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 in the San Diego region are the Santa Margarita River, San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River, Otay River, and Tijuana River. Major coastal waterbodies are the 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 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 (Figure 4.10-2).

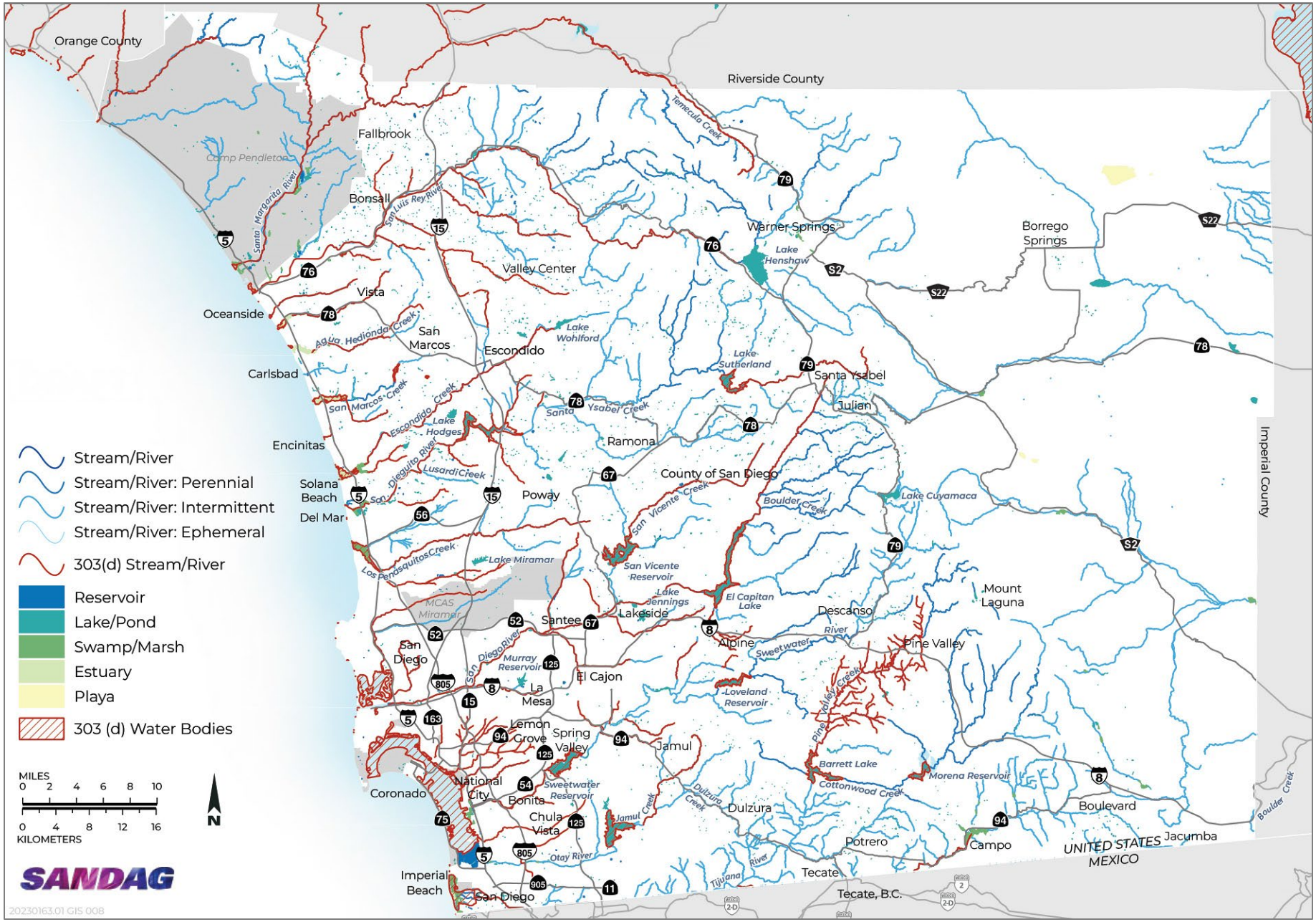
San Diego Hydrologic Basin

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, Peñasquitos, San Diego River, 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.

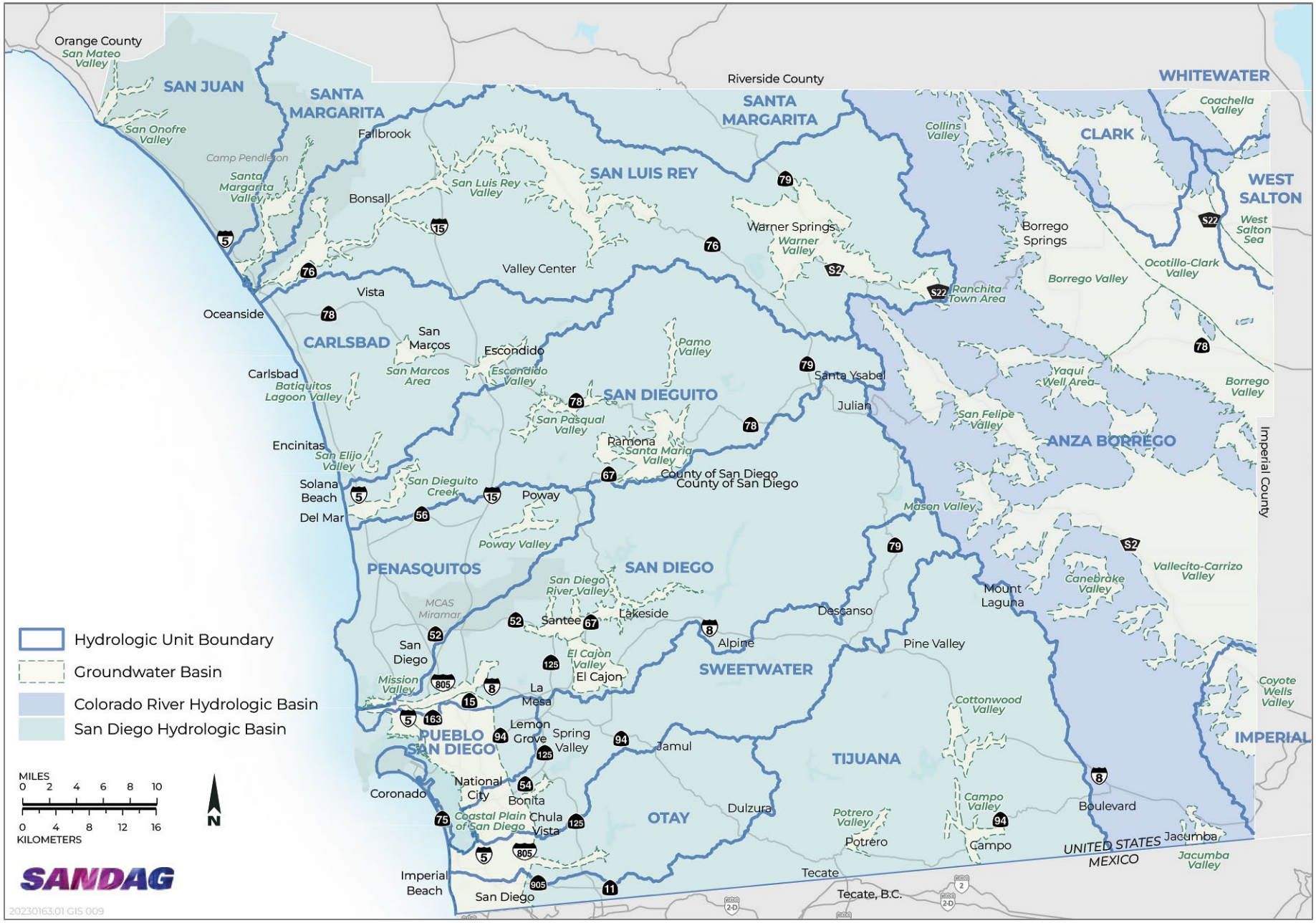
The major characteristics of the 11 watersheds are described below. Beneficial uses of water bodies within these watersheds are described in the "Water Quality" section under "Beneficial Uses/Water Quality Objectives."

San Juan watershed (HAs 901.1–901.5), also referred to as the South Orange County watershed, 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 Canyon [901.4]). The San Onofre Hydrologic Area is completely within the boundaries of San Diego County. It encompasses approximately 37,500 acres near the northern border of the county, and 97% of it is dedicated to military uses associated with MCB Camp Pendleton. The San Mateo Canyon Hydrologic Area is approximately 31,000 acres within San Diego County, and approximately 53% is incorporated into MCB 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]). Water quality monitoring indicates that the watershed's surface waters are high in total dissolved solids (TDS). A Water Quality Improvement Plan (WQIP) for the South Orange County (South OC) Watershed Management Area (WMA) was developed by the County of Orange, Orange County Flood Control District, and the Cities of Aliso Viejo, Dana Point, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, and San Juan Capistrano (Permittees) and accepted by the San Diego Regional Water Quality Control Board in June 2018 (SOC 2024).



Source: Data downloaded from State Water Resources Control Board and US Geological Survey (National Hydrology Dataset) in 2025; adapted by Ascent in 2025.

Figure 4.10-1 Surface Hydrology & Major Surface Water Map



Source: Data downloaded from California Department of Water Resources in 2022; adapted by Ascent in 2025.

Figure 4.10-2 SGMA Basins Map

Santa Margarita watershed (HAs 902.1–902.9) 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%). Other land uses include agriculture (7%), military (30%), miscellaneous land uses (11%), and residential (8%). Presently, several waterbodies are impaired due to excessive nutrients from a variety of sources, including agricultural areas, orchards, livestock, domestic animals, septic systems, use of recycled water, and urban runoff (PCW n.d.-a).

San Luis Rey watershed (HAs 903.1–903.3) is the third-largest HU in the San Diego region (with an approximately 560-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. The watershed also contains six groundwater aquifers: Warner, Pauma, Pala, Bonsall, Moosa, and Mission Basins. Approximately 54% of the land in the watershed is vacant or undeveloped. The next largest land uses in the watershed are residential (15%), tribal reservations (14%), and agriculture (14%). The lower San Luis Rey River is impaired for a number of pollutants, consisting of, but not limited to selenium, Enterococcus bacteria, total coliform bacteria, chloride, phosphorus, and TDS. Major sources of pollutants in the San Luis Rey watershed are agriculture, orchards, livestock, domestic animals, urban runoff, and septic systems (PCW n.d.-b).

Carlsbad watershed (HAs 904.1–904.6), 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 68% urbanized, and its population results in the area being one of the most densely populated portions of the San Diego region (PCW n.d.-c). The dominant land uses within the watershed are residential (29%), freeways and roads (12%), agricultural lands (12%), commercial and industrial lands (6%), miscellaneous uses (9%), and vacant/undeveloped (32%) (PCW n.d.-c). As a result of this level of urbanization, water quality impairments include excessive coliform bacteria and sediment loading from upstream sources. Agricultural and urban runoff, sewage spills, and livestock have been identified as primary contributing sources. The coastal lagoons are critical freshwater and estuarine habitats for numerous plant and animal species (PCW n.d.-c).

San Dieguito watershed (HAs 905.1–905.5) 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. Within the watershed, there are five HAs: Hodges, San Pasqual, Santa Maria Valley, Santa Ysabel, and Solana Beach. Over half of the land in the watershed (61%) is undeveloped or designated as open space (PCW n.d.-d). The remaining 39% of the land area is being used for residential areas (18%), agriculture (14%), and other uses (7%). Major features in 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 excess nutrients. San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion due to restricted or intermittent tidal flushing (PCW n.d.-d).

Peñasquitos watershed (HAs 906.1–906.5) encompasses a land area of 94 square miles, making it the second-smallest WMA in San Diego County. It lies in the central portion of San Diego County and neighbors the San Dieguito River Watershed to the north and the Mission Bay/La Jolla and San Diego River WMAs to the south. Approximately 46% of the watershed remains undeveloped or has otherwise been dedicated to open space and recreational lands. The remaining 54% of the land area is being used for residential areas (27%), roadways and transportation (12%), and other uses (15%). The remaining "other" 15% includes industrial, office, commercial, and agricultural land uses. Within the Los Peñasquitos watershed, pollutants are sourced primarily from urban runoff, sewage spills, dredging, and landfill leachate (PCW n.d.-e).

San Diego watershed (HAs 907.1–907.4) 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% of the watershed is undeveloped, mainly in the upper, eastern portion.

The remaining 56% is urbanized with open space and park land (23%); residential (19%); transportation (6%); and commercial, agricultural, industrial, military, and miscellaneous land uses (2%) land uses predominating (PCW n.d.-f). Sources of pollutants within the San Diego River Watershed include urban and agricultural runoff, mining operations, and sewage spills (PCW n.d.-f).

San Diego watershed (HAs 907.1–907.4) is located entirely within the boundaries of San Diego County and includes three major subwatersheds: Pueblo San Diego, Sweetwater, and Otay. The San Diego Bay watershed supplies many local residents with potable water sourced from one of four reservoirs: the Sweetwater, Loveland, and Upper and Lower Otay reservoirs. Sources of pollutants impacting the above beneficial uses include urban and agricultural runoff, resource extraction, septic systems, and marinas and boating activities (PCW n.d.-g).

Pueblo San Diego watershed (HAs 908.1–908.3) 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% developed with urban uses, but the dominant land use remains relatively consistent between HAs. Residential areas are the primary land use in all three of its hydrologic areas, comprising 32%, 40%, and 46% of the total land area of the Point Loma (908.1), San Diego Mesa (908.2), and National City (908.3) HAs, respectively (PCW n.d.-g). 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 metal parameters and aquatic toxicity (PCW n.d.-g). 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 n.d.-g). 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 909.1–909.3) 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% of the watershed is within unincorporated County of San Diego jurisdiction. Over half of the watershed is undeveloped and open space lands (60%). The Lower Sweetwater is the most urbanized, with residential areas leading at 44%, followed by transportation uses at 18% of land area. Undeveloped and open space lands dominate the majority of the area within the Middle and Upper Sweetwater HAs, making up 63% and 82%, respectively. Residential land uses follow in each of the hydrologic areas, with 28% and 12% of the total in each of the Middle and Upper Sweetwater HAs. 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, whereas the urbanized lower part contains portions of several cities, including San Diego, National City, Chula Vista, La Mesa, and Lemon Grove. Water quality impairments in the watershed are coliform bacteria, Enterococcus bacteria, trace metals, and other toxics (PCW n.d.-h).

Tijuana watershed (HAs 911.1–911.8) is the southernmost in the San Diego region with a drainage area of approximately 1,750 square miles (27% on the US side of the international border and 73% on the Mexico side). Within the US-controlled Tijuana watershed, most of the land remains undeveloped at 86% of the land area, followed by residential land uses at 7%, agricultural land uses at 3%, and transportation uses at 2%. 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 n.d.-i).

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% 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. 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, and agriculture. The remaining portions are sparsely populated with single-family residential units and a small amount of other uses (County of San Diego 2011a).

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:

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 (CRB RWQCB 2024).

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 (CRB RWQCB 2024).

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 United States–Mexico border. 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 (CRB RWQCB 2024).

Groundwater Hydrology

Groundwater supplies in 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% 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% 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 (Regional Water Management Group 2018). Alluvial and sedimentary aquifers (or groundwater basins) underlay a relatively small area of the region and account for approximately 13% 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 2011a). Because alluvial basins generally occur in low-lying areas of a watershed, surface water bodies and surface water runoff may accumulate in streams, lakes, or other surface depressions within alluvial basins may provide additional recharge to these basins. Surface water bodies within an alluvial or sedimentary aquifer may increase the recharge due to leakage from the water body into the subsurface. Alluvial and sedimentary aquifers typically have significant storage capacity, with specific yield values between 1 and 30% (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 2021). 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 (Regional Water Management Group 2018). The San Diego Integrated Regional Water Management (IRWM) contains 22 separate groundwater basins, as defined by the California Department of Water Resources (DWR) Bulletin 118 (Regional Water Management Group 2018). All groundwater basins listed below are alluvial aquifers with the exception of Escondido Valley and El Cajon Valley, which are both alluvial and fractured rock aquifers. These groundwater basins are shown in Figure 4.10-2 and consist of:

- 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 (Sweetwater Valley Basin, Otay Valley Basin, and Tijuana Basin were consolidated into one San Diego Formation Basin)
- 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 270,000–360,000 acre-feet of groundwater (Regional Water Management Group 2018).

Fractured rock underlies approximately 73% of the unincorporated area of the county. The majority of the mountainous region of the county consists of these fractured rocks, and fractured rock aquifers typically have much less storage capacity than alluvial aquifers (County of San Diego 2011a). Additionally, because of 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% of the total volume of the aquifer. Specific yield values in San Diego County fractured rock are estimated to range from about 0.001–1% (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 2011a). 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%), Borrego Palm Canyon, and San Felipe Creek (approximately 35% when combined with Borrego Palm Canyon). Little recharge, if any from San Felipe Creek benefits users in Borrego Springs because 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 the 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.

WATER QUALITY

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

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 area 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.

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 in 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, Recreation, 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 7,930 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) (SWRCB 2024a). The treated wastewater is then released through ocean outfalls, percolation beds, or groundwater recharge.

The San Diego Regional 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 Public Utilities Department operates the Point Loma WWTP, North City Water Reclamation Plant (WRP), South Bay WRP, and the Environmental Monitoring and Technical Services Laboratory. The Point Loma WWTP treats roughly 175 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 n.d.-a). Up to 30 mgd of wastewater can be treated at the North City WRP (City of San Diego n.d.-a). Water processed through the North City WRP is distributed throughout the northern region of San Diego via more than 79 miles of distribution for irrigation, landscaping, and industrial use. The South Bay WRP has the capacity to process 15 mgd (City of San Diego n.d.-a); 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 in the San Diego region are the Encina Water Pollution Control Facility and the City of Escondido Hale Avenue Resource Recovery Facility (HARRF). The Encina Water

Pollution Control Facility has the capacity to process approximately 43 mgd and treats about 21 mgd (EWA n.d.); the HARRF has the capacity to process 18 mgd and has an average daily flow of 12.7 MGD (City of Escondido n.d.).

Clean Water Act Section 303(d) Impaired Waters

On December 13th, 2024, the US Environmental Protection Agency (EPA) gave partial approval and partial disapproval to the SWRCB's 2024 California Integrated Report (CWA Section 303[d] List and 305[b] Report) (SWRCB 2025). EPA approved the majority of the 303(d) list but identified 53 waterbody-pollutant combinations it is considering adding to the 303(d) list. The impaired water segments and associated pollutants in the San Diego region are identified in Appendix J. Figure 4.10-1 illustrates the location of the region's impaired water body segments. See further description of the 303(d) list in the Regulatory Setting below.)

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. (See further description of TMDLs in the Regulatory Setting below.) Once a TMDL is established, the RWQCB 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 January 23, 2024, several 303(d)-listed water body segments in the San Diego region are at various stages of TMDL development (SWRCB 2024b). 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 (R9-2002-01213 and R9-2007-0043)
- nitrogen 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.

Approved Advance Restoration Plans (ARPs), defined in Section 4.10.2, consist of:

- Tijuana River ARP
- Famosa Slough TMDL Phosphorus
- Loma Alta Slough Nutrient TMDL
- San Mateo Creek Invasive Species TMDL
- Santa Margarita River Estuary TMDL

The following TMDLs are in progress as of April 2024:

- San Diego Bay Investigations:
  - Laurel Hawthorn Central Embayment
  - Mouth of Chollas Creek
  - Shipyards Sediment Site Cleanup
- Tenth Avenue Marine Terminal (Switzer Creek)
  - Lagoon Investigations: Impaired Lagoons, Adjacent Beaches, and Agua Hedionda Creek.

Colorado River Hydrologic Basin Surface Water and Groundwater Quality

The Colorado River is the primary source of 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).

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 (SWRCB 2019). 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 (SWRCB 2006).

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 cause flash flood events especially in narrow valleys. 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. However, as the San Diego region averages approximately 10 to 13 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 in 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 Governor's 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 DWR (DWR 2025). 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 estimate of where water would flow if a dam failed completely and suddenly with a full reservoir.

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 DWR to increase awareness of flood risks associated with state-federal levees. A state-federal levee is a levee that is part of the facilities of the State Plan of Flood Control. 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 (Caltrans 2025).

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% 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 historical, 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., areas having a respective 1 and 0.2% chance of being equaled or exceeded with water 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% 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 2021).

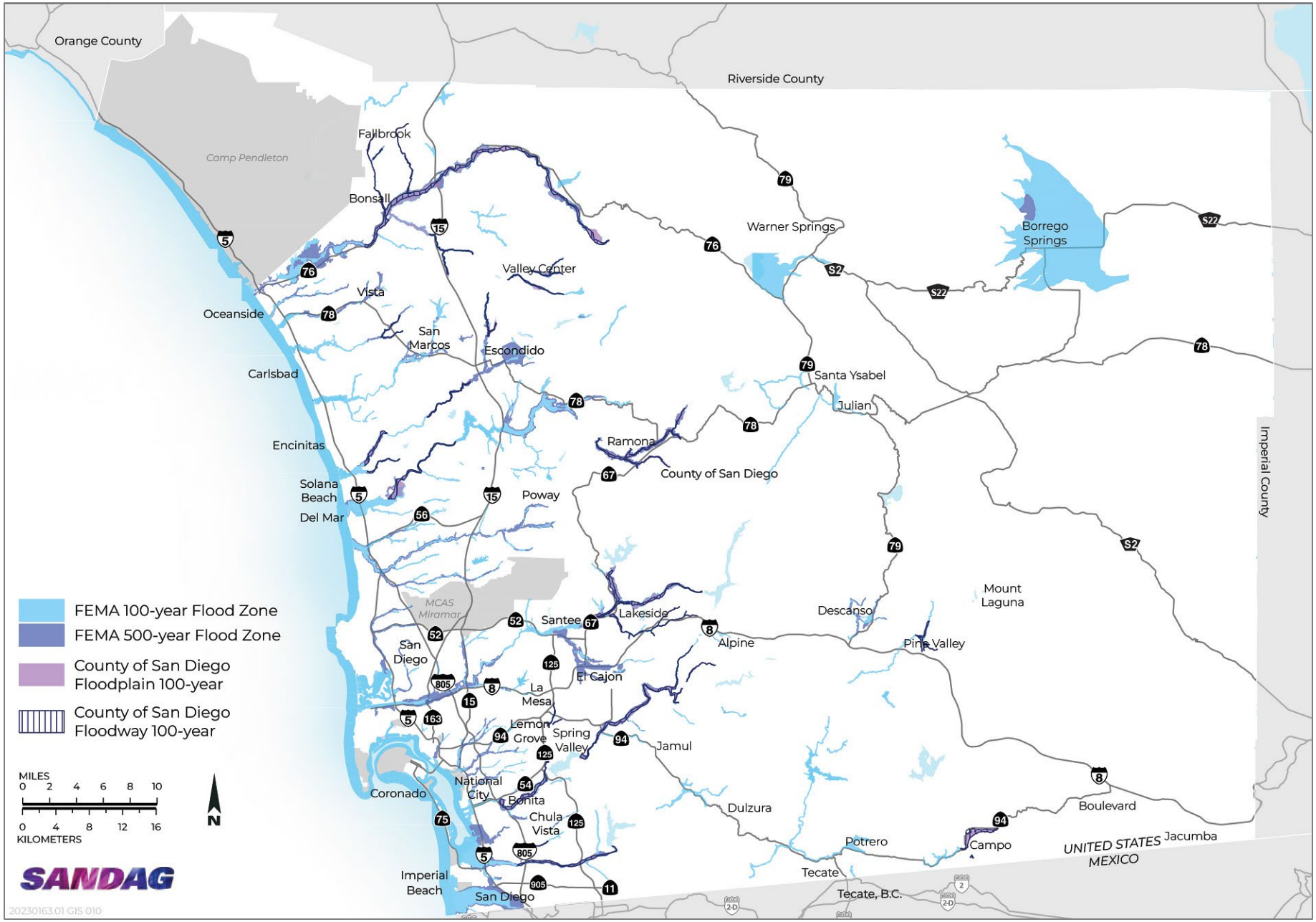
Tsunamis are long-period sea waves generated by an abrupt movement of large volumes of water. These waves can be caused by underwater earthquakes, landslides, volcanic eruptions, meteoric impacts, or onshore slope failures. Seismic conditions and fault zones in the San Diego region are discussed in Section 4.7, "Geology, Soils, and Paleontological Resources." The California Department of Conservation 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.

Maps are available by quadrangle for each affected coastal area/community in 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 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 (Barberopoulou et al. 2011). Between 1854 and 2010, San Diego experienced numerous tsunamis generated by both local and distant earthquakes, including sources as far away as Japan, Chile, Alaska, Hawaii, Kamchatka, Indonesia, Ecuador, and the Aleutians. The most powerful earthquakes, such as the Chilean earthquake in 1960, the Alaskan earthquakes in 1964 and 2004 (Indonesia), and the Rat Islands earthquake in 1957, produced the most significant impacts. While many other events, such as those in 1854, 1923, 1944, and 1952, produced smaller waves of 0.1–0.7 meters, minor damage to harbor infrastructure still occurred. The February 27, 2010 Chile tsunami, with a magnitude of 8.8, produced waves 0.4 meter in height, strong currents, and flooding near Imperial Beach. Smaller events, such as the December 26, 2004 Indonesia tsunami, were detectable by tide gauges, showing that San Diego's harbor has consistently recorded the effects of major global seismic events (Barberopoulou et al. 2011).

ANTICIPATED EFFECTS FROM CLIMATE CHANGE

The San Diego region is likely to experience a variety of climate change impacts including longer and more intense droughts, sea-level rise of up to 1.3 feet by 2050 and up to 6.7 feet by 2100, fewer rainy days, more rainfall during the biggest rainstorms by 2050, and a decrease in runoff and streamflow due to less snowpack and more evaporation (CEP and SDF 2015; Kalansky et al. 2018; OPC 2024; Jennings et al. 2018). When it rains, these climate change effects make the region more susceptible to accelerated erosion and increased mudflow. (Higgs 2024).

Climate change can also worsen water quality in a variety of the region's water resources through increased nonpoint water pollution (i.e., pollution that enters water bodies from a variety of sources) during severe storm events, saltwater intrusion resulting from sea-level rise, sediment from increased incidence of wildfires, and higher temperatures. Heavier storms may decrease both beach and surface water quality because rainfall causes contamination from nonpoint source pollutants such as trash, fertilizers, sediments, metals, sewage, and other fluids, which then drain into the ocean, rivers, reservoirs, and streams. As a result, California health officials recommend that people stay out of the ocean for at least 72 hours following rain events of at least 0.1 inch (Schiff et al. 2016). In 2024, San Diego saw a number of beach closures and advisories due to high bacteria levels, primarily from sewage runoff, particularly from the Tijuana River. La Jolla Children's Pool, Coronado, the Silver Strand, Mission Bay, and Imperial Beach all experienced closures (Anastas 2024; CNS 2024; Smith 2024). The San Diego region may see 8 percent more precipitation during its heaviest storms by 2050 and these more intense rainstorms from climate change may worsen hazardous runoff (CEP and SDF 2015).



Sources: Data downloaded FEMA in 2022 and SANGIS in 2025; adapted by Ascent in 2025.

Figure 4.10-3 Flood Zone and Floodplain Map

Climate change could cause these incidents to increase in frequency or severity. Along the coast, saltwater intrusion from sea-level rise can infiltrate groundwater, worsening the quality of freshwater resources. Projected increases in wildfires across the region may also worsen water quality for surface waterbodies by increasing risk for severe flooding, erosion, and sediment, nutrient, and metal flows into rivers, lakes, and reservoirs (USGS 2023). Additionally, higher temperatures may lead to longer stratification periods (a seasonal separation of water into layers) driving harmful algae blooms, fish die-offs, and increased methane emissions (Tandon 2021).

4.10.2 Regulatory Setting

FEDERAL LAWS, REGULATIONS, PLANS AND POLICIES

Clean Water Act

The federal Clean Water Act (CWA) (33 U.S. Code [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 United States. 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, 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 antidegradation 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 2024). 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 2025). An ARP, as defined by the United States Environmental Protection Agency, is a near-term plan or description of actions, with a schedule and milestones, that can in some cases be more immediately beneficial or practicable than a TMDL in achieving water quality objectives. An ARP is not a substitute for a TMDL, but rather is designed to address impairments prior to the development of a TMDL.

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. SWRCB and the RWQCBs are responsible for issuing Section 401 Water Quality Certifications. Most certifications are issued in connection with CWA Section 404 US 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 United States from point or nonpoint sources without first obtaining an NPDES permit. SWRCB and the nine RWQCBs administer the NPDES permit program. 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 WQOs 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, 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 fill materials into waters of the United States (as defined in 33 CFR 328.3[a]), including wetlands. Dredged material means material that is excavated or dredged from waters of the United States. Fill material means material placed in waters of the United States where the material has the effect of replacing any portion of a waters of the United States with dry land or changing the bottom elevation of waters of the United States. Examples of fill material are rock, sand, soil, clay, plastics, woodchips, concrete, and materials used to create any structure or infrastructure in waters of the United States. Activities in waters of the United States 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.

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 United States 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 that 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 historical, 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 implements standards for ensuring consistency between water quality control plans and policies (SWRCB 2019). 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 2019).

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 WQOs. WQOs 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. SWRCB and the 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
    - will not result in water quality less than that prescribed in state policies (e.g., WQOs 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
    - 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.

2019 Final San Diego Integrated Regional Water Management Plan

The Final 2019 San Diego IRWM Plan was prepared under the direction of the Regional Water Management Group consisting of the San Diego County Water Authority, the County of San Diego, and the City of San Diego (Regional Water Management Group 2018). 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.

California Fish and Game Code Section 1602

All diversions, obstructions, and 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), under 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 NPDES 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, 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 CWA Section 402(p)(6). On February 5, 2013, 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 "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 2022-0057-DWQ (previously 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 2022).

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 2022-0057-DWQ (previously Order 2009-0009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ), the Construction General Permit (SWRCB 2022). 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 1 acre.

Permit applicants are required to submit a notice of intent to SWRCB and to prepare a stormwater 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 (postconstruction BMPs). The Construction General Permit also includes requirements for risk-level assessment for construction sites, a stormwater effluent monitoring and reporting program, 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 and 2018-0028-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 United States 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.

Special Protections for Areas of Special Biological Significance

On March 20, 2012, SWRCB approved Resolution No. 2012-0012 approving an exception to the Ocean Plan prohibition against discharges to Areas of Special Biological Significance (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.

Sustainable Groundwater Management Act

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. Within the county, three groundwater basins have been designated as medium- and high-priority basins by the state under the SGMA. These include Borrego Springs, San Luis Rey Valley, and San Pasqual Valley. See Section 4.18, "Water Supply," for further discussion on this topic.

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 2021).

Water Quality Control Plan for the San Diego Basin

The preparation and adoption of basin plans are 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, WQOs 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 WQOs that must be attained or maintained to protect beneficial uses and conform to the state's antidegradation policy. The WQOs are the levels of water quality constituents that must be met to protect the beneficial uses. A list of these water quality constituents that received narrative or numerical concentration objectives is identified below (San Diego RWQCB 2021). A complete and detailed list of WQOs can be found in the Basin Plan. Each water quality constituent may result in varied objectives conditional on the beneficial use of the waters.

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
- TDS
- Toxicity
- Toxic pollutants[3]
- Trihalomethanes
- Turbidity
- Un-Ionized ammonia

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 2021) 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
- NAV: navigation
- POW: hydropower generation
- REC-1: contact water recreation
- REC-2: non-contact water recreation
- COMM: commercial and sport fishing

[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. Chemical constituents are aluminum, color, copper, corrosivity, foaming agents, iron, manganese, methyl tert-butyl ether, 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.

- BIOL: preservation of biological habitats of special significance
- AQUA: aquaculture
- WARM: warm freshwater habitat
- COLD: cold freshwater habitat
- EST: estuarine habitat
- MAR: marine habitat
- WILD: wildlife habitat
- RARE: rare, threatened, or endangered species
- MIGR: migration of aquatic organisms
- SHELL: shellfish harvesting
- SPWN: spawning, reproduction, and/or early development
- CUL: tribal tradition and culture
- T-SUB: tribal subsistence fishing
- SUB: subsistence fishing

Beneficial uses identified in the Basin Plan (San Diego RWQCB 2021) 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
- WARM: warm freshwater habitat
- SHELL: shellfish harvesting.

Traditionally, groundwater supplies in the San Diego region have produced high-quality drinking water. However, naturally occurring and more recent anthropogenic sources of contamination have decreased 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. SWRCB maintains the GeoTracker database of several types of such 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 2025). Not all of 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 in the San Diego region, contaminated stormwater infiltration, abandoned well heads, and leaking underground storage tanks. The most common contaminants in groundwater in the San Diego region are elevated nitrate, TDS, iron, manganese, and toxic organic pollutants (Regional Water Management Group 2018).

Beneficial uses identified in the Basin Plan (San Diego RWQCB 2021) for groundwaters the San Diego region are:

- MUN: municipal and domestic supply
- AGR: agricultural supply
- IND: industrial service supply
- IPS: industrial process supply
- 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 3-9 and 3-10 in the Basin Plan (San Diego RWQCB 2021) for specific WQOs for each HA for inland surface waters and groundwater, respectively.

Colorado River Basin Regional Water Quality Control Board

The Colorado River Basin RWQCB's goal is to maintain the existing water quality of all nondegraded ground water basins. However, in most cases, groundwater that is pumped generally returns to the basin after use with an increase in mineral concentrations, such as TDS and nitrate, that are picked up by water during its use. Under these circumstances, the RWQCB's objective is to minimize the quantities of contaminants reaching any ground water basin. This could be achieved by establishing management practices for major discharges to land. Until the RWQCB can complete investigations for the establishment of management practices, the objective will be to maintain the existing water quality where feasible.

Colorado River Basin Plan

Beneficial uses identified for surface waters in the Water Quality Control Plan for the Colorado River Basin (CRB RWQCB 2024) for the San Diego region are:

- MUN: municipal and domestic supply
- AGR: agriculture supply
- AQUA: aquaculture
- IND: industrial service supply
- GWR: groundwater recharge
- REC-1: water contact recreation
- REC-2: non-contact water recreation
- WARM: warm freshwater habitat
- COLD: cold freshwater habitat
- WILD: wildlife habitat
- POW: hydropower generation
- FRSH: freshwater replenishment

- RARE: preservation of Rare, threatened, or endangered species
- LREC I: limited water contact recreation.

The groundwater quality discussion for this region is focused on the Borrego Valley Groundwater Basin. The most extensive water quality monitoring data in 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 make up 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 in 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 because 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 (CRB RWQCB 2024) for groundwaters in the San Diego region are:

- MUN: municipal and domestic supply
- AGR: agricultural supply
- IND: industrial service supply.

Establishment of numerical objectives for ground water involves complex considerations because the quality of ground water varies significantly with depth of well perforations, existing water levels, geology, hydrology and several other factors. The RWQCB indicates that detailed investigation of the ground water basins should be conducted before establishing specific ground WQOs (CRB RWQCB 2024).

LOCAL LAWS, REGULATIONS, PLANS, AND POLICIES

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 Storm Water 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 United States 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 MS4 permit, required by NPDES, requires the development of a hydromodification management plan (HMP). Pursuant to RWQCB Order 2007-0001, provision D.1.g, HMPs shall be prepared with the purpose of managing increases in runoff discharge rates and durations from specific projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force. Regulations require site design to account for hydrology and drainage studies are required for projects with significant increases in impervious surfaces. Projects are discouraged from diverting or increasing flows that cross a site. Larger projects (those with 50 acres of disturbance or greater) are subject to hydromodification requirements and must develop a project-level HMP.

The Municipal Permit requires that the Copermittees develop a WQIP for each of 10 WMAs in the San Diego region. These plans identify the highest priority water quality conditions in 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 to identify design requirements and related postconstruction requirements to protect stormwater quality for new development and significant redevelopment in the incorporated cities and unincorporated areas of the San Diego region (County of San Diego 2020). 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 postconstruction 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, which integrates current research on LID implementation in the San Diego region (County of San Diego 2014a). Design techniques include minimizing impervious areas, conserving natural areas, and using 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 predevelopment flow rates and durations.

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

On June 19, 2012, SWRCB adopted Resolution No. 2012-0032, adopting the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of On-Site Wastewater Treatment Systems (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 2012c).

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, or 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 CWA; 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 WQOs for nitrate in groundwater basins. The basin plan amendment also incorporates the State Water Quality Control Policy for Siting, Designing, Operation, and Maintenance of OWTS and made updates related to implementation of waste discharge requirements and adopted resolutions. The Office of Administrative Law approved the San Diego Water Board's Nitrate/OWTS Policy Basin Plan amendment on May 17, 2016 (San Diego RWQCB 2024). 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 2021).

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 in 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 Nontraditional Small MS4. MTS and applied for coverage under the Phase II General Permit. SWRCB adopted Order WQ 2018-007-EXEC amending WQ Order 2013-0001-DWQ on March 13, 2018, to add MTS as a nontraditional 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 MCB 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 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 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 the 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 WQOs, 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. According to a 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 2023).

Approximately 270,263 people may be at risk of 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 low-income households and elderly people. Approximately 585,882 people are at risk of the 500-year flood hazard (County of San Diego 2023).

County of San Diego Floodplain Management Plan

The County of San Diego Floodplain Management Plan (FMP) assesses the flooding hazards in the unincorporated areas of San Diego County, summarizes current County of San Diego programs, describes potential mitigation strategies, and presents a plan for future action (County of San Diego 2007). It was prepared with input from county residents, responsible officials, and consultants, and with the support of Cal OES and FEMA. The FMP discusses a series of flood hazard issues and presents follow-up actions and recommendations for risk reduction. Using 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, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]) 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 from 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* discusses potential risks of flooding, dam failure, safety procedures, involved agencies, and current and future action policies (County of San Diego 2011b). The Safety Element 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. 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 On Site Wastewater Treatment Systems

The Local Agency Management Program (LAMP), updated in February 2025, allows the continued use of OWTS in the jurisdiction of the County of San Diego and expands the local program to permit and regulate alternative OWTS while protecting water quality and public health (County of San Diego 2025). 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.

City of San Diego Stormwater Standards Manual

The Stormwater Standards Manual (City of San Diego 2024) provides the requirements for controlling discharges of pollutants in stormwater associated with construction and permanent phases of development project to ensure new development project comply with federal and state permitting. Specifically, the manual provides guidance for complying with, updated on-site post-construction stormwater requirements for Standard Projects and Priority Development Projects (PDPs), and provides updated procedures for planning, preliminary design, selection, and design of permanent stormwater BMPs based on the performance standards presented in the MS4 Permit.

City of San Diego Manual Standard Operating Procedures

The Standard Operating Procedures Administrative Procedures for Floodplain Management and Compliance (City of San Diego 2023) provides the requirements for minimum actions required for the intake, review, acceptance and recordkeeping of all new and substantially improved projects, as well as all repairs due to substantial damage when proposed in a Special Flood Hazard Area (SFHA) and/or near a Levee. All City departments are responsible for coordinating effectively to ensure that all projects comply with the City's municipal code.

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 checklist questions that address the criteria in CEQA Guidelines Appendix G. 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 the portion of 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, Recreation, 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, in conflict with a water quality control plan or its implementation, or as a result of substantially altering the existing drainage pattern of the area in a manner which provides substantial additional sources of polluted runoff.

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.

The analysis discloses potential impacts to hydrology and water quality. There is not enough evidence to support that climate change effects would worsen the proposed Plan's hydrology and water quality impacts, with the exception of flooding. Due to existing laws and regulations, the hydrology and water quality (HWQ-1 and HWQ-2) impacts of the proposed Plan are unlikely to worsen with future climate change. Analysis would be speculative and is not included in this section. However, because there is literature available that suggests the impacts of the proposed Plan on flooding may worsen with climate change, this literature and analysis are discussed in the HWQ-3 and HWQ-4 impact analyses.

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, OR AS A RESULT OF SUBSTANTIALLY ALTERING THE EXISTING DRAINAGE PATTERN OF THE AREA IN A MANNER WHICH PROVIDES SUBSTANTIAL ADDITIONAL SOURCES OF POLLUTED RUNOFF.

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 whether 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., postconstruction) 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, 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 (2022-0057-DWQ) and local MS4 permit requirements under San Diego Regional Municipal Storm Water Permit (Order R9-2013-0001 [as amended by Order No. R9-2015-0001 and R9-2015-0100]), 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 analysis evaluates whether 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 surfaces that would collect pollutants from vehicles, consisting of, 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 postconstruction 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. Therefore, runoff volumes and pollutants leaving sites during construction and postconstruction operations would be substantially reduced through source control, site design, and 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, substantially degrades water quality, or provide substantial sources of polluted runoff due to implementation of the forecasted regional growth and land use change and planned transportation network improvements.

Water quality impacts associated with wastewater discharge from wastewater treatment facilities (e.g., Point Loma WWTP and Ocean Outfall, 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, "Public Services, Recreation, and Utilities," 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

2035

Regional Growth and Land Use Change

As shown in Table 2-1, in Section 2.0, "Project Description," of this Draft EIR, from 2022 to 2035, the region is forecasted have an increase of 117,056 people (4%), 137,242 housing units (11%), and 67,297 jobs (4%). The 2035 regional SCS land use pattern is shown in Figure 2-4. Approximately 93.3% of the forecasted regional population increases between 2022 and 2035 are in the cities of San Diego (51.3%), Chula Vista (26.1%), and San Marcos (15.8%). Those same three jurisdictions would accommodate approximately 71.4% of new housing units in the region between 2022 and 2035, while the cities of San Diego, San Marcos, and Oceanside would accommodate more than 69.5% of new jobs in the region between 2022 and 2035.

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 ground-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 2035 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. As shown in Table 2-1 in Chapter 2, "Project Description," of this Draft EIR, approximately 93.3% of the forecasted regional population increases between 2022 and 2035 are in the cities of San Diego (51.3%), Chula Vista (26.1%), and San Marcos (15.8%). 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 and groundwater 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, consisting of, 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, such as the CWA implemented by Porter-Cologne Act, Water Code Section 13000 et seq.; NPDES regulations; and the Municipal Permit, would ensure that the increased runoff volume and pollutants generated from development are effectively treated. 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 postconstruction. 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 the 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 WQOs that protect designated beneficial uses of surface and groundwater, as defined in the 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 predevelopment hydrology in compliance with enforced hydromodification requirements (Municipal Permit). Postconstruction BMPs would consist of, 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 manage 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 predevelopment 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 2035. As a result, wastewater discharges (primarily residential, commercial, and industrial) from regional wastewater treatment plants, such as the Point Loma WWTP and Ocean Outfall, 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.

Although population growth would result in an increase in the amount of wastewater generated, especially in the cities of San Marcos and Chula Vista, the existing wastewater treatment plants would have sufficient capacity to serve forecasted growth through 2035 (see Section 4.15). However, smaller treatment plants throughout the region would need to be expanded to ensure they have 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, whereas 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, relative to new regulatory permit requirements for evaluating and ensuring compliance.

Compliance with applicable regulatory requirements outlined above, including CWA implemented by Porter-Cologne Act, Water Code Section 13000 et seq.; NPDES regulations; the Municipal Permit; and Construction General Permit, and in Section 4.10.2, "Regulatory Setting," would require that predevelopment 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, conflict with a water quality control plan or its implementation, or provide substantial sources of polluted runoff. 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 contaminate runoff or receiving waters. In addition, bridge and roadway modifications 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 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 (EPA 2025). 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, and creosote (railway ties) (Wiłkomirski et al. 2010). 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 4.10-1, a variety of transportation network improvements proposed by 2035 cross 303(d)-listed water bodies. Most improvements would occur in areas that are already highly developed with impervious surfaces. By 2035, most projects that would cross 303(d) waters would either be active transportation projects or local improvements to the regional arterial system, streets, or roads with a more limited potential to introduce large acreages of new impervious surface area. Although these facilities are primarily developed urban areas, they also cross 303(d)-listed waters, including rivers, creeks, and lagoons. Transportation network improvements in semirural and rural areas would result in greater increases in impervious surface area and collection of pollutants relative to existing conditions, which would degrade surface water or groundwater quality, conflict with a water quality control plan or its implementation, or provide substantial sources of polluted runoff.

Table 4.10-1 Planned Transportation Network Improvements Crossing 303(d)-Listed Water Bodies by 2035

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
Bike			
	Bayshore Bikeway Segment 1	San Diego Bay	18070304
	Coastal Rail Trail Encinitas	Cottonwood Creek (San Marcos Creek watershed)	18070303
	Coastal Rail Trail Oceanside	Loma Alta Creek	18070303
		Loma Alta Slough	18070303
	Coastal Rail Trail San Diego: Carmel Valley to Roselle via Sorrento	Los Peñasquitos Creek	18070304
		Soledad Canyon	18070304
	Coastal Rail Trail San Diego: Mission Bay (Clairemont to Tecolote)	Tecolote Creek	18070304
	Coastal Rail Trail: Encinitas to Carlsbad	Batiquitos Lagoon	18070303
	I-15 Bikeway: Camino del Rio South to Rancho Mission Road—off-street	San Diego River (Lower)	18070304
	Inland Rail Trail: Phase 4	Buena Vista Creek	18070303
	Inland Rail Trail: Vista to Oceanside	Loma Alta Creek	18070303
	Pacific Beach to East Mission Bay	Mission Bay (area at mouth of Rose Creek only)	18070304
	San Diego River Trail: Bridge connection (Sefton Field to Mission Valley YMCA)	San Diego River (Lower)	18070304
	San Diego River Trail: Carlton Oaks Segment	Forester Creek	18070304
		San Diego River (Lower)	18070304
	Santee–El Cajon Corridor–Forester Creek Connection	Forester Creek	18070304

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
Highway			
	I-15 Managed Lanes	San Diego River (Lower)	18070304
	I-15/I-805 ML connector	Chollas Creek	18070304
	I-5 Managed Lanes	Paleta Creek	18070304
		Loma Alta Creek	18070303
		San Luis Rey River, Lower (west of I-15)	18070303
	I-5/I-805 ML connector	Los Peñasquitos Creek	18070304
		Soledad Canyon	18070304
	I-805 Managed Lanes	Chollas Creek	18070304
		San Diego River (Lower)	18070304
		Chollas Creek	18070304
	SR 15 Managed Lanes	Chollas Creek	18070304
	SR 52 Managed Lanes	Forester Creek	18070304
		San Diego River (Lower)	18070304
	SR 67	Poway Creek	18070304
		San Diego River (Lower)	18070304
	SR 76	San Luis Rey River, Upper (east of I-15)	18070303
	SR 78 Managed Lanes	Buena Creek	18070303
		Buena Vista Creek	18070303
Rail			
	Blue Line (San Ysidro to UTC)	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		Sweetwater River, Lower (below Sweetwater Reservoir)	18070304
		Switzer Creek	18070304
		Tecolote Creek	18070304
		Telegraph Canyon Creek	18070304
	Green Line (Santee to Downtown)	Alvarado Creek	18070304
		San Diego River (Lower)	18070304
	Orange Line (El Cajon to Downtown)	Chollas Creek	18070304
		Switzer Creek	18070304
	Regional Rail 398	Batiquitos Lagoon	18070303
		Buena Vista Lagoon	18070303
		Cottonwood Creek (San Marcos Creek watershed)	18070303
		Loma Alta Creek	18070303
		Los Peñasquitos Creek	18070304

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
		Los Peñasquitos Lagoon	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		Soledad Canyon	18070304
		Tecolote Creek	18070304
	Regional Rail 598	Batiquitos Lagoon	18070303
		Buena Vista Lagoon	18070303
		Cottonwood Creek (San Marcos Creek watershed)	18070303
		Loma Alta Creek	18070303
		Loma Alta Slough	18070303
		Los Peñasquitos Creek	18070304
		Los Peñasquitos Lagoon	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		Soledad Canyon	18070304
		Tecolote Creek	18070304
	SPRINTER (Oceanside to Escondido)	Buena Creek	18070303
		Buena Vista Creek	18070303
		Escondido Creek	18070303
		Loma Alta Creek	18070303

Notes: I = Interstate; SR = State Route; ML = Managed Lane; UTC = University Town Center.

Source: SWRCB 2018; adapted by Ascent 2025.

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, and 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 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 WQOs 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). Postconstruction 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 including the Construction General Permit, Caltrans Statewide Storm Water Program and Management Plan, and Municipal Stormwater Permit outlined above and in Section 4.10.2, "Regulatory Setting," would require that predevelopment 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.

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 conflict with a water quality control plan or its implementation, or provide substantial sources of polluted runoff 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 2035 analysis, 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. As shown in Table 2-1 in Section 2.0 "Project Description," of this Draft EIR, from 2036 to 2050, the region is forecasted to decrease by 4,112 people (-0.1%), increase by 65,577 housing units (4.8%), and increase by 103,460 jobs (6.2%). The 2050 regional SCS land use pattern is shown in Figure 2-5. The majority of the forecasted regional population decrease between 2036 and 2050 is attributed to the unincorporated jurisdictions, the City of Carlsbad, and the City of El Cajon. Approximately 78.8% of new housing units would be developed in the City of San Diego (51.6%), City of Chula Vista (17.1%), and unincorporated jurisdictions. Similarly, these same three jurisdictions would accommodate approximately 70.3% 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 and groundwater quality if not properly managed. Several creeks and coastal lagoons have existing water quality impairments; therefore, any

increase in pollutant concentrations from new development could 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 2035 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 postconstruction. 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 WQOs that protect designated beneficial uses of surface and groundwater, as defined in the Basin Plan.

During operations and maintenance of development projects, postconstruction 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. Postconstruction BMPs are listed in the 2035 analysis.

As discussed in the 2035 analysis, 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 2022). 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, whereas 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 is not adversely impacted by wastewater discharges.

Compliance with applicable regulatory requirements outlined above including CWA implemented by Porter-Cologne Act, Water Code Section 13000 et seq.; NPDES regulations; the Municipal Permit; Construction General Permit, and in Section 4.10.2, "Regulatory Setting," would require that predevelopment 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, conflict with a water quality control plan or its implementation. or provide substantial sources of polluted runoff. This impact is less than significant.

Transportation Network Improvements and Programs

Major transportation network improvements by 2050 include new Managed Lanes and Managed Lane Connectors on SR 52, SR 56, SR 75, SR 94, SR 125, SR 163, I-15, and I-805, several of which will be a continuation of improvements from 2035. As described in the 2035 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 could also generate pollutants that could contaminate runoff or receiving waters. In addition, bridge and roadway modifications across water courses would be required. Construction disturbances and dredging would have an adverse impact on 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. As described above, primary water pollutants associated with transportation infrastructure include oil and grease, metals, sediment, hydrocarbons, trash and debris, PAHs, heavy metals, and herbicides. Runoff would transport pollutants via local storm drain systems, and if not properly managed, pollutants could adversely affect surface water quality. In general, bicycle improvement 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 4.10-2, several planned transportation network improvements by 2050, including the addition of Managed Lanes to Interstate (I) 5, I-15, I-805, State Route (SR) 15, SR 78, and SR 94, cross multiple 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 such that transportation-related pollutants would discharge into storm drains and receiving waters which could degrade water quality in violation of water quality standards or WDRs, conflict with a water quality control plan or its implementation. or provide substantial sources of polluted runoff. Transportation network improvements by 2050 include new Managed Lanes and Managed Lane connectors on SR 15, SR 52, SR 78, I-15, and I-805, which would also cross 303(d)-listed water bodies. Like the 2035 phase year, 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 and transportation-related pollutants would discharge into storm drains and receiving waters which could degrade water quality in violation of water quality standards or WDRs, conflict with a water quality control plan or its implementation. or provide substantial sources of polluted runoff.

Compliance with applicable regulatory requirements described in the 2035 analysis and in Section 4.10.2, "Regulatory Setting," would require that predevelopment 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 WQOs 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, conflict with a water quality control plan or its implementation, or provide substantial sources of polluted runoff. This impact is therefore less than significant.

Table 4.10-2 Planned Transportation Network Improvements Crossing 303(d)-Listed Water Bodies by 2050

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
Bike			
	Camp Pendleton Trail	San Mateo Creek (San Diego County)	18070301
	Bear Valley Bikeway	Kit Carson Creek	18070304
	Chollas Creek Bikeway: North Fork	Chollas Creek	18070304
	Clairemont Mesa to Linda Vista Bikeway	Rose Creek	18070304
	Golden Hill to Fairmount Park	Chollas Creek	18070304

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
	I-15 Bikeway: Murphy Canyon Road to Affinity Court	Carroll Canyon	18070304
		Murphy Canyon	18070304
		Rose Creek	18070304
	I-15 Bikeway: via Rancho Parkway to Citracado Parkway	Kit Carson Creek	18070304
	North Coast Bike Trail	Cottonwood Creek (San Marcos Creek watershed)	18070303
		San Dieguito Lagoon, Lower Basin	18070304
		San Dieguito River	18070304
	San Diego River Bikeway Connections	San Diego River (Lower)	18070304
	San Luis Rey River Trail	Green Canyon Creek	18070303
		Live Oak Creek (San Diego County)	18070303
		San Luis Rey River, Lower (west of I-15)	18070303
	SR 125 Connector: Bonita Road to the United States–Mexico Border	Otay River	18070304
	SR 52 Bikeway: I-5 to Santo Road	Murphy Canyon	18070304
		Rose Creek	18070304
		San Clemente Creek (San Diego County)	18070304
	SR 67 Bikeway – Lakeside to Ramona	Poway Creek	18070304
		San Diego River (Lower)	18070304
	SR 94 multiuse pathway	Mexican Canyon Creek (western tributary to Sweetwater River, Upper)	18070304
		Steele Canyon	18070304
		Sweetwater River, Middle (between Sweetwater and Loveland Reservoirs)	18070304
Highway			
	I-15 Managed Lanes	Murphy Canyon	18070304
		San Diego River (Lower)	18070304
		Shepherd Canyon	18070304
	I-15/I-805 ML connector	Chollas Creek	18070304
	I-15/SR 94 ML connector	Chollas Creek	18070304
	I-5 Managed Lanes	Paleta Creek	18070304
		Loma Alta Creek	18070303
		San Luis Rey River, Lower (west of I-15)	18070303
	I-5/I-805 ML Connector	Los Peñasquitos Creek	18070304
		Soledad Canyon	18070304
	I-805 Managed Lanes	Chollas Creek	18070304
		San Clemente Creek (San Diego County)	18070304
		San Diego River (Lower)	18070304

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
		Chollas Creek	18070304
	SR 15 Managed Lanes	Chollas Creek	18070304
	SR 52 Managed Lanes	Murphy Canyon	18070304
		Forester Creek	18070304
		San Diego River (Lower)	18070304
	SR 67	Poway Creek	18070304
		San Diego River (Lower)	18070304
	SR 76	Gomez Creek	18070303
		Gomez Creek	18070303
		San Luis Rey River, Upper (east of I-15)	18070303
		Pauma Creek	18070303
		San Luis Rey River, Upper (east of I-15)	18070303
	SR 78 Managed Lanes	Agua Hedionda Creek	18070303
		Buena Creek	18070303
		Buena Vista Creek	18070303
		San Marcos Creek, Upper (above San Marcos Lake)	18070303
	SR 79	Santa Ysabel Creek (above Sutherland Reservoir)	18070304
	SR 94	Cottonwood Creek below Barrett Reservoir	18070305
		Dulzura Creek	18070304
		Jamul Creek	18070304
		Olive Vista Creek	18070304
Rail			
	Blue Line (San Ysidro to UTC)	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		Sweetwater River, Lower (below Sweetwater Reservoir)	18070304
		Switzer Creek	18070304
		Tecolote Creek	18070304
		Telegraph Canyon Creek	18070304
	Green Line (Santee to Downtown)	Alvarado Creek	18070304
		San Diego River (Lower)	18070304
	Light Rail 582	Chollas Creek	18070304
		Paleta Creek	18070304
		Paradise Creek, HSA 908.320	18070304
		San Diego River (Lower)	18070304

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
		Sweetwater River, Lower (below Sweetwater Reservoir)	18070304
		Telegraph Canyon Creek	18070304
	Orange Line (El Cajon to Downtown)	Chollas Creek	18070304
		Switzer Creek	18070304
	Regional Rail 398	Batiquitos Lagoon	18070303
		Buena Vista Lagoon	18070303
		Cottonwood Creek (San Marcos Creek watershed)	18070303
		Loma Alta Creek	18070303
		Los Peñasquitos Creek	18070304
		Los Peñasquitos Lagoon	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		San Dieguito Lagoon, Lower Basin	18070304
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		San Luis Rey River, Lower (west of I-15)	18070303
		Soledad Canyon	18070304
		Tecolote Creek	18070304
	Regional Rail 598	Batiquitos Lagoon	18070303
		Buena Vista Lagoon	18070303
		Cottonwood Creek (San Marcos Creek watershed)	18070303
		Loma Alta Creek	18070303
		Loma Alta Slough	18070303
		Los Peñasquitos Creek	18070304
		Los Peñasquitos Lagoon	18070304
		Rose Creek	18070304
		San Diego River (Lower)	18070304
		San Dieguito Lagoon, Lower Basin	18070304
		San Dieguito River	18070304
		San Elijo Lagoon	18070303
		San Luis Rey River, Lower (west of I-15)	18070303
		Soledad Canyon	18070304
		Tecolote Creek	18070304
	SPRINTER (Oceanside to Escondido)	Buena Creek	18070303
		Buena Vista Creek	18070303
		Escondido Creek	18070303

Improvement Type	Project Name	Impaired Waterbody	Hydrologic Unit #
		San Marcos Creek, Upper (above San Marcos Lake)	18070303
	Streetcar	Switzer Creek	18070304

Notes: I = Interstate; SR = State Route; ML = Managed Lane; UTC = University Town Center.

Source: SWRCB 2018; adapted by Ascent 2025.

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, conflict with a water quality control plan or its implementation, or provide substantial sources of polluted runoff 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.

MITIGATION MEASURES

No mitigation measures are required for this impact.

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

Evaluation of potential impacts associated with changes to the existing drainage pattern is based on a review of the proposed Plan in the context of state regulations, such as the Construction General Permit, and local regulations, such as general plans. The analysis examines how implementation of the proposed Plan, including components of the Sustainable Community Strategy (SCS) land use pattern and planned transportation improvements, such as increased impervious surfaces and construction activities associated with future development that would accommodate regional growth, may affect existing hydrology. 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. Implementation of the proposed Plan would have a significant impact related to alteration of existing drainage patterns if implementation were to substantially increase erosion or siltation on or off site.

Impact Analysis

2035

Regional Growth and Land Use Change

Regional growth and land use change associated with the proposed Plan could alter existing topography, change drainage patterns, increase impervious surface area, add pollutant sources, and reduce natural (i.e., undeveloped) landscape.

As shown in Table 2-1, in Section 2.0, "Project Description," of this Draft EIR, from 2022 to 2035, the region is forecasted have an increase of 117,056 people (4%), 137,242 housing units (11%), and 67,297 jobs (4%). The 2035 regional SCS land use pattern is shown in Figure 2-4. Approximately 93.3% of the forecasted regional population increases between 2022 and 2035 are in the cities of San Diego (51.3%), Chula Vista (26.1%), and San Marcos (15.8%). Those same three jurisdictions would accommodate approximately 71.4% of new housing units in the

region between 2022 and 2035, while the cities of San Diego, San Marcos, and Oceanside would accommodate more than 69.5% of new jobs in the region between 2022 and 2035.

Most development between 2022 and 2035 would consist of infill development and redevelopment in existing urban and suburban communities that are already highly developed with impervious surfaces. Redevelopment of existing areas or new development would likely require grading or earthwork and alter existing topography, which may increase the propensity for soils to become unstable and cause erosion or siltation on or off future development sites. 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 topography and 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, including Section 402 of the CWA, the Construction General Permit, and the Municipal Permit. 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 1 acre and would identify the sources of pollutants that may affect the quality of stormwater and would include construction BMPs to control erosion and minimize pollutants (e.g., sedimentation/siltation) in runoff.

Related to alterations to existing topography, development associated with the proposed Plan would be required to adhere to existing laws and regulations, including the design standards described in the CBC and all standard design, grading, and construction practices to avoid or reduce erosion or siltation. Specifically, the CBC addresses the design and construction of excavations, foundations, and other building elements to mitigate adverse soil conditions by requiring structures and buildings are built to withstand potential hazards associated with unstable or problematic soils. Compliance with the CBC would minimize risks associated with locating future development on unstable geologic units or soils. See Section 4.7.2 for a description of applicable CBC requirements. Further, site-specific analyses would be required for future development as a result of regional growth. Corrective measures, such as structural reinforcement and using engineered fill to replace unstable and expansive soils, would be applied to the design of individual future projects. All site designs would be reviewed and approved by the appropriate agencies.

During operations and maintenance, development projects would maintain predevelopment hydrology in compliance with current hydromodification requirements of the Municipal Permit. 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 predevelopment 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 postconstruction operations would be required to be mitigated and treated through LID, on site design, or off site 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 to comply with the Municipal Permit. 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 Municipal Permit requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain predevelopment 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 2035. This impact is less than significant.

Transportation Network Improvements and Programs

Major transportation network improvements by 2035 include new Managed Lanes and Managed Lane connectors on SR 15, SR 52, SR 78, SR 125, I-5, I-15, and I-805. The proposed Plan also includes Reversible Managed Lane improvements on SR-75, improvements to rural corridors on SR 67, SR 76, SR 79, SR 94, and I-8, as well as interchange and arterial operational improvements on SR 94 and SR 125. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as tolling equipment and Regional Border Management System investments on SR 11. Upgrades at certain locations on the LOSSAN Rail Corridor would be implemented during this period. Other major network improvements include grade separations at certain locations on the SPRINTER, Green line, Blue Line, and Orange Line. Double-tracking is also proposed on the SPRINTER. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

The proposed transportation network improvements (e.g., highway, arterial, transit, and bicycle) would result in alterations to existing topography and drainage patterns without the incorporation of the appropriate BMPs. By 2035, additional transportation network improvements and programs would be developed, including new Managed Lanes and Managed Lane connectors on SR 15, SR 52, SR 78, I-5, I-15, and I-805. The proposed Plan also includes improvements to rural intersections and interchanges on SR 67, SR 76, and SR 94, as well as interchange and arterial operational improvements on SR 94 and SR 125. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico Border, as well as tolling equipment and regional border management system investments on SR 11. Upgrades at certain locations on the Los Angeles–San Diego–San Luis Obispo (LOSSAN) Rail Corridor would be implemented during this period. Other major network improvements include grade separations at certain locations on the SPRINTER, Green line, Blue Line, and Orange Line. Double-tracking is also proposed on the SPRINTER. Some of these improvements and programs may involve major grading or earthwork resulting in alterations to existing topography and 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. Although 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 increases in impervious areas and the construction of bridge pilings which can alter streams, rivers, and floodways. 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 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.

Caltrans policies related to 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 Municipal Permit, Construction General Permit, Municipal Stormwater Permit, and the Caltrans NPDES permit, on and off site 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 such as the Construction General Permit and Industrial General Permit, 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 predevelopment 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 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, "Regulatory Setting," 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 predevelopment hydrology, and would reduce, infiltrate, and properly manage stormwater runoff such that alterations to the existing drainage pattern of an area, would not result in substantial erosion or siltation on or off site. Therefore, this impact (HWQ-2) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

Similar to the 2035 analysis, regional growth and development associated with the proposed Plan could alter existing topography, 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. Redevelopment of existing areas or new development would likely require grading or earthwork and alter existing topography, which may increase the propensity for soils to become unstable and cause erosion or siltation on or off future development sites. As shown in Table 2-1 in Section 2.0 "Project Description," of this Draft EIR, from 2036 to 2050, the region is forecasted to decrease by 4,112 people (-0.1%), increase by 65,577 housing units (4.8%), and increase by 103,460 jobs (6.2%). The 2050 regional SCS land use pattern is shown in Figure 2-5. The majority of the forecasted regional population decrease between 2036 and 2050 is attributed to the unincorporated jurisdictions, the City of Carlsbad, and the City of El Cajon. Approximately 78.8% of new housing units would be developed in the City of San Diego (51.6%), City of Chula Vista (17.1%), and unincorporated jurisdictions. Similarly, these same three jurisdictions would accommodate approximately 70.3% 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, development forecasted on vacant land, open space, and agricultural land, mainly in San Diego County, 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 result in alterations to existing topography and 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, and siltation, as well as design standards and other applicable regulations such as the Construction General Permit, and the Municipal Permit to reduce impacts. development associated with the proposed Plan would be required to adhere to existing laws and regulations, including the design standards described in the CBC and all standard design, grading, and construction practices to avoid or reduce erosion or siltation. Specifically, the CBC addresses the design and construction of excavations, foundations, and other building elements to mitigate adverse soil conditions by requiring structures and buildings are built to withstand potential hazards associated with unstable or problematic soils. Compliance with the CBC would minimize risks associated with locating future development on unstable geologic units or soils. See Section 4.7.2 for a description of applicable CBC requirements. Further, site-specific analyses would be required for future development as a result of regional growth. Corrective measures, such as structural reinforcement and using engineered fill to replace unstable and expansive soils, would be applied to the design of individual future projects. All site designs would be reviewed and approved by the appropriate agencies. 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 comply with hydromodification management requirements identified in the Municipal Permit, which requires the implementation of hydrologic control measures so that post project runoff flow rates and durations do not exceed predevelopment flow rates and durations. Further, the Municipal Permit would require LID, on site design, or off site structural BMPs for future development. 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 accommodating regional growth, surface runoff patterns and erosive flows would be controlled. Through the Municipal Permit requirements to incorporate hydromodification measures, future development that would accommodate regional growth would maintain predevelopment 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

Major transportation network improvements by 2050 include new Managed Lanes and Managed Lane Connectors on SR 52, SR 56, SR 75, SR 94, SR 125, SR 163, I-15, and I-805, several of which will be a continuation of improvements from 2035. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as expansion of and improvements to existing port of entry facilities, which will continue during this period. Upgrades at certain locations on the LOSSAN Rail Corridor would continue during this period. Grade separations on the SPRINTER, Blue Line, Green Line, and Orange Line, as well as double-tracking on the SPRINTER would also continue during this period. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

Similar to the 2035 analysis, the proposed transportation network improvements by 2050 would result in alterations to existing topography and 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. Although most of the transportation network improvements would occur in already urbanized areas, some improvements, mainly in San Diego County, would occur on vacant land, increasing impervious surface areas, stormwater flow volume or velocity, and scouring and erosion in channels. Similar to the 2035 analysis, 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 2-7 and 2-8. Transportation network improvements and programs proposed under the proposed Plan would be required to conform to and comply with the water quality protection regulations discussed above 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 standards (e.g., municipal HMPs, Caltrans, FHWA, and FTA standards) 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 predevelopment 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, "Regulatory Setting," 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 predevelopment hydrology, and would reduce, infiltrate, and properly manage stormwater runoff such that alterations to the existing drainage pattern of an area, would not result in substantial erosion or siltation on or off site. Therefore, this impact (HWQ-2) in the year 2050 is less than significant.

MITIGATION MEASURES

No mitigation measures are required for this impact.

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

Evaluation of potential impacts associated with changes to the existing drainage pattern potential and flooding impacts is based on a review of the proposed Plan in the context of federal regulations such as FEMA's NFIP; and local regulations such as general plans and the County's Multi-Jurisdictional Hazard Mitigation Plan, and local flood control and stormwater management practices. The analysis examines how implementation of the proposed Plan, including components of the SCS land use pattern and planned transportation improvements, such as increased impervious surfaces, and construction activities, may alter existing drainage patterns that could lead to flooding or impede or redirect flood flows.

Future development associated with the implementation of the SCS land use pattern 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), whereas 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 under the proposed Plan are qualitatively evaluated in the analysis below. A qualitative analysis of the proposed Plan's ability to maintain predevelopment hydrology, properly minimize and treat project runoff, and incorporate LID site design is provided, and any resulting potential impacts associated with flooding are analyzed. 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. The analysis is based on the most current data and planning tools, including data from FEMA's FIRMs that delineate 100-year flood hazard areas to assist local governments with the land use planning and floodplain management decisions, in accordance with the National Flood Insurance Act, and the County of San Diego's 100-year flood hazard mapping identified in the Multi-Jurisdictional Hazard Mitigation Plan.

Impact Analysis

2035

Regional Growth and Land Use Change

As shown in Table 2-1, in Section 2.0, "Project Description," of this Draft EIR, from 2022 to 2035, the region is forecasted have an increase of 117,056 people (4%), 137,242 housing units (11%), and 67,297 jobs (4%). The 2035 regional SCS land use pattern is shown in Figure 2-4. Approximately 93.3% of the forecasted regional population increases between 2022 and 2035 are in the cities of San Diego (51.3%), Chula Vista (26.1%), and San Marcos (15.8%). Those same three jurisdictions would accommodate approximately 71.4% of new housing units in the region between 2022 and 2035, while the cities of San Diego, San Marcos, and Oceanside would accommodate more than 69.5% of new jobs in the region between 2022 and 2035. The regional growth pattern in 2035 would result in development within 100-year and 500-year flood hazard zones (see Figure 4.10-3). FEMA prepares FIRMs that delineate floodplains in geographic areas across the nation to assist with appropriate land use planning and floodplain management decisions needed to meet the requirements of the NFIP. In general, the NFIP mandates that development is not to proceed within the 100-year floodplain if development is expected to increase flood

elevation by 1 foot or more. The County of San Diego FMP identifies actions and recommendations for flood risk reduction (County of San Diego 2007). Development that would accommodate growth under the proposed Plan is required to align with the County's hazard MAP as part of compliance with the County of San Diego FMP (County of San Diego 2007). Designing regional growth land use projects to comply with County and city general plan safety elements and flood ordinances would further ensure that development associated with the proposed Plan would be built to minimize flood risk.

As discussed in Impact HWQ-2, development that would accommodate regional growth and land use patterns associated with the proposed Plan would change drainage patterns, increase impervious surface area, 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, an increase in potential for flooding, and 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 regulations would require the implementation of BMPs during construction to minimize runoff from the construction site and reduce the potential for any on or off site flooding. During operations and maintenance, development projects would ensure predevelopment hydrology is maintained in compliance with current hydromodification requirements of the Municipal Permit, as discussed in Impact HWQ-2. Runoff from post construction operations for all new developments would be required to be mitigated and treated through LID, on site design, or off site 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. 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 run-on and runoff from individual construction sites. Therefore, the proposed Plan would not result in construction impacts that could increase the rate or amount of surface runoff in a manner which would result in flooding on or off site or impede or redirect flood flows by 2035.

To address the alteration of drainage patterns that could affect existing flood risk, compliance with the NPDES MS4 Phase I and Phase II permits requires agencies to implement stormwater management plans. Stormwater management plans require the implementation of site design control measures, which can include conserving natural areas, protecting slopes and channels, minimizing impervious surfaces, the use of vegetated swales and buffers, grass median strips, detention basins, ponds or constructed wetlands, infiltration basins, settlement ponds, or other LID practices and drainage control features such as rain gardens, vegetated rooftops, rain barrels, and permeable pavement. These design practices would help to maximize on site infiltration of runoff, preserve natural drainage flow where appropriate, and control stormwater drainage and runoff flow to minimize potential drainage impacts affecting existing flood risk. Although future development could result in an increased volume of surface water runoff from new impervious surfaces compared to existing conditions, compliance with local, state, and federal regulations would be effective in minimizing impacts related to alteration of drainage.

Land use patterns by 2035 under the proposed Plan to accommodate regional growth would be concentrated in built-out areas where drainage infrastructure already exists. In these areas, increasing intensification of land uses would either be accommodated by existing drainage infrastructure or project applicants would be required to construct infrastructure improvements in accordance with local ordinances within the plan area. Development that would occur in undeveloped and/or vacant areas with no previous infrastructure would be required to comply with NPDES permits, depending on project size; site design control measures and LID practices to address flooding; and local ordinances and regulations regarding on site drainage, stormwater management, and runoff. Compliance with applicable regulations would ensure that drainage would not be altered such that any changes to existing drainage patterns would not increase the rate or amount of surface runoff in a manner which would result in flooding on or off site or impede or redirect 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 volumes and flooding would be controlled. Through the requirements to incorporate hydromodification measures as required by the Municipal Permit, the regional growth and land use changes would maintain predevelopment hydrology and would not substantially increase the rate or amount of, 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 2035. This impact is less than significant.

Transportation Network Improvements and Programs

Major transportation network improvements by 2035 include new Managed Lanes and Managed Lane connectors on SR 15, SR 52, SR 78, SR 125, I-5, I-15, and I-805. The proposed Plan also includes Reversible Managed Lane improvements on SR-75, improvements to rural corridors on SR 67, SR 76, SR 79, SR 94, and I-8, as well as interchange and arterial operational improvements on SR 94 and SR 125. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as tolling equipment and Regional Border Management System investments on SR 11. Upgrades at certain locations on the LOSSAN Rail Corridor would be implemented during this period. Other major network improvements include grade separations at certain locations on the SPRINTER, Green line, Blue Line, and Orange Line. Double-tracking is also proposed on the SPRINTER. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

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. Although 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 or velocity, thereby increasing the risk of flooding. However, no other structures apart from bridge pilings associated with transportation network improvements are anticipated to be added 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 run-on 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 prepared with the purpose of managing increases in runoff discharge rates and durations from specific projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force.

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 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 Permit, require that PDPs maintain predevelopment 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 predevelopment 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, "Regulatory Setting," 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 increase the rate or amount of, 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 predevelopment hydrology and would reduce, infiltrate, and properly manage stormwater runoff. Therefore, this impact (HWQ-3) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

As shown in Table 2-1 in Section 2.0 "Project Description," of this Draft EIR, from 2036 to 2050, the region is forecasted to decrease by 4,112 people (-0.1%), increase by 65,577 housing units (4.8%), and increase by 103,460 jobs (6.2%). The 2050 regional SCS land use pattern is shown in Figure 2-5. The majority of the forecasted regional population decrease between 2036 and 2050 is attributed to the unincorporated jurisdictions, the City of Carlsbad, and the City of El Cajon. Approximately 78.8% of new housing units would be developed in the City of San Diego (51.6%), City of Chula Vista (17.1%), and unincorporated jurisdictions. Similarly, these same three jurisdictions would accommodate approximately 70.3% of new jobs between 2036 and 2050. Similar to the 2035 analysis, the land use pattern in 2050 would result in development within 100-year and 500-year flood hazard zones (see Figure 4.10-3). Designing regional growth and land use projects to comply with NFIP mandates, the County of San Diego FMP, and County and city general plan safety elements and flood ordinances would minimize flood risk to future development. Compliance with individual requirements or regulatory oversight, approval, or involvement from municipal and county flood control management agencies would further reduce the risk of pollutant release due to project site inundation by restricting uses that are dangerous to health, safety, and property due to erosion or water hazards; require uses vulnerable to floods to be protected from 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. As described above, the NFIP mandates that development is not to proceed within the 100-year floodplain if development is expected to increase flood elevation by 1 foot or more, which would prohibit new development in areas subject to flooding which could increase the risk of pollutant release due to inundation.

Similar to the 2035 analysis and as discussed in Impact HWQ-2, development that would accommodate regional growth and land use patterns associated with the proposed Plan would change drainage patterns, increase impervious surface area, 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 off site flooding or impeded or redirected flood flows.

Operations and maintenance for development projects would be required to maintain predevelopment hydrology in compliance with enforced hydromodification requirements, similar to requirements in the Municipal Permit, which would require LID, on site design, or off site structural BMPs. Through the requirements to incorporate hydromodification measures, the regional growth and land use changes would maintain predevelopment hydrology. Therefore, development associated with regional growth and land use change would not substantially alter existing drainage patterns, or increase the rate or amount of surface runoff in a manner which would result in flooding on or off site or impede or redirect flood flows by 2050. This impact is less than significant.

Transportation Network Improvements and Programs

Major transportation network improvements by 2050 include new Managed Lanes and Managed Lane Connectors on SR 52, SR 56, SR 75, SR 94, SR 125, SR 163, I-15, and I-805, several of which will be a continuation of improvements from 2035. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as expansion of and improvements to existing port of entry facilities, which will continue during this period. Upgrades at certain locations on the LOSSAN Rail Corridor would continue during this period. Grade separations on the SPRINTER, Blue Line, Green Line, and Orange Line, as well as double-tracking on the SPRINTER would also continue during this period. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

Similar to the 2035 analysis and as discussed in Impact HWQ-2, the proposed transportation network improvements by 2050, including the addition of Managed Lanes to Interstate (I) 5, I-15, I-805, State Route (SR) 15, SR 78, and SR 94 would increase impervious surface which could 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 associated with transportation network improvements are anticipated to be added 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 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 predevelopment hydrology. Therefore, transportation network improvements associated with the proposed Plan would not substantially alter existing drainage patterns, or substantially increase the rate or amount of, or impede or redirect 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, "Regulatory Setting," 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 substantially increase the rate or amount of, 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 predevelopment hydrology and would reduce, infiltrate, and properly manage stormwater runoff such that on or off site flooding would not occur. Therefore, this impact (HWQ-3) in the year 2050 is less than significant.

Impacts of the Proposed Plan with Future Climate Change

With future climate change, growth and land use change and transportation network improvements would result in alterations to drainage patterns. However, development and transportation projects as described in the proposed Plan are required to comply with existing and evolving regulatory requirements that control surface runoff patterns and floodwater, as well as design standards (e.g., SWPPP, hydromodification, and LID measures) and other applicable regulations to reduce impacts. The proposed Plan's drainage impacts would be worsened by climate change; however, regularly updated flood mapping, regulations (e.g., NPDES), and design standards are increasingly stringent and are expected to mitigate runoff.

MITIGATION MEASURES

No mitigation measures are required for this impact.

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

Analysis Methodology

This section analyzes whether areas where growth would occur and land use change and transportation network improvements that occur near the San Diego region's coastline would be subjected to hazards resulting from flooding, tsunamis, or seiches. In addition, this section analyzes whether inland areas where growth would occur and land use change and transportation network improvements that occur near surface water resources, such as streams and rivers, would be subject to flooding. Flooding, tsunami, and seiche hazard areas identified in local general plans or other data sources are referenced to determine whether any forecasted regional growth and land use change or planned transportation network improvements or programs under the proposed Plan would occur in 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 land use changes or planned transportation network improvements may occur in 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 would occur in areas with 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. A new project that might result in the risk of pollutant release due to inundation would likely be limited to an industrial project that uses significant amounts of chemicals in industrial processes or stores chemical outdoors that could be washed away in the event of flooding from tsunami or seiche. This section evaluates the potential for future development that would accommodate regional growth that could be inundated by flooding and pose a risk of release of pollutants.

Impact Analysis

2035

Regional Growth and Land Use Change

As shown in Table 2-1, in Section 2.0, "Project Description," of this Draft EIR, approximately 93.3% of the forecasted regional population increase between 2022 and 2035 are in the cities of San Diego (51.3%), Chula Vista (26.1%), and San Marcos (15.8%). Development with project footprints that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas in 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 2025). 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, 19 measurable tsunamis have been recorded in the San Diego region, with most only a few tenths of a meter high (Agnew 1979). There is no historical precedent for large damaging seiches in the San Diego region; therefore, the risk of seiches affecting development associated with regional growth would be expected to be low.

Although the risk of tsunami and seiche and the associated risk of pollution release are considered low in the San Diego region, development under the proposed Plan would occur in areas subject to these hazards. Regional growth in 2035 would result in development within 100-year and 500-year flood hazard zones (see Figure 4.10-3). Designing regional growth and land use projects to comply with NFIP mandates, the County of San Diego FMP, and County and City general plan safety elements and flood ordinances would minimize flood risk to development associated

with the proposed Plan. As described above, the NFIP mandates that development is not to proceed within the 100-year floodplain if development is expected to increase flood elevation by 1 foot or more, which would prohibit new development in areas subject to flooding which could increase the risk of pollutant release due to inundation.

Development projects associated with regional growth in the Plan area would also be subject to the requirements of applicable municipal and county flood control management regulations and plans such as the County of San Diego FMP, and local floodplain management ordinances (e.g., the County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]). Compliance with individual requirements or regulatory oversight, approval, or involvement from municipal and county flood control management agencies would further reduce the risk of pollutant release due to project site inundation by restricting uses that are dangerous to health, safety, and property due to erosion or water hazards; require uses vulnerable to floods to be protected from 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.

The risk of release of pollutants is related to local seismic conditions and potential flooding that could occur. As described in Section 4.9, "Hazards and Hazardous Materials," development that occurs in the Plan area could include a range of type and intensity of pollutants during construction and operation. The use and storage of these pollutants is regulated to minimize the potential for accidental release. State and local regulations are also in place that require flood protection. 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. As a result, there is not a substantial risk of pollutant release due to project inundation.

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 comply with safety policies in the County of San Diego General Plan Safety Element to reduce the risk associated with flooding hazards, such as Policy S-9.3, which requires development within mapped flood hazard areas be sited and designed to minimize on and off-site hazards to health, safety, and property due to flooding, and Policy S-9.6, which prohibits development in dam inundation areas. State planning and zoning law requires that all city and county general plans contain a safety element that identifies and appraises hazards including the effects of seismically induced waves, such as tsunamis and seiches. The County of San Diego General Plan Safety Element policies S-9.3 and S-9.6 reduce the risk of flooding hazards by requiring development within mapped flood hazard areas to be sited and designed to minimize on and off-site hazards (County of San Diego 2011b).

The portions of the regional growth and land use development pattern associated with the proposed Plan that are located within the existing floodplains, including the cities of San Diego and Chula Vista and San Diego County, would be impacted by a 100-year flood if appropriate design measures are not incorporated. Table 4.10-3 shows the land use types in each municipality in the San Diego region that encroach upon the 100-year floodplain for 2035.

Table 4.10-3 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
Bay or lagoon	Carlsbad, Chula Vista, Coronado, Del Mar, Encinitas, Imperial Beach, National City, Oceanside, County of San Diego, San Diego, Solana Beach
Beach—active	Carlsbad, Coronado, Encinitas, Oceanside, County of San Diego, San Diego
Beach—passive	Carlsbad, Coronado, Del Mar, Encinitas, Oceanside, County of San Diego, San Diego
Casino	County of San Diego

Land Use Type	Municipality
Cemetery	County of San Diego, San Diego
Commercial under construction	Encinitas, San Diego, Santee
Communications and utilities	Carlsbad, Chula Vista, Coronado, Del Mar, Escondido, National City, Oceanside, County of San Diego, San Diego, San Marcos, Vista
Community shopping center	Carlsbad, Chula Vista, El Cajon, Encinitas, Escondido, National City, 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, Vista
Extractive industry	Chula Vista, Coronado, National City, Poway, County of San Diego, San Diego
Field crops	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Fire or police station	Chula Vista, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Vista
Freeway	Carlsbad, Chula Vista, 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 or civic center	Coronado, Poway, County of San Diego, San Diego
Group quarters	San Marcos
Heavy industry	San Diego
Hospital—general	San Diego
Hotel or motel (high rise)	San Diego
Hotel or motel (low rise)	Carlsbad, Chula Vista, Del Mar, El Cajon, La Mesa, National City, Oceanside, County of San Diego, San Diego, San Marcos
Industrial park	Carlsbad, Chula Vista, El Cajon, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Industrial under construction	Chula Vista, County of San Diego, San Diego
Intensive agriculture	Carlsbad, Encinitas, Oceanside, Poway, County of San Diego, San Diego, Vista
Jail or prison	County of San Diego, Santee
Junior college	Encinitas, Escondido, San Diego
Junior high school or middle school	Carlsbad, El Cajon, Escondido, Oceanside, San Diego, Vista
Junkyard, dump, or landfill	Chula Vista, County of San Diego, San Diego
Lake, reservoir, or large pond	Chula Vista, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, Santee
Landscape open space	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
Library	National City, Poway, County of San Diego
Light industry—general	Chula Vista, Del Mar, El Cajon, Lemon Grove, National City, Oceanside, County of San Diego, San Diego, Santee, Vista
Marina	Chula Vista, Coronado, National City, Oceanside, San Diego
Marine terminal	National City, San Diego

Land Use Type	Municipality
Military training	County of San Diego, San Diego
Military use	Coronado, County of San Diego, Imperial Beach, National City, San Diego
Mission	Oceanside, County of San Diego, San Diego
Mixed use	Del Mar, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Mobile home park	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, La Mesa, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Multifamily—residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Multifamily—residential without units	County of San Diego Escondido, National City, San Diego
Neighborhood shopping center	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
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, La Mesa, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Orchard or vineyard	County of San Diego, Oceanside, San Diego
Other group quarters facility	Carlsbad, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Santee, Vista
Other health care	Chula Vista, County of San Diego, Del Mar, Escondido, San Diego, Vista
Other public services	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Other recreation—high	Carlsbad, Chula Vista, County of San Diego, El Cajon, Encinitas, National City, Poway, San Diego, San Marcos, Santee, Vista
Other recreation—low	County of San Diego, San Diego, Vista
Other retail trade and strip commercial	Carlsbad, Chula Vista, Coronado, County of San Diego, El Cajon, Escondido, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Other school	Carlsbad, County of San Diego, Escondido, National City, Oceanside, Poway, San Diego, San Marcos
Other transportation	Carlsbad, Chula Vista, County of San Diego, Del Mar, Imperial Beach, National City, Poway, San Diego
Other university or college	San Diego
Park—active	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Park & Ride lot	Chula Vista
Parking lot—structure	San Diego
Parking lot—surface	Chula Vista, Coronado, County of San Diego, National City, Oceanside, San Diego, San Marcos, Vista
Post office	County of San Diego, El Cajon, Escondido, Oceanside, 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
Rail station or transit center	County of San Diego, La Mesa, 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, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista

Land Use Type	Municipality
Residential recreation	Carlsbad, Chula Vista, Coronado, County of San Diego, Escondido, National City, Oceanside, San Diego, Santee, Vista
Residential under construction	Chula Vista, County of San Diego, Escondido, San Diego
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
Road under construction	San Diego
School district office	County of San Diego, Escondido, San Marcos
SDSU, CSU San Marcos, or UC San Diego	San Diego
Senior high school	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Santee
Service station	Carlsbad, Chula Vista, El Cajon, Encinitas, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, 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
Single family—residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, 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
Single room occupancy units (SROs)	San Diego
Spaced rural residential	Carlsbad, Chula Vista, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Specialty commercial	County of San Diego, San Diego
Stadium or arena	San Diego
Tourist attraction	County of San Diego, San Diego
UC San Diego hospital, VA hospital, or Balboa Hospital	San Diego
Undevelopable natural area	Coronado, County of San Diego, El Cajon, Escondido, National City, Oceanside, San Diego, Santee
Vacant and undeveloped land	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista
Warehousing	Chula Vista, County of San Diego, Del Mar, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos
Water	County of San Diego, Imperial Beach, Vista
Wholesale trade	Chula Vista, County of San Diego, Poway, San Diego, San Marcos

Source: FEMA 2025.

Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]) and water quality requirements (e.g., regional waste discharge requirements) would be required for all development projects to minimize flood hazards and associated risk of 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 from 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 in the city of San Diego and areas downstream of Lake Murray, Sweetwater Reservoir, and Lower Otay Lake, as depicted in Figure 2-4 which shows the proposed 2035 SCS land use pattern. Planning and design of development projects would be required to comply with Policy S-9.6 of the County of San Diego General Plan Safety Element, which prohibits development in dam inundation areas to reduce the risk of damage associated with dam or levee failure.

Project designs and review approvals would include reference to the 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 in coastal and rough terrain areas are designed for safety. By complying with all applicable regulations and safety ordinances outlined above and in Section 4.10.2, "Regulatory Setting," storm flows would be controlled, substantially reducing flood hazards. Through the various requirements to incorporate floodplain management, safety ordinances, and siting requirements to restrict development in areas prone to flooding, 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

Major transportation network improvements by 2035 include new Managed Lanes and Managed Lane connectors on SR 15, SR 52, SR 78, SR 125, I-5, I-15, and I-805. The proposed Plan also includes Reversible Managed Lane improvements on SR-75, improvements to rural corridors on SR 67, SR 76, SR 79, SR 94, and I-8, as well as interchange and arterial operational improvements on SR 94 and SR 125. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as tolling equipment and Regional Border Management System investments on SR 11. Upgrades at certain locations on the LOSSAN Rail Corridor would be implemented during this period. Other major network improvements include grade separations at certain locations on the SPRINTER, Green line, Blue Line, and Orange Line. Double-tracking is also proposed on the SPRINTER. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

Similar to regional growth and land use changes, the transportation network improvements in place by 2035 would be located in or near coastal areas. Proposed improvements that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas in the city of San Diego. However, the risk of tsunamis in the San Diego region is low. There is no historical precedent 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 and the associated risk of pollution release are low in the San Diego region, transportation improvements under the proposed Plan would occur in areas potentially subject to these hazards. Transportation network improvements within 100-year flood hazard areas, including mostly local roadway and arterial improvements, would be exposed to flood hazards. Table 4.10-4 shows the transportation network improvements planned for 2035 that would encroach upon 100-year floodplains.

Designing regional growth and land use projects to comply with NFIP mandates, the County of San Diego FMP, and County and City general plan safety elements and flood ordinances would minimize flood risk to

transportation improvements associated with the proposed Plan. Compliance with individual requirements or regulatory oversight, approval, or involvement from municipal and county flood control management agencies would further reduce the risk of pollutant release due to project site inundation by restricting uses that are dangerous to health, safety, and property due to erosion or water hazards; require uses vulnerable to floods to be protected from 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. As described above, the NFIP mandates that development is not to proceed within the 100-year floodplain if development is expected to increase flood elevation by 1 foot or more, which would prohibit new development in areas subject to flooding which could increase the risk of pollutant release due to inundation.

Caltrans policies related to 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 flooding that could result in the release of pollutants as a result of inundation would be avoided or substantially reduced. Compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]) would be required for all transportation network improvement projects to minimize impacts associated with flooding. 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 from 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 the risk of 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.

The risk of release of pollutants is related to local seismic conditions and potential flooding that could occur. As described in Section 4.9, "Hazards and Hazardous Materials," transportation improvements that would occur in the plan area could involve the use of pollutants during construction and operation. The use and storage of these pollutants is regulated to minimize the potential for accidental release. Local regulations, including floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]) are also in place that require flood protection to minimize impacts associated with flooding. 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. As a result, there is not a substantial risk of pollutant release due to project inundation.

Table 4.10-4 2035 Transportation Network Improvements in the 100-Year Floodplain

Improvement Type	Improvement
Bike	Bayshore Bikeway Segment 1
Bike	Bayshore Bikeway: Barrio Logan Segment (Beardsley Street to Park Boulevard)
Bike	Bayshore Bikeway: Segment 8B—Palomar Street to Main Street
Bike	Coastal Rail Trail Del Mar
Bike	Coastal Rail Trail Oceanside
Bike	Coastal Rail Trail San Diego: Carmel Valley to Roselle via Sorrento
Bike	Coastal Rail Trail San Diego: Del Mar to Sorrento via Carmel Valley
Bike	Coastal Rail Trail San Diego: Mission Bay (Clairemont to Tecolote)
Bike	Coastal Rail Trail San Diego: UTC to Rose Canyon
Bike	Coastal Rail Trail: Carlsbad

Improvement Type	Improvement
Bike	Coastal Rail Trail: Encinitas to Carlsbad
Bike	I-15 Bikeway: Camino del Rio South to Rancho Mission Road: Off-Street
Bike	I-805 Multiuse path bridge Main Street to Palm Avenue
Bike	Inland Rail Trail: Phase 4
Bike	Inland Rail Trail: Vista to Oceanside
Bike	Ocean Beach to Mission Bay
Bike	Pacific Beach to East Mission Bay
Bike	San Diego River Trail: bridge connection (Sefton Field to Mission Valley YMCA)
Bike	San Diego River Trail: I-805 to Fenton Parkway
Bike	San Diego River Trail: Mast Park to Lakeside Baseball Park
Bike	San Diego River Trail: Carlton Oaks Segment
Bike	Santee–El Cajon Corridor–Forester Creek Connection
Bike	SR 67 Bikeway: Lakeside to Ramona
Highway	I-15 Managed Lanes
Highway	I-5 Managed Lanes
Highway	I-5/I-805 ML connector
Highway	I-5/SR 78 ML connector
Highway	I-805 Managed Lanes
Highway	SR 15 Managed Lanes
Highway	SR 52 operational improvements
Highway	SR 67
Highway	SR 76
Highway	SR 78 Managed Lanes
Highway	SR 94/SR 125 interchange/arterial improvements
Rail	Blue Line (San Ysidro to UTC)
Rail	Green Line (Santee to Downtown)
Rail	Orange Line (El Cajon to Downtown)
Rail	Regional Rail 398
Rail	Regional Rail 598
Rail	SPRINTER (Oceanside to Escondido)

Notes: I = Interstate; SR = State Route; ML = Managed Lane; UTC = University Town Center.

Source: FEMA 2025.

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 areas 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, in compliance with Policy S-9.6 of the County of San Diego General Plan Safety Element, which prohibits development in dam inundation areas to reduce the risk of damage associated with dam or levee failure. Planning and design of transportation network improvements would be required to comply with Policy S-9.6 of the County of San Diego

General Plan Safety Element, which prohibits development in dam inundation areas 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, "Regulatory Setting," 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 siting requirements to prohibit development in areas prone to flooding, runoff would be controlled, flooding hazards would be substantially reduced, and the risks associated with tsunami and seiche hazards would be minimized. Safety policies from the Safety Element, such as the County of San Diego Safety Element policies discussed above, 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.

2035 Conclusion

Compliance with applicable regulatory requirements and implementation of design measures, safety ordinances and policies, and hazardous materials storage requirements described above and in Section 4.10.2, "Regulatory Setting," 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 siting requirements to prohibit development in areas prone to flooding, 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-4) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change

As shown in Table 2-1 in Section 2.0 "Project Description," of this Draft EIR, from 2036 to 2050, the region is forecasted to decrease by 4,112 people (-0.1%), increase by 65,577 housing units (4.8%), and increase by 103,460 jobs (6.2%). The 2050 regional SCS land use pattern is shown in Figure 2-5. The majority of the forecasted regional population decrease between 2036 and 2050 is attributed to the unincorporated jurisdictions, the City of Carlsbad, and the City of El Cajon. Approximately 78.8% of new housing units would be developed in the City of San Diego (51.6%), City of Chula Vista (17.1%), and unincorporated jurisdictions. Similarly, these same three jurisdictions would accommodate approximately 70.3% of new jobs between 2036 and 2050. 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 precedent 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 are 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. Regional growth in 2050 would result in development within 100-year and 500-year flood hazard zones (see Figure 4.10-3). Designing regional growth land use projects to comply with NFIP mandates, the County of San Diego FMP, and County and City general plan safety elements and flood ordinances would minimize flood risk to development associated with the proposed Plan. As described above, the NFIP mandates that development is not to proceed within the 100-year floodplain if development is expected to increase flood elevation by 1 foot or more, which would prohibit new development in areas subject to flooding which could increase the risk of pollutant release due to inundation.

Development projects associated with regional growth in the Plan area would also be subject to the requirements of applicable municipal and county flood control management regulations and plans such as the County of San Diego FMP, and local floodplain management ordinances (e.g., the County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]). Compliance

with individual requirements or regulatory oversight, approval, or involvement from municipal and county flood control management agencies would further reduce the risk of pollutant release due to project site inundation.

The risk of release of pollutants is related to local seismic conditions and potential flooding that could occur. As described in Section 4.9, "Hazards and Hazardous Materials," development that occurs in the Plan area could include a range of type and intensity of pollutants during construction and operation. The use and storage of these pollutants is regulated to minimize the potential for accidental release. State and local regulations are also in place that require flood protection. 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. As a result, there is not a substantial risk of pollutant release due to project inundation.

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 such as County of San Diego General Plan Safety Element Policy S-9.3, which requires development within mapped flood hazard areas be sited and designed to minimize on and off-site hazards to health, safety, and property due to flooding, and Policy S-9.6, which prohibits development in dam inundation areas to reduce the risk associated with flooding hazards. State planning and zoning law requires a safety element (City of San Diego 2015) in all city and county general plans that identifies and appraises hazards including the effects of seismically induced waves, such as tsunamis and seiches. The County of San Diego General Plan Safety Element policies S-9.3 and S-9.6 reduce the risk of flooding hazards by requiring development within mapped flood hazard areas to be sited and designed to minimize on and off-site hazards.

The regional growth and land use changes associated with the proposed Plan that are located in the existing floodplains, including the cities of San Diego and Chula Vista and San Diego County, would be impacted by a 100-year flood if appropriate design measures are not incorporated. Refer to Table 4.10-5 for the proposed changes in land use types that encroach upon the 100-year floodplain through 2050. However, as discussed in the 2035 analysis, compliance with local floodplain management ordinances (e.g., County of San Diego Flood Damage Prevention Ordinance, the City of San Diego floodplain ordinance [Chapter 14, Article 3, Division 1]) 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 risk of release of pollutants. Planning and design of development projects would also be required to incorporate Policy S-9.6 of the County of San Diego General Plan Safety Element, which prohibits development in dam inundation areas to reduce the risk of damage associated with dam or levee failure.

By complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, "Regulatory Setting," storm flows would be controlled, and flooding hazards would be substantially reduced. Through the various requirements to incorporate floodplain management, safety ordinances, and siting requirements to prohibit development in areas prone to flooding, 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 4.10-5 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, County of San Diego, San Diego, Solana Beach

Land Use Type	Municipality
Beach—active	Carlsbad, Coronado, Encinitas, Oceanside, County of San Diego, San Diego
Beach—passive	Carlsbad, Coronado, Del Mar, Encinitas, Oceanside, County of San Diego, San Diego
Casino	County of San Diego
Cemetery	County of San Diego, San Diego
Commercial under construction	Encinitas, San Diego, Santee
Communications and utilities	Carlsbad, Chula Vista, Coronado, Del Mar, Escondido, National City, Oceanside, County of San Diego, San Diego, San Marcos, Vista
Community shopping center	Carlsbad, Chula Vista, El Cajon, Encinitas, Escondido, La Mes, National City, 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, Vista
Extractive industry	Chula Vista, Coronado, National City, Poway, County of San Diego, San Diego
Field crops	Carlsbad, Encinitas, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos
Fire or police station	Chula Vista, Escondido, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Vista
Freeway	Carlsbad, Chula Vista, 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 or civic center	Coronado, Poway, County of San Diego, San Diego
Group quarters	San Marcos
Heavy industry	San Diego
Hospital—general	San Diego
Hotel or motel (high rise)	San Diego
Hotel or motel (low rise)	Carlsbad, Chula Vista, Del Mar, El Cajon, La Mesa, National City, Oceanside, County of San Diego, San Diego, San Marcos
Industrial park	Carlsbad, Chula Vista, El Cajon, Oceanside, County of San Diego, San Diego, San Marcos, Santee, Vista
Industrial under construction	Chula Vista
Intensive agriculture	Carlsbad, Encinitas, Oceanside, Poway, County of San Diego, San Diego
Jail or prison	County of San Diego, Santee
Junior college	Encinitas, Escondido, San Diego
Junior high school or middle school	Carlsbad, El Cajon, Escondido, Oceanside, San Diego, Vista
Junkyard, dump, or landfill	Chula Vista, County of San Diego, San Diego
Lake, reservoir, or large pond	Chula Vista, Escondido, National City, Oceanside, Poway, County of San Diego, San Diego, Santee
Landscape open space	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
Library	National City, Poway, County of San Diego

Land Use Type	Municipality
Light industry—general	Chula Vista, Del Mar, El Cajon, Lemon Grove, National City, Oceanside, County of San Diego, 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, County of San Diego, San Diego
Mixed use	Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Vista
Mobile home park	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, La Mesa, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Multifamily—residential	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Multifamily—residential without units	County of San Diego Escondido, National City, San Diego
Neighborhood shopping center	Carlsbad, Chula Vista, County of San Diego, Encinitas, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Office (low rise)	Carlsbad, Chula Vista, County of San Diego, Del Mar, 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, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach, Vista
Orchard or vineyard	County of San Diego, Oceanside, San Diego
Other group quarters facility	Carlsbad, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Santee, Vista
Other health care	Chula Vista, County of San Diego, Del Mar, Escondido, San Diego, Vista
Other public services	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Other recreation—high	Carlsbad, Chula Vista, County of San Diego, El Cajon, Encinitas, National City, Poway, San Diego, San Marcos, Vista
Other recreation—low	County of San Diego, San Diego, Vista
Other retail trade and strip commercial	Carlsbad, Chula Vista, Coronado, County of San Diego, El Cajon, Escondido, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Other school	Carlsbad, County of San Diego, Escondido, National City, Oceanside, Poway, San Diego, San Marcos
Other transportation	Carlsbad, County of San Diego, Del Mar, Imperial Beach, National City, Poway, San Diego
Other university or college	San Diego
Park—active	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Escondido, Imperial Beach, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Parking lot—surface	Chula Vista, Coronado, County of San Diego, National City, Oceanside, San Diego, San Marcos, Vista
Post office	El Cajon, Escondido, Oceanside, San Diego
Public storage	Chula Vista, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Vista
Public or semipublic	San Marcos

Land Use Type	Municipality
Racetrack	County of San Diego, Del Mar
Rail station or transit center	County of San Diego, La Mesa, Oceanside, San Diego
Railroad right-of-way	Carlsbad, Chula Vista, County of San Diego, Del Mar, El Cajon, Encinitas, La Mesa, National City, Oceanside, San Diego, San Marcos, Solana Beach, Vista
Regional shopping center	Carlsbad, Escondido, National City, Oceanside, San Diego
Religious facility	Chula Vista, County of San Diego, Escondido, Oceanside, Poway, San Diego, San Marcos, Santee, Vista
Residential recreation	Carlsbad, Chula Vista, Coronado, County of San Diego, Escondido, National City, Oceanside, San Diego, Santee, Vista
Residential under construction	Chula Vista, County of San Diego, Escondido, San Diego
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
Road under construction	San Diego
School district office	County of San Diego, Escondido, San Marcos
SDSU, CSU San Marcos, UC San Diego	San Diego
Senior high school	Carlsbad, Chula Vista, County of San Diego, El Cajon, Escondido, Oceanside, San Diego, San Marcos, Santee
Service station	Carlsbad, Chula Vista, El Cajon, Encinitas, Escondido, National City, Oceanside, Poway, San Diego, San Marcos, Santee, 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
Single family—residential	County of San Diego, Oceanside
Single family—residential without units	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, Encinitas, Escondido, Oceanside, Poway, San Diego, Solana Beach, Vista
Single room occupancy units (SROs)	San Diego
Spaced rural residential	Carlsbad, Chula Vista, County of San Diego, Del Mar, Encinitas, Escondido, Poway, San Diego, San Marcos, Santee, Vista
Specialty commercial	County of San Diego, Oceanside, San Diego
Stadium or arena	San Diego
Tourist attraction	County of San Diego, San Diego
UC San Diego hospital, VA hospital, or Balboa Hospital	San Diego
Undevelopable natural area	Coronado, County of San Diego, El Cajon, Escondido, National City, Oceanside, San Diego, Santee
Vacant and undeveloped land	Carlsbad, Chula Vista, Coronado, County of San Diego, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, National City, Oceanside, Poway, County of San Diego, San Diego, San Marcos, Santee, Vista

Land Use Type	Municipality
Warehousing	Chula Vista, County of San Diego, Del Mar, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos
Water	County of San Diego, Imperial Beach, Vista
Wholesale trade	Chula Vista, County of San Diego, Poway, San Diego, San Marcos

Source: FEMA 2025.

Transportation Network Improvements and Programs

Major transportation network improvements by 2050 include new Managed Lanes and Managed Lane Connectors on SR 52, SR 56, SR 75, SR 94, SR 125, SR 163, I-15, and I-805, several of which will be a continuation of improvements from 2035. In addition, the proposed Plan includes increased roadway and transit connections to the United States–Mexico border, as well as expansion of and improvements to existing port of entry facilities, which will continue during this period. Upgrades at certain locations on the LOSSAN Rail Corridor would continue during this period. Grade separations on the SPRINTER, Blue Line, Green Line, and Orange Line, as well as double-tracking on the SPRINTER would also continue during this period. See Tables 2-7 through 2-10 for a full list of proposed projects by subregion.

Similar to regional growth and land use change, the transportation network improvements in place by 2050 would be located in or near coastal areas. Proposed improvements that lie in low elevations directly adjacent to the coast would be susceptible to tsunami, including coastal areas in 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 and the associated risk of pollution release are low in the San Diego region, transportation improvements under the proposed Plan would occur in areas potentially subject to these hazards.

Transportation network improvements within 100-year flood hazard areas, including Managed Lanes and Managed Lane connectors, would be exposed to flood hazards without the appropriate design measures. Table 4.10-6 shows the transportation network improvements planned for 2050 that would encroach upon the 100-year floodplain. Caltrans policies related to 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 flooding that could result in the release of pollutants as a result of inundation would be avoided or substantially reduced. By incorporating the required design standards and complying with all applicable regulations and ordinances outlined above and in Section 4.10.2, "Regulatory Setting," 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 policies, 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 4.10-6 2050 Transportation Network Improvements in the 100-Year Floodplain

Improvement Type	Improvement
Bike	Bear Valley Bikeway
Bike	Chollas Creek Bikeway: North Fork
Bike	Clairemont Mesa to Linda Vista Bikeway
Bike	Golden Hill to Fairmount Park
Bike	I-15 Bikeway: Murphy Canyon Road to Affinity Court
Bike	I-15 Bikeway: Poway Road interchange to Carmel Mountain Road
Bike	I-15 Bikeway: Via Rancho Parkway to Citracado Parkway

Improvement Type	Improvement
Bike	I-805 connector: Bonita Road to Floyd Avenue
Bike	I-805 connector: Bonita Road to H Street
Bike	Midway to Pacific Beach Bikeway
Bike	North Coast Bike Trail
Bike	North County Inland Bikeway: El Camino Real
Bike	Pacific Highway Coastal Rail Trail airport connections (PACTAC)
Bike	San Diego River Bikeway connections
Bike	San Luis Rey River Trail
Bike	Saturn Boulevard Bikeway
Bike	SR 125 Connector: Bonita Road to United States–Mexico Border
Bike	SR 52 Bikeway: I-5 to Santo Road
Bike	SR 94 multiuse pathway
Highway	I-15 Managed Lanes
Highway	I-5 Managed Lanes
Highway	I-5/I-805 ML connector
Highway	I-5/SR 78 ML connector
Highway	I-8 operational improvements
Highway	I-805 Managed Lanes
Highway	I-805/SR 163 ML connector
Highway	SR 15 Managed Lanes
Highway	SR 52 Managed Lanes
Highway	SR 52 operational improvements
Highway	SR 56 Managed Lanes
Highway	SR 67
Highway	SR 76
Highway	SR 78
Highway	SR 78 Managed Lanes
Highway	SR 79
Highway	SR 94
Highway	SR 94/SR 125 interchange/arterial improvements
Rail	Blue Line (San Ysidro to UTC)
Rail	Green Line (Santee to Downtown)
Rail	Light Rail 582
Rail	Orange Line (El Cajon to Downtown)
Rail	Regional Rail 398
Rail	Regional Rail 598
Rail	SPRINTER (Oceanside to Escondido)

Notes: I = Interstate; SR = State Route; ML = Managed Lane; UTC = University Town Center.

Source: FEMA 2025.

2050 Conclusion

Compliance with applicable regulatory requirements and implementation of design measures, safety ordinances and policies, and hazardous materials storage requirements described above and in Section 4.10.2, "Regulatory Setting," 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 siting requirements to prohibit development in areas prone to flooding, 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-4) in the year 2050 is less than significant.

Impacts of the Proposed Plan with Future Climate Change

With future climate change, growth and land use change and transportation network improvements would result in risk of pollution from inundation in flood hazard, tsunami, and seiche zones. Climate change is increasing the risk of inundation especially in established flood hazard zones. Chollas, Mission Valley, Sorrento Valley and the Tijuana River Valley in the City of San Diego as well as Oceanside, San Marcos, Escondido, and Encinitas have been identified as the most flood-prone areas (City of San Diego n.d.-b). Parts of El Cajon, Santee, and Poway have been designated as floodplains (Caoile 2024). As stormwater travels, it collects trash, bacteria, and toxic pollutants such as detergents, fertilizers, pesticides, motor oil, heavy materials, and pet waste and distributes that into the region's water bodies. Pollution from these hazards can be minimized if development and transportation projects implemented by the proposed Plan remain in compliance with applicable regulatory requirements design measures, safety ordinances, and water quality requirements. The proposed Plan's inundation risks would be worsened by climate change; however, regulatory requirements, design measures, safety ordinances, and water quality requirements would reduce risks.

MITIGATION MEASURES

No mitigation measures are required for this impact.

4.10.5 Cumulative Impacts Analysis

C-HWQ-1 MAKE A CUMULATIVELY CONSIDERABLE CONTRIBUTION TO ADVERSE EFFECTS RELATED TO HYDROLOGY AND WATER QUALITY

The area of geographic consideration for cumulative impacts on hydrology and water quality is the Southern California and Northern Baja California region. The analysis of cumulative hydrology and water quality impacts considers how land use change and the transportation system would impact hydrology and water quality across the Southern California and Northern Baja region as a whole because the majority of water bodies in the San Diego area are part of hydrologic systems located across multiple jurisdictions. As a result, water pollution or alterations to a portion of a watershed produced by urban development in one jurisdiction can result in hydrology and water quality impacts that affect other jurisdictions or the entire region.

A projection approach for hydrology and water quality cumulative analysis allows for an overarching discussion of regional and cross-border impacts throughout multiple watersheds associated with general patterns of regional urbanization, growth, and land use changes while also allowing for specific consideration of any projects with known impacts to hydrology and water quality. Cumulative impacts on hydrology and water quality are evaluated in two steps. First, the combined effects of the proposed Plan, adopted plans, and probable future projects are considered to determine whether their impacts are collectively (i.e., cumulatively) significant. If the cumulative impact is significant, the proposed Plan's incremental contribution is then assessed to determine whether it is cumulatively considerable, which would be considered a significant cumulative impact associated with the Plan. Specifically, significant cumulative impacts related to hydrology and water quality would occur if the Plan would result in a considerable contribution to a cumulatively significant degradation of water quality in violation of any water quality standards or waste discharge requirements or substantial increased sources of polluted runoff;

substantial reduction in groundwater quantity or quality; substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation would increase; exposure of people, structures, or facilities to a significant risk involving flooding; or exposure of people or structures to a significant risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone.

Impacts of the Proposed Plan

Compliance with existing regulatory requirements described in Section 4.10.2, "Regulatory Setting," would ensure that the regional growth and land use change and the transportation network improvements would not result in: substantial degradation of water quality in violation of any water quality standards or waste discharge requirements, or substantial increased sources of polluted runoff; substantial reduction in groundwater quantity or quality; substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation would increase; exposure of people, structures, or facilities to a significant risk involving flooding; or exposure of people or structures to a significant risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. These impacts would be less than significant in 2035 and 2050 (Impact HWQ-1 through HWQ-4).

Impacts of Related Projects

Projects planned in the Southern California region, such as the Navy OTC Revitalization Project, San Diego International Airport (SDIA) Airport Development Plan, California High-Speed Rail Train, Midway Rising Specific Plan, and City of San Diego Pure Water North City, would involve ground-disturbing activities that could result in impacts related to water quality and changes to drainage. Other land development and infrastructure projects throughout the region, such as transportation infrastructure, energy generation and transmission corridors, and commercial and residential land development, would also result in impacts if these projects were not in compliance with federal, state, and local water quality requirements, such as the CWA implemented by Porter-Cologne Act; Water Code Section 13000 et seq.; NPDES regulations; and the Municipal Permit.

Impacts of Projections in Adopted Plans

The Southern California Association of Governments 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy (2024-2050 RTP/SCS) EIR identified the potential to violate water quality standards associated with wastewater and storm water permits. The EIR also concluded that the 2024-2050 RTP/SCS would alter the existing drainage patterns in ways that would result in substantial erosion or siltation. Implementation was found to also reduce groundwater infiltration due to increased impervious surfaces and increase flooding hazards by locating projects on alluvial fans and in 100-year flood hazard areas. These water quality and hydrology impacts would be significant and unavoidable, even with the implementation of proposed mitigation (SCAG 2024).

The 2019 IRWM Plan was prepared by the San Diego Regional Water Management Group, which consists of the San Diego County Water Authority (SDCWA), the City of San Diego, and the County of San Diego. IRWM planning is a relatively new California initiative with regional plans designed to improve collaboration in water resources management and comprehensively address all aspects of water management and planning throughout an IRWM region. IRWM plans cross jurisdictional and watershed boundaries; involve multiple agencies, stakeholders, individuals, and groups; and attempt to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. Specific to water quality, the IRWM includes Objective H to effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment (Regional Water Management Group 2018).

Water quality control plans or basin plans have been written by each RWQCB. These plans determine the beneficial uses of each water body in the basin and set forth narrative and numerical WQOs for constituents that could have a substantial impact related to those beneficial uses. They also describe implementation programs to protect the beneficial uses of all water in the region, and surveillance and monitoring activities to evaluate the effectiveness of the basin plan. For example, the San Diego Basin Plan includes multiple policies specific to the protection of water quality, including Policy Three, "Point sources and nonpoint sources of pollution shall be

controlled to protect designated beneficial uses of water," and Policy Four, "Instream beneficial uses shall be maintained, and when practical, restored, and enhanced" (San Diego RWQCB 2021).

Adopted land use plans for local jurisdictions in Southern California would support the construction of new development and redevelopment through policy changes, general plan updates, and zoning amendments that encourage and facilitate population growth and land use changes. These development projects would impact hydrology and water quality. The severity of these impacts would be determined by location of the projects within the watersheds, and the sensitivity of the receiving bodies and the types of BMPs employed. All US projects would be required to adhere to all of the regulatory requirements described in Section 4.10.2, "Regulatory Setting." Projects associated with policy changes and amendments would also impact hydrology and water quality for the same reasons as discussed with infrastructure projects.

Waste discharges into some receiving waters from Northern Baja California would ultimately enter the Tijuana River and the Pacific Ocean where the waste would impact beaches in the southern part of the San Diego region. The Tijuana River is a 303(d)-listed water body for various impairments. The Tijuana River Estuary, a National Estuarine Sanctuary, supports a variety of threatened and endangered plants and animals and is 303(d)-listed for eutrophic conditions, indicator bacteria, lead, low dissolved, oxygen, nickel, pesticides, thallium, trash, toxicity, and turbidity (San Diego RWQCB 2021). Discharges from Northern Baja, which are not controlled by regional regulations, would impact these water bodies within the region.

Some of the plans considered in the cumulative analysis include the Water Quality Control Plans for the five basins in the greater region: San Diego Basin, Colorado River Basin, Santa Ana Basin, Los Angeles Basin, and the Lahontan Basin (San Diego RWQCB 2021; CRB RWQCB 2024; Santa Ana RWQCB 1995; LA RWQCB 1994; Lahontan RWQCB 2021). These basin plans set forth WQOs for constituents that could have a significant impact related to the beneficial uses of water. Although these documents do not have accompanying environmental analysis, they provide important overarching strategies, future planning considerations, and planned large projects related to water quality and hydrology throughout the region.

Cumulative Impacts and Impact Conclusions

2035

Substantial Degradation of Surface or Groundwater Quality Plans

As described above, compliance with federal, state, and local water quality requirements, such as the CWA implemented by Porter-Cologne Act, Water Code Section 13000 et seq.; NPDES regulations; and the Municipal Permit, would ensure that implementation of the proposed Plan would not result in a substantial degradation of water quality in violation of any water quality standards or waste discharge requirements. When the proposed Plan's impact are added to impacts related to surface or groundwater quality in water sources originating in the United States cumulative impacts would be less than significant due to federal and state regulatory requirements also applicable to development throughout the region for the protection of WQOs. WQOs would protect beneficial uses throughout Southern California and ensure effectiveness of regulations pertaining to water quality and hydrologic modifications.

However, contributions to cumulative water quality impacts occur in part because polluted water from Northern Baja California, which is not subject to federal and state regulatory requirements, discharges into the Tijuana River and affects receiving waters throughout the region. Although impacts exist due to unregulated polluted water that enters the region, the proposed Plan would not add to this water quality impact to produce a significant cumulative water quality impact for the reasons outlined above, including adherence to federal and state regulatory requirements.

Thus, cumulative water quality impacts would not be significant, and the proposed Plan's contribution to the cumulative water quality impact would not be cumulatively considerable in 2035.

Drainage and Release of Pollutants in Flood or Seiche Zones

As described above, in 2035, implementation of the proposed Plan would not result in ; substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation would increase; would not expose e people, structures, or facilities to a significant risk involving flooding; and would not exposure of people or structures to a significant risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. When the proposed Plan's impact is added to impacts related to substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation within the Southern California and Northern Baja California region, cumulative impacts would be less than significant due to federal and state regulatory requirements, such as flood ordinances and the Municipal permit also applicable to development throughout the region for the protection of water quality from pollutants. Therefore, the proposed Plan would not result in a cumulatively considerable contribution to a cumulative impact related to adverse hydrological effects caused by depletion of groundwater, changes in drainage patterns, or the release of pollutants in flood or seiche zones.

2050

Substantial Degradation of Surface or Groundwater Quality Plans

As described above, compliance with federal, state, and local water quality requirements such as the CWA implemented by Porter-Cologne Act, Water Code Section 13000 et seq.; NPDES regulations; and the Municipal Permit, would ensure that implementation of the proposed Plan would not result in a result in a substantial degradation of water quality in violation of any water quality standards or waste discharge requirements. When the proposed Plan's impact are added to impacts related to surface or groundwater quality in water sources originating in the United States cumulative impacts would be less than significant due to federal and state regulatory requirements also applicable to development throughout the region for the protection of WQOs to protect beneficial uses throughout Southern California, and the effectiveness of regulations pertaining to water quality and hydrologic modifications.

However, contributions to cumulative water quality impacts occur in part because polluted water from Northern Baja California, which is not subject to federal and state regulatory requirements, discharges into the Tijuana River and affects receiving waters throughout the region. Although impacts exist due to unregulated polluted water that enters the region, the proposed Plan would not add to this water quality impact to produce a significant cumulative water quality impact for the reasons outlined above, including adherence to federal and state regulatory requirements. Thus, cumulative water quality impacts would not be significant, and the proposed Plan's contribution to the cumulative water quality impact would not be cumulatively considerable in 2050.

Drainage and Release of Pollutants in Flood or Seiche Zones

As described above, in 2050, implementation of the proposed Plan would not result in substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation would increase; would not expose people, structures, or facilities to a significant risk involving flooding; and would not exposure of people or structures to a significant risk of pollutant release due to inundation of a flood hazard, tsunami, or seiche zone. When the proposed Plan's impact is added to impacts related to substantial alteration of the existing drainage pattern of an area such that flood risk, erosion, or siltation within the Southern California and Northern Baja California region, cumulative impacts would be less than significant due to federal and state regulatory requirements, such as flood ordinances and the Municipal permit also applicable to development throughout the region for the protection of water quality from pollutants. Therefore, the proposed Plan would not result in a cumulatively considerable contribution to a cumulative impact related to adverse hydrological effects caused by depletion of groundwater, changes in drainage patterns, or the release of pollutants in flood or seiche zones.

MITIGATION MEASURES

No mitigation measures are required.