, Solana Beach, Vista
Regional Shopping Center	Carlsbad, County of San Diego, Escondido, National City, Oceanside, San Diego
Religious Facility	Chula Vista, County of San Diego, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Residential Recreation	Carlsbad, Chula Vista, Coronado, County of San Diego, Oceanside, San Diego, Santee, Vista
Residential Under Construction	Carlsbad, Chula Vista, County of San Diego, Encinitas, Imperial Beach, Oceanside, San Diego, Santee
Resort	Carlsbad, Coronado, County of San Diego, Oceanside, San Diego, Solana Beach
Road Right Of Way	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
School District Office	County of San Diego, Escondido, San Diego, San Marcos
Schools	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, National City, San Diego, San Marcos, Vista
SDSU/CSU San Marcos/UCSD	San Diego
Senior High School	County of San Diego, El Cajon, Escondido, Oceanside, San Diego
Service Station	Carlsbad, Chula Vista, Encinitas, Escondido, National City, Oceanside, San Diego, Solana Beach, Vista
Single Family Detached	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Single Family Multiple-Units	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista

Land Use Type	Municipality
Single Family Residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Oceanside, Poway, San Diego, Santee, Solana Beach, Vista
Single Family Residential Without Units	Carlsbad, Coronado, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Solana Beach, Vista
Spaced Rural Residential	Carlsbad, Chula Vista, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Spaced Rural Residential Without Units	County of San Diego
Specialty Commercial	Coronado, Del Mar, San Diego
Stadium/Arena	San Diego
Tourist Attraction	San Diego
UCSD/VA Hospital/Balboa Hospital	San Diego
Undevelopable Natural Area	Coronado, County of San Diego, Oceanside, San Diego
Vacant And Undeveloped Land	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, S.D. County, San Diego, San Marcos, Santee, Solana Beach, Vista
Warehousing	Chula Vista, County of San Diego, Lemon Grove, National City, Oceanside, Poway, San Diego
Water	Coronado, County of San Diego, Encinitas, Imperial Beach, Oceanside, San Diego
Wholesale Trade	County of San Diego, Chula Vista, Poway

Source: FEMA 2019.

Development under the proposed Plan would occur in areas subject to inundation hazards from failure of a dam or levee, including coastal areas within the City of San Diego and areas downstream of Lake Murray, Sweetwater Reservoir, and Lower Otay Lake. Cal OES dam inundation maps and LFPZ maps would be reviewed for all projects associated with development of the proposed Plan to determine the extent of inundation for at-risk areas in the event of a dam or levee failure, respectively. Planning and design of development projects would be required to incorporate safety policies from the County of San Diego General Plan Safety Element to reduce the risk of damage associated with dam or levee failure.

By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, storm flows would be controlled and flooding hazards would be substantially reduced. Mandatory BMPs would be implemented to manage and substantially reduce pollutant release in a flood event. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the risk of pollutant release due to inundation by flood hazard, tsunami, or seiche would be minimized. Therefore, the regional growth and land use change would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. This impact is less than significant.

Transportation Network Improvements and Programs

Project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the City of San Diego; however, the risk of tsunamis in the San Diego region is low. There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of

seiches and associated risk of pollutant release affecting transportation network improvements would be low. Although the risk of tsunami and seiche is low in the San Diego region, future transportation facilities would undergo a project-specific analysis in which required standards would be applied to minimize risks from seiche or tsunami. Projects would be designed to convey 100-year flood waters, which would also sufficiently convey seiche or tsunami flows within these design parameters. In addition, planning and design of transportation network improvements would be required to incorporate safety policies from the Seismic Safety Element to reduce the risk of property damage associated with tsunami and seiche hazards. Project designs and review approvals would include reference to the Seismic Safety Element, CADC maps showing tsunami inundation areas, FEMA maps, and other pertinent resources to determine at-risk areas such that proposed projects are safely designed in coastal areas.

Transportation network improvements within 100-year flood hazard areas, including Managed Lanes improvements on I-5, I-805, and I-15, among others; Transit Leap improvements; and Active Transportation and Demand Management, would be exposed to flood hazards without the appropriate design measures. Table 4.10-10 shows the transportation network improvements planned for 2035 that would encroach upon the 100-year floodplain. Design protocols (defined in Section 4.10.2 above) require designers of transportation facilities to minimize the risk from flooding events, including flooding that may result from climate change. Design practices employed in accordance with the local HMP; Caltrans standards; and other related regulations and programs, including FHWA, FTA, and Caltrans policies on adapting to climate change, sea-level rise, and flooding, would be required. Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance) would be required for all transportation network improvement projects to minimize public and private losses due to flood conditions. Flood ordinance requirements are discussed under Impact HWQ-3 in the 2025 analysis. Any additional runoff and associated pollutants from new or improved transportation facilities would be conveyed to downstream flood control structures while protecting associated waterbodies from adverse water quality impacts. Prior to flood events, measures such as sandbag barriers and gravel bag berms would be implemented to reduce the risk of pollutant release. Post-construction BMPs would consider natural stormwater quality treatment and would include LID, hydromodification measures, and revegetation efforts. In addition, construction and operations would comply with local stormwater ordinances, stormwater requirements established by the Municipal Stormwater Permit, and regional waste discharge requirements.

Transportation network improvements under the proposed Plan would occur in areas subject to inundation hazards from failure of a dam or levee. Cal OES dam inundation maps and LFPZ maps would be reviewed for all projects associated with transportation network improvements of the proposed Plan to determine the extent of inundation for at-risk areas in the event of a dam or levee failure, respectively. Planning and design of development projects would be required to incorporate safety policies from the County of San Diego General Plan Safety Element to reduce the risk of dam or levee failure hazards and associated pollutant release.

By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, impacts associated with release of pollutants due to inundation of a flood hazard, tsunami, or seiche zone would be minimized. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, runoff would be controlled, flooding hazards would be substantially reduced, and the risks associated with tsunami and seiche hazards would be minimized. Therefore, the transportation network improvements would not substantially increase the risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. This impact is less than significant.

Table 4.10-10
2035 Transportation Network Improvements in the 100-year Floodplain

Improvement Type	Improvement
Complete Corridor: ML	SR 163 (I-8 to I-805)
Complete Corridor: ML	SR 52 (I-15 to Mast Boulevard)
Complete Corridor: ML	SR 52 (Mast Boulevard to SR 125)
Complete Corridor: ML	SR 78 (I-5 to Twin Oaks)
Complete Corridor: ML	SR 94 (I-15 to I-805)
Complete Corridor: ML	SR 94 (I-5 to I-15)
Complete Corridor: ML	SR 94 (I-805 to SR 125)
Complete Corridor: ML/Goods Movement	I-15 (I-5 to I-805)
Complete Corridor: ML/Goods Movement	I-15 (I-8 to SR 163)
Complete Corridor: ML/Goods Movement	I-5 (H Street to Pacific Highway)
Complete Corridor: ML/Goods Movement	I-5 (I-805 to SR 56)
Complete Corridor: ML/Goods Movement	I-5 (Pacific Highway to SR 52)
Complete Corridor: ML/Goods Movement	I-5 (SR 52 to I-805)
Complete Corridor: ML/Goods Movement	I-5 (SR 905 to H Street)
Complete Corridor: ML/Goods Movement	I-805 (Balboa Avenue to NB Bypass Lane)
Complete Corridor: ML/Goods Movement	I-805 (H Street to I-15)
Complete Corridor: ML/Goods Movement	I-805 (I-15 to I-8)
Complete Corridor: ML/Goods Movement	I-805 (I-8 to Mesa College Drive)
Complete Corridor: ML/Goods Movement	I-805 (Mesa College Drive to Balboa Avenue)
Complete Corridor: ML/Goods Movement	I-805 (Palm Avenue to H Street)
Complete Corridor: MLC	I-5 (I-805)
Complete Corridor: MLC	I-5 (SR 15)
Complete Corridor: MLC	I-5 (SR 78)
Complete Corridor: MLC	I-805 (I-8)
Complete Corridor: MLC	I-805 (SR 163)
Complete Corridor: Rural	SR 76 (SR 76 to Pauma Reservation Road)
Transit Leap	Commuter Rail 582
Transit Leap	LRT 399
Transit Leap/Goods Movement	Commuter Rail 398
Transit Leap/Goods Movement	LRT 510
Active Transportation	Bayshore Bikeway: Segment 8B Main Street to Ada Street
Active Transportation	Central Coast Corridor
Active Transportation	Coastal Rail Trail – Rose Canyon
Active Transportation	Coastal Rail Trail Carlsbad
Active Transportation	Coastal Rail Trail Carlsbad – Reach 3 Tamarack to Cannon
Active Transportation	Coastal Rail Trail Del Mar
Active Transportation	Coastal Rail Trail Oceanside – Alta Loma Marsh bridge
Active Transportation	Coastal Rail Trail San Diego – Carmel Valley to Roselle via Sorrento

Improvement Type	Improvement
Active Transportation	Coastal Rail Trail San Diego – Del Mar to Sorrento via Carmel Valley
Active Transportation	Coastal Rail Trail San Diego – Mission Bay (Clairemont to Tecolote)
Active Transportation	Coastal Rail Trail San Diego – Pacific Highway (Fiesta Island Road to Taylor Street)
Active Transportation	Coastal Rail Trail San Diego – UTC to Rose Canyon
Active Transportation	I-15 Bikeway – Camino del Rio South to Rancho Mission Road
Active Transportation	I-15 Bikeway – Rancho Mission Road to Murphy Canyon Bike Path
Active Transportation	Inland Rail Trail: Oceanside
Active Transportation	San Diego River Bikeway Connections
Active Transportation	San Diego River Trail – Mast Park to Lakeside baseball park
Active Transportation	San Diego River Trail – Rancho Mission Road to Camino Del Rio North
Active Transportation	Santee – El Cajon Corridor
Local Improvements – RAS	College Boulevard Reach A

2035 Conclusion

Compliance with applicable regulatory requirements and implementation of design measures, safety ordinances, and water quality requirements described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements would minimize the release of pollutants due inundation of a flood hazard, tsunami, or seiche zone. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the proposed Plan would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. Therefore, this impact (HWQ-3) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

Approximately 78 percent of the 2036 to 2050 population growth would occur in the City of San Diego (37 percent), City of Chula Vista (28 percent) and City of San Marcos (13 percent). Project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the Cities of San Diego and Chula Vista; however, the risk of tsunamis in the San Diego region is low. There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of seiches affecting regional growth and land use change development would be low.

Although the risk of tsunami and seiche and the associated risk of pollution release is considered low in the San Diego region, development under the proposed Plan would occur in areas subject to these hazards, such as the Cities of San Diego and Chula Vista. Construction activities and operation would comply with local stormwater ordinances, stormwater requirements established by the Municipal Stormwater Permit, and regional waste discharge requirements. Prior to flood events, measures would be implemented to reduce the risk of pollutant release. Compliance with enforced planning and design standards, regulations, and safety ordinances would

serve to address and minimize the release of pollutants due to inundation in a flood hazard, tsunami, or seiche zone. The Seismic Safety Element would reduce the risk of hazard resulting from future seismic and related events. Project designs and review approvals would include reference to the Seismic Safety Element, CADC maps showing tsunami inundation areas, FEMA maps, and other pertinent resources to determine at-risk areas such that proposed projects are safely designed in coastal areas.

The regional growth and land use changes associated with the proposed Plan that are located within the existing floodplains, including the Cities of San Diego and Chula Vista and the County of San Diego, would be impacted by a 100-year flood if appropriate design measures are not incorporated. Refer to Table 4.10-11 for the proposed changes in land use types that encroach upon the 100-year floodplain through 2050. However, as discussed in the 2025 and 2035 analyses, drainage designs would be made to conform to the flood control requirements of the applicable jurisdiction, including any applicable information regarding flooding resulting from climate change that would occur in the long term (e.g., the year 2050). Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance) and water quality requirements (e.g. regional waste discharge requirements) would be required for all development projects to minimize hazards due to flood conditions and associated release of pollutants. Planning and design of development projects would also be required to incorporate safety policies from the County of San Diego General Plan Safety Element to reduce the risk of damage associated with dam or levee failure.

By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, storm flows would be controlled and flooding hazards would be substantially reduced. Mandatory BMPs would be implemented to manage and substantially reduce pollutant release in a flood event. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the risk of pollutant release due to inundation by flood hazard, tsunami, or seiche would be minimized. Therefore, the regional growth and land use change would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. This impact is less than significant.

Table 4.10-11
2050 Land Use Types in the 100-year Floodplain

Land Use Type	Municipality
Airstrip	County of San Diego
Arterial Commercial	Carlsbad, Chula Vista, Coronado, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego. San Marcos, Santee, Solana Beach, Vista
Automobile Dealership	Chula Vista, El Cajon, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Bay or Lagoon	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Imperial Beach, National City, Oceanside, San Diego, Solana Beach
Beach – Active	Carlsbad, Coronado, Encinitas, Imperial Beach, Oceanside, County of San Diego, San Diego, Solana Beach
Beach – Passive	Carlsbad, Coronado, Del Mar, Encinitas, Imperial Beach, Oceanside, San Diego, Solana Beach
Casino	County of San Diego
Cemetery	County of San Diego, San Diego

Land Use Type	Municipality
Commercial	Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Solana Beach, Vista
Commercial Recreation	Oceanside, County of San Diego, San Diego, San Marcos
Commercial Under Construction	National City, Vista
Communications and Utilities	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Escondido, National City, Oceanside, County of San Diego, San Diego, San Marcos, Vista
Community Shopping Center	Chula Vista, Encinitas, Escondido, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Convention Center	San Diego
Dormitory	San Diego
Elementary School	Chula Vista, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, Santee
Extractive Industry	Chula Vista, Coronado, Imperial Beach, National City, Poway, County of San Diego, San Diego, Santee
Field Crops	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Fire/Police Station	Chula Vista, Escondido, Oceanside, Poway, County of San Diego, San Marcos, Vista
Freeway	Carlsbad, Chula Vista, Coronado, El Cajon, Encinitas, Escondido, La Mesa, Lemon Grove, National City, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
General Aviation Airport	El Cajon, Oceanside, County of San Diego
Golf Course	Carlsbad, Chula Vista, Coronado, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee
Golf Course Clubhouse	Chula Vista, National City, County of San Diego, San Diego
Government Office/Civic Center	County of San Diego, San Diego
Group Quarters	San Diego
Heavy Industry	National City, San Diego
Hospital – General	San Diego
Hospitals	Chula Vista, San Diego
Hotel/Motel (High-Rise)	San Diego
Hotel/Motel (Low-Rise)	Carlsbad, Chula Vista, Del Mar, El Cajon, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Vista
Hotel/Motel/Resort	Carlsbad, National City, San Diego
Industrial Park	Carlsbad, Chula Vista, El Cajon, Escondido, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Industrial Under Construction	County of San Diego, San Diego
Intensive Agriculture	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Jail/Prison	Santee

Land Use Type	Municipality
Junior College	Escondido, San Diego
Junior High School or Middle School	Carlsbad, El Cajon, Escondido, Oceanside County of San Diego, San Diego
Junkyard/Dump/Landfill	Chula Vista, Oceanside, County of San Diego, San Diego
Lake/Reservoir/Large Pond	Chula Vista, Escondido, National City, Oceanside, Poway, S.D. County, San Diego, Santee
Landscape Open Space	Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, S.D. County, San Diego, San Marcos, Santee, Solana Beach, Vista
Library	National City, S.D. County
Light Industry	Chula Vista, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, S.D. County, San Diego, San Marcos, Vista
Light Industry – General	Chula Vista, Del Mar, Lemon Grove, National City, Oceanside, S.D. County, San Diego, San Marcos, Santee, Vista
Marina	Chula Vista, Coronado, National City, Oceanside, San Diego
Marine Terminal	National City, San Diego
Military Training	County of San Diego, San Diego
Military Use	Coronado, County of San Diego, Imperial Beach, National City, San Diego
Mission	Oceanside
Mixed Use	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Mobile Home Park	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, La Mesa, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Multi-Family Residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Multi-Family Residential Without Units	Chula Vista, County of San Diego Escondido, Imperial Beach, National City, Oceanside, San Diego
Neighborhood Shopping Center	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Office	County of San Diego, El Cajon, Escondido, National City, San Diego, San Marcos
Office (Low-Rise)	Carlsbad, Chula Vista, County of San Diego, El Cajon, Encinitas, Escondido, La Mesa, Lemon Grove, National City, Poway, San Diego, Solana Beach, Vista
Open Space Park Or Preserve	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Orchard Or Vineyard	County of San Diego, Escondido, Oceanside, Poway, San Diego, San Marcos
Other Group Quarters Facility	County of San Diego, El Cajon, Escondido, Oceanside, San Diego, Santee, Vista
Other Health Care	Chula Vista, County of San Diego, Escondido, San Diego, Vista
Other Public Services	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, Poway, San Diego, Vista
Other Recreation – High	Carlsbad, Chula Vista, Coronado, County of San Diego, El Cajon, Encinitas, Imperial Beach, National City, Oceanside, Poway, San Diego, Vista

Land Use Type	Municipality
Other Recreation – Low	County of San Diego, San Diego, Vista
Other Retail Trade And Strip	Chula Vista, Coronado, County of San Diego, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, Vista
Other School	County of San Diego, Escondido, National City, Poway, San Marcos
Other Transportation	Carlsbad, Chula Vista, County of San Diego, Del Mar, Imperial Beach, Oceanside, San Diego
Other University Or College	Chula Vista, San Diego
Park – Active	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Park And Ride Lot	Chula Vista, Escondido, Oceanside
Parking Lot – Structure	San Diego
Parking Lot – Surface	Coronado, Del Mar, Escondido, National City, Oceanside, San Diego, San Marcos, Vista
Parks	Chula Vista, Coronado, National City, Oceanside, Poway, San Diego, San Marcos
Post Office	County of San Diego, El Cajon, Escondido, Oceanside, San Diego
Public Services	Carlsbad, Chula Vista, County of San Diego, San Diego
Public Storage	Chula Vista, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Vista
Racetrack	County of San Diego, Del Mar, San Diego
Rail Station/Transit Center	County of San Diego, Oceanside, San Diego
Railroad Right Of Way	Carlsbad, Chula Vista, County of San Diego, Del Mar, El Cajon, Encinitas, National City, Oceanside, San Diego, San Marcos, Solana Beach, Vista
Regional Shopping Center	Carlsbad, County of San Diego, Escondido, National City, Oceanside, San Diego
Religious Facility	Chula Vista, County of San Diego, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Residential Recreation	Carlsbad, Chula Vista, Coronado, County of San Diego, Oceanside, San Diego, Santee, Vista
Residential Under Construction	Carlsbad, Chula Vista, County of San Diego, Encinitas, Imperial Beach, Oceanside, San Diego, Santee
Resort	Carlsbad, Coronado, County of San Diego, Oceanside, San Diego, Solana Beach
Road Right Of Way	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
School District Office	County of San Diego, Escondido, San Diego, San Marcos
Schools	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, National City, Poway, San Diego, San Marcos, Vista
SDSU/CSU San Marcos/UCSD	San Diego
Senior High School	County of San Diego, El Cajon, Escondido, Oceanside, San Diego
Service Station	Carlsbad, Chula Vista, Encinitas, Escondido, National City, Oceanside, San Diego, Solana Beach, Vista
Single Family Detached	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista

Land Use Type	Municipality
Single Family Multiple-Units	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Single Family Residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Single Family Residential Without Units	Carlsbad, Coronado, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Solana Beach, Vista
Spaced Rural Residential	Carlsbad, Chula Vista, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Spaced Rural Residential Without Units	County of San Diego
Specialty Commercial	Coronado, Del Mar, San Diego
Stadium/Arena	San Diego
Tourist Attraction	San Diego
UCSD/VA Hospital/Balboa Hospital	San Diego
Undevelopable Natural Area	Coronado, County of San Diego, Oceanside, San Diego
Vacant And Undeveloped Land	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, S.D. County, San Diego, San Marcos, Santee, Solana Beach, Vista
Warehousing	Chula Vista, County of San Diego, Lemon Grove, National City, Oceanside, Poway, San Diego
Water	Coronado, County of San Diego, Encinitas, Imperial Beach, Oceanside, San Diego
Wholesale Trade	County of San Diego, Chula Vista, Poway

Source: FEMA 2019.

Transportation Network Improvements and Programs

Project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas within the City of San Diego; however, the risk of tsunamis in the San Diego region is low. There is no historical precedence for large damaging seiches in the San Diego region; therefore the risk of seiches and associated risk of pollutant release affecting transportation network improvements would be low. Although the risk of tsunami and seiche is low in the San Diego region, future transportation facilities would undergo a project-specific analysis in which required standards would be applied to minimize risks from seiche or tsunami. Projects would be designed to convey 100-year flood waters, which would also sufficiently convey seiche or tsunami flows within these design parameters. In compliance with the Seismic Safety Element the risk of hazard resulting from future seismic and related events would be reduced. Project designs and review approvals would include reference to the Seismic Safety Element, CADC maps showing tsunami inundation areas, FEMA maps, and other pertinent resources to determine at-risk areas such that proposed projects are safely designed in coastal areas.

Transportation network improvements within 100-year flood hazard areas, including Managed Lanes and Technology Connectors, would be exposed to flood hazards without the appropriate design measures. Table

4.10-12 shows the transportation network improvements planned for 2050 that would encroach upon the 100-year floodplain. Design practices employed in accordance with the local HMP; Caltrans standards; and other related regulations and programs, including FHWA, FTA, and Caltrans policies on adapting to climate change, sea-level rise, and flooding, would be required. By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, impacts associated with release of pollutants due to inundation of a flood hazard, tsunami, or seiche zone would be minimized. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, runoff would be controlled, flooding hazards would be substantially reduced, and the risks associated with tsunami and seiche hazards would be minimized. Therefore, the transportation network improvements would not substantially increase the risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. This impact is less than significant.

Table 4.10-12
2050 Transportation Network Improvements in the 100-year Floodplain

Improvement Type	Improvement
Complete Corridor: ML	SR 125 (SR 905 to SR 54)
Complete Corridor: ML	SR 52 (I-5 to I-805)
Complete Corridor: ML	SR 54 (Valley Road to SR 125)
Complete Corridor: ML	SR 56 (I-5 to I-15)
Complete Corridor: ML/Goods Movement	I-15 (SR 76 to County Line)
Complete Corridor: ML/Goods Movement	I-15 (Valley Parkway to SR 76)
Complete Corridor: ML/Goods Movement	I-5 (Cassidy Street to Harbor Drive)
Complete Corridor: ML/Goods Movement	I-5 (La Costa to Cassidy Street)
Complete Corridor: ML/Goods Movement	I-5 (SR 56 to Via de La Valle)
Complete Corridor: ML/Goods Movement	I-5 (Via de La Valle to La Costa)
Complete Corridor: ML/Goods Movement	I-805 (Palm Avenue to H Street)
Complete Corridor: ML/Goods Movement	I-805 (SR 905 to Palm Avenue)
Complete Corridor: MLC	I-805 (SR 52)
Complete Corridor: MLC	I-805 (SR 54)
Complete Corridor: MLC	SR 125 (SR 52)
Complete Corridor: Connector	I-5 (I-8)
Complete Corridor: Connector	I-5 (SR 56)
Transit Leap	Commuter Rail 582
Transit Leap	Commuter Rail 583
Transit Leap	LRT 510
Transit Leap/Goods Movement	Commuter Rail 398
Active Transportation	Clairemont – Centre City Corridor

Improvement Type	Improvement
Active Transportation	Encinitas to San Marcos Corridor – Leucadia Boulevard to El Camino Real
Active Transportation	I-15 Bikeway – Murphy Canyon Road to Affinity Court
Active Transportation	I-15 Bikeway – Poway Road interchange to Carmel Mountain Road
Active Transportation	I-805 CONNECTOR
Active Transportation	I-805 Connector – Bonita Road to Floyd Avenue
Active Transportation	San Diego River Trail – Mast Park to Lakeside baseball park
Active Transportation	San Luis Rey River Trail
Active Transportation	SR 125 Connector – Bonita Road to U.S.–Mexico Border
Active Transportation	SR 52 Bikeway – I-5 to Santo Road
Active Transportation	SR 52 Bikeway – SR 52/Mast Drive to San Diego River Trail
Active Transportation	SR 56 Bikeway – El Camino Real to Caminito Pointe

2050 Conclusion

Compliance with applicable regulatory requirements and implementation of design measures, safety ordinances, and water quality requirements described above and in Section 4.10.2 would ensure that regional growth and land use changes as well as transportation network improvements would minimize the release of pollutants due inundation of a flood hazard, tsunami, or seiche zone. Through the various requirements to incorporate floodplain management, safety ordinances, and treatment BMPs, the proposed Plan would not substantially increase the risk of pollutant release due to inundation in a flood hazard, tsunami, or seiche zone. Therefore, this impact (HWQ-3) in the year 2050 is less than significant.

Exacerbation of Climate Change Effects

Although there will be climate change impacts related to risks of pollution from inundation in a flood hazard, tsunami, or seiche zone, the proposed Plan would not exacerbate climate change risks of pollution from these hazards if development and transportation projects implementing the proposed Plan remain in compliance with applicable regulatory requirements design measures, safety ordinances, and water quality requirements.