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## Hydrology and Water Quality

This section characterizes existing hydrologic resources in the treatable landscape. Hydrologic resources include surface waters and groundwater. This section describes the impacts to hydrologic resources through the degradation of water quality and increased sedimentation that are known or have the potential to occur in the study area. Federal, state, and local regulations related to hydrology and water quality are summarized. Potential impacts of the proposed CalVTP implementation are analyzed, and mitigation measures are provided for those impacts determined to be significant.

Comments on the Notice of Preparation (see Appendix A) related to hydrology and water quality requested that the analysis consider: the potential for sedimentation and water quality effects from program activities; potential water temperature increases from vegetation removal; water quality effects to surface waters adjacent to treatment areas; and runoff implications to downstream communities. These issues are addressed in Section 3.11.3, “Impact Analysis and Mitigation Measures.”

### Environmental Setting

#### Topography and Climate

The study area encompasses the treatable landscape and adjacent areas in California. The State’s topography is highly varied and includes 1,340 miles of seacoast, as well as high mountains, inland flat valleys, and deserts. Elevations in California range from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. The climate of California is as highly varied as its topography. Depending on elevation, proximity to the coast, and altitude, climate types include temperate oceanic, highland, sub-arctic, Mediterranean, steppe, and desert (CGS 1995). The average annual precipitation across all California climate types is approximately 23 inches and approximately 75 percent of the State’s annual precipitation falls between November and March, primarily in the form of rain, with the exception of high mountain elevations (DWR 2003:pg. 20). Average annual precipitation ranges from more than 100 inches in the mountainous areas within the Smith River in Del Norte County to less than 2 inches in Death Valley, illustrating the extreme differences in precipitation levels within the State (Mount 1995). Overall, northern California is wetter than southern California and the majority of the State’s annual precipitation occurs in the northern coastal region.

#### Hydrologic Resources

###### Surface Waters

For the purposes of the PEIR, surface waters occur as streams, lakes, ponds, coastal waters, lagoons, and estuaries, or are found in floodplains, dry lakes, desert washes, wetlands and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are very diverse due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions. Overall, California has a diverse range of watershed conditions with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region.

The average annual runoff for the State is 71 million acre-feet (DWR 1998). The State has more than sixty major stream drainages and more than 1,000 smaller, but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade Mountains that feed surface flows, fill reservoirs and recharge groundwater. Federal, state and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

###### Groundwater

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the State (DWR 2003: 20). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, the majority of California’s groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California’s urban, agricultural and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the State, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

#### Water Quality

Land uses have a substantial effect on surface water and groundwater water quality in California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; volatile organic compounds (VOCs) and toxic chemicals from urban runoff and industrial discharges; sediment from poor road construction, improperly managed construction sites, and agricultural areas; and deposition of pollutants from the atmosphere and modification of hydrologic flow patterns. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the U.S. Environmental Protection Agency (EPA) and State Water Resources Control Board (SWRCB) through the California regional water quality control boards (RWQCB). Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

Groundwater pollution or contamination is caused by (1) naturally occurring or synthesized chemicals that are discharged onto the land surface and percolate through to groundwater resources below, (2) flow into groundwater reservoirs through improperly sealed well casings, (3) leaking underground storage tanks, and (4) failed underground pipelines. Unintended backflow into wells can also occur when plumbing and pumping systems are not properly protected against backflow. Many of the sources of pollution and their toxic constituents are similar to those associated with surface water pollution. The most common groundwater pollutants are generated from nonpoint sources of salt, nitrite, pesticides, industrial effluent, and pathogens. Salt and nitrite contamination is the most common groundwater pollution and affects 10 to 15 percent of California’s wells, mostly through various agricultural activities (Harter 2003). Recent long drought periods in the State have resulted in overdraft of groundwater aquifers as needs for water increase in areas with limited surface water flow. Over pumping results in the concentration of mineral salts in the depleted aquifer and could make the groundwater source unusable for drinking water and other beneficial uses.

Sediment is considered a major pollutant according to the EPA and the SWRCB and is a key total maximum daily load (TMDL) constituent that determines impairment and 303(d) listing of impaired water bodies in a number of watersheds and river basins. High sediment loads are detrimental to beneficial water uses and aquatic habitat used by plant, amphibian and fish communities. Erosion is influenced by a variety of factors including geology and soil characteristics, topography, climate, and land use practices, among others. Sedimentation is a result of erosion and the transport of eroded fine materials to a watercourse or waterbody and could result in increased turbidity, elevated levels of total dissolved solids and total suspended solids. Erosion and sedimentation are natural phenomena but are greatly influenced by land management practices and land disturbance activities.

In general, naturally occurring erosion and sedimentation occurs from weathering of bedrock or saturation of soils in erosion prone areas causing landslides, earthflows, debris flows, and other mass wasting-related processes; lateral channel migration resulting in bank erosion; channel downcutting and incision; and surface erosion cause by precipitation, runoff and wind on bare soil surfaces. Sporadically occurring natural events such as flooding caused by heavy and prolonged precipitation and rain events following soon after wildfire can generate high levels of sedimentation and erosion. In addition, heavy precipitation in a recently burned area can quickly lead to oversaturated and unstable soils, increasing the risk of landslide, earthflows, and debris flows. Some human activities that can result in accelerated erosion and sedimentation include road building, construction activities, agriculture (including some timber harvesting) and grazing, and recreation. Agriculture, mining, and other land disturbing activities that ~~often~~ result ~~create~~ in bare soil areas, ~~which are~~ can be prone to higher levels of surface runoff. Increased runoff can result in sheet, rill, and gully erosion, and landslides.

#### Flood Hazards

Floods are naturally occurring phenomena in California, although their occurrence and effects can be exacerbated by human activities and land management practices. Floods keep erosion and sedimentation in natural balance, replenish soils, recharge groundwater, and support a variety of riverine and costal floodplain habitats. Flooding in California can be divided into eight categories, with all hydrologic regions subject to at least one type of flooding:

* Flash Flooding – quickly formed floods with high velocity flows that are often caused by stationary or slow-moving storms. Flash floods typically occur on steep slopes and impermeable surfaces, and in areas adjacent to streams and creek.
* Slow-Rise Flooding – Gradual inundation as waterways or lakes overflow their banks. Slow-rise flooding in California typically occurs over a matter of days and is caused by heavy precipitation or rapid snowmelt.
* Debris-Flow Flooding- Flows made up of water, liquefied mud, and debris can form and accelerate quickly, reach high velocities, and travel great distances. Debris flows are commonly caused by heavy localized rainfall on burned hillsides devoid of vegetation.
* Alluvial Fan Flooding- Shallow, high velocity, sediment laden flows with uncertain flow paths on the surface and at the toe of alluvial fans. These floods are typically caused by localized rainstorms and snowmelt.
* Coastal Flooding – Inundation at locations normally above the level of high tide, often caused by storm surges during high tide.
* Tsunami Flooding – High speed seismic sea waves triggered by underwater earthquakes or landslides that displace large volumes of water.
* Stormwater Flooding – Localized flooding that occurs in urban areas during or after a storm event.
* Engineered Structure Failure Flooding – Flooding as a result of dam failure or levee failure. This type of flooding presents the potential for catastrophic impact, depending on the amount of water impounded and the location of populated areas downstream.

#### Hydrologic Regions

Organizing the environmental setting by discrete regions that share general hydrologic-, basin-, and climate-related characteristics aids in understanding California’s diverse hydrologic conditions and resources within the treatable landscape. The California Department of Water Resources (DWR) divided the State into 10 hydrologic regions: Central Coast, Colorado River, North Coast, North Lahontan, Sacramento River, San Francisco Bay, San Joaquin River, South Coast, South Lahontan, and Tulare Lake (Figure 3.11-1). The hydrologic region designations are based on major



Source: Data downloaded from CAL FIRE in 2019

Figure 3.11-1 Hydrologic Regions

drainage basins, and similar topographic and hydrologic characteristics, and provide a systematic framework for evaluating hydrologic resources and water quality at the statewide scale. The general regional, topographic, and climate characteristics of each hydrologic region in the treatable landscape is discussed below. For each DWR hydrologic region, Table 3.11-1 identifies specific characteristics pertaining to hydrology, water quality, and sedimentation and quantifies the area of treatable landscape therein.

##### Central Coast

The Central Coast Hydrologic Region is located in central California, extending from Monterey Bay to Santa Barbara. The region covers nearly 11,300 square miles, primarily within the southern Coast Range. This region includes Monterey, Santa Barbara, Santa Cruz, and San Luis Obispo counties and portions of Kern, San Benito, Santa Clara, San Mateo, and Ventura counties. The temperate Mediterranean climate of the Central Coast is characterized by mild, wet winters and warm, dry summers. Due to marine influences, the coastal climate in this region is typically cooler with smaller daily and seasonal temperature changes. Further inland, the climate is more continental resulting in warmer summers, colder winters, and greater daily and seasonal temperature variation. Pockets of redwood and Douglas fir forests can be found in wet and foggy microclimates. Other vegetation communities include coastal live oak forests, montane chaparral, and annual grasslands. Elevations within the region range from sea level to mountain peak elevations up to 7,000 feet. Major mountain ranges include: Santa Cruz, Sierra Madre, San Rafael, and Santa Ynez mountains; Caliente, Diablo, Gabilan, La Panza, and Temblor ranges, and the coastal Santa Lucia Range. The treatable landscape is evenly distributed within this hydrologic region and covers roughly 3,926 square miles (approximately 35 percent of the region).

##### Colorado River

The Colorado River hydrologic region is located in southeastern California encompassing nearly 20,000 square miles. This region includes Imperial County and portions of Riverside, San Bernardino, and San Diego counties. The regional climate is primarily subtropical-desert with hot summers and short, mild winters. Milder temperatures are typical in mountainous areas in the north and west. Vegetation in the western mountain consists of montane chaparral, western hardwood forest, ponderosa pine, and fir-spuce cover types. Colorado, Sonora, and Mojave desert shrub vegetation types dominate the remainder of the region. Elevations within the region range from 230 feet below sea level (surface of the Salton Sea) to mountain peak elevations up to 10,000 feet. Major mountain ranges include the San Bernardino and San Jacinto mountains. The treatable landscape within this hydrologic region is located in the western mountains and covers approximately 560 square miles (roughly 3 percent of the region).

##### North Coast

The North Coast hydrologic region is located in northern California encompassing nearly 19,500 square miles. The boundary of the region extends north from Tomales Bay to the Oregon Border and to the east to the Goose Lake Basin. The North Coast region includes all or portions of Del Norte, Glenn, Humboldt, Marin, Siskiyou, Sonoma, and Trinity counties. This region encompasses coastal redwood forests, mountains, inland valley, and semi-desert conditions, and as a result the regional climate is highly variable. The western coastal areas are typically cooler with temperatures ranging from 80s in the summer to 30s in winter months. In comparison, inland areas experience greater extremes in temperature with summer highs in the 100s and winter lows below freezing. Vegetation in the coastal areas includes redwood and Douglas fir forest, western hardwoods, and annual grassland. Coastal vegetation types give way to mixed conifers, oak forest, and mountain chaparral in the inland mountains and valleys. Elevations within the region range from sea level to mountain peak elevations over 8,000 feet. Major mountain ranges include the California Coast Range and the Klamath Mountains. The treatable landscape within this hydrologic region is predominantly located in the Coast Range and in the arid lands east of the Klamath range, and covers roughly 6,839 square miles (approximately 35 percent of the region).

Table 3.11-1 General Characteristics of Hydrologic Regions

| California DWR Hydrologic Region1 | Hydrology Hydrology Precipitation | Hydrology Runoff and  Flood Hazard | Hydrology Major Surface Water Features | Water Quality | Sedimentation | Treatment Area within Hydrologic Region |
| --- | --- | --- | --- | --- | --- | --- |
| Central Coast | Primarily rainfall, insignificant snowfall. Average precipitation ranges between 12 and 42 inches per year. Interior southern valleys: 5-10 inches. Mountain areas: >50 inches. | All rivers in the region are prone to winter storm produced flooding. Small, steep watersheds that are subject to short, intense floods. Limited seasonal base flow and no significant snowmelt runoff. | Big Sur River  Carmel River  Naciemento River  Salinas River  San Antonio River  San Benito River  Santa Maria River  Santa Ynez River | Surface water issues: Erosion and sedimentation, wildlife and fisheries degradation, bacteria, eutrophication, and metals from nonpoint surface runoff, and agricultural runoff.  Groundwater issues: Drinking water impairment, nitrates, toxic pollutants, and saltwater intrusion caused by nonpoint surface runoff and groundwater overdraft. | Steep upland areas with unstable geologies are prone to erosion during large storm events and could deposit sediment in rivers and on floodplains.  Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, gullying and subsequent debris flows. | 2,512,900 acres/ 3,926 square miles |
| Colorado River | Lowest annual precipitation of the 10 DWR hydrologic regions. Average annual rainfall ranges from 3 to 6 inches. | Characterized by low annual rainfall and runoff, and sparse vegetation. Streams are typically low gradient and braided in valley areas and steep gradient in mountainous areas. Storms are generally of short duration and high intensity, and could result in flash floods in lowland alluvial fan areas. Ephemeral streams are prone to flooding during heavy rainfall events. | Alamo River  Colorado River  New River  Salton Sea  Whitewater River | Surface water issues: Sedimentation, salinity, drinking water impairment, bacteria, pesticides, herbicides from agricultural runoff, wastewater, erosion, and diversions.  Groundwater issues: Drinking water impairment and VOCs caused by groundwater overdraft and fuel tank leaks. | Erosion and sedimentation primarily from ravel, surface erosion, wind erosion, and as freeze-thaw. Short duration and high intensity storms could result in debris flows generated in steep mountainous areas. In comparison, lowland and valley areas tend to have lower erosion and sediment yields. | 358,591 acres/ 560 square miles |
| North Coast | Highest precipitation in the State with average annual of 50 inches. High intensity and long duration rainfall events are common during the winter period. Annual precipitation ranges from 15 inches in Modoc County to nearly 200 inches in northern Del Norte County. Heavy snowfall is limited to the higher elevations of the Klamath Mountains and Trinity Alps. | Highest peak discharge values in the State Smaller, coastal watersheds tend to exhibit rapid hydrograph response, with lower base flows and little snowmelt. In comparison, larger inland rivers experience slower hydrograph response, with higher base flows and significant snowmelt runoff. | Albion River  Bear River  Big River  Bodega Harbor  Eel River  Garcia River  Gualala River  Humboldt Bay  Klamath River  Mad River  Mattole River  Navarro River  Noyo River  Redwood Creek  Russian River  Salmon Creek  Scott River  Shasta River  Smith River  Tenmile River  Trinity River  Van Duzen River | Surface water issues: Erosion and sedimentation from timber harvesting, roads, and grazing; nonpoint source pollution from storm water runoff; channel modification, gravel mining and dairies; and MTBE, PCE, and dioxin contamination.  Groundwater issues: Leaking underground tanks. | High rainfall, in combination with steep mountainous areas underlain in places by unstable geologies/soils, high uplift rates, and poor land use practices (e.g. timber harvesting, grazing, and poor road/trail construction) could result in high peak discharge, erosion and sediment yields during large storm events. | 4,377,003 acres/ 6,839 square miles |
| North Lahontan | Average precipitation for the region is approximately 23 inches, primarily snowfall. Annual precipitation ranges from less than 5 inches in the valley areas of Lassen and Mono counties to more than 60 inches in the Sierra Nevada. | Lowland valley areas could experience high peak runoff in short and steep ephemeral drainages. Most watersheds are small and steep. Prolonged spring runoff and high base flow is typical of drainages in the Sierra Nevada. Many drainages are ephemeral and could experience rapid hydrograph response and resultant flooding. | Carson River  Surprise Valley  Susan River  Truckee River  Walker River | Surface water issues: Erosion and sedimentation from agriculture, roads, and grazing; nonpoint source pollution from storm water runoff; acid drainage from inactive mines, and individual waste water systems.  Groundwater issues: Drinking water, salinity, and VOCs from mining drainage, overdraft, and fuel tank leaks. | Flashy storm flows with high peak discharge, lack of vegetation, poorly consolidated geology, and steep channel morphology could result in debris flows, erosion and sediment yield.  Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying. | 776,008 acres/ 1,212 square miles |
| Sacramento River | Average precipitation for the region is approximately 37 inches with annual precipitation increasing from south to north and from west to east. | Major rivers receive high spring runoff from snowmelt from adjacent mountain streams and rivers. Flooding in the lowland areas is a result of elevated and prolonged spring runoff coupled with year round elevated base flows. | Sacramento River  Major tributaries:  American River  Bear River  Butte Creek  Cache Creek  Clear Lake  Feather River  McCloud River  Pitt River  Putah Creek  Yuba River | Surface water issues: Erosion and sedimentation from roads, dairies and agriculture; and nonpoint source pollution from storm water runoff.  Groundwater issues: Drinking water impairment, salinity, VOCs from irrigated agriculture and dairy nonpoint sources, overdraft, and fuel tank leaks. | Erosion and sediment yields are generally low due to stable geologies and abundant vegetative cover. Although heavy storm rainfall and saturated soil conditions, coupled with land use practices (e.g. timber harvesting, grazing, agriculture, and poor road construction) could result in high erosion and sediment yields. | 5,349,357 acres/8,358 square miles |
| San Francisco Bay | Average precipitation for the region is approximately 25 inches. Because of marine influences and rain shadows, the annual precipitation is 20-25 inches in the North Bay, 15-20 inches in the South Bay (east of the Santa Cruz mountains), and more than 40 inches in the higher elevation west facing mountainous areas. | Small, steep watersheds that are subject to high rainfall from short, intense storms. All rivers are prone to intense flooding during major storm events. | Alameda Creek  Corte Madera Creek  Coyote Creek  Green Valley Creek  Guadalupe River  Napa River  Novato Creek  Petaluma River  San Leandro Creek  San Lorenzo Creek  San Mateo Creek  San Pablo Creek  Sonoma Creek  Suisun Creek  Tomales Bay  Walnut Creek  Wildcat Creek | Surface water issues: Erosion and sedimentation from agriculture, roads; agricultural runoff; nonpoint source pollution from storm water runoff; trace metals; toxic pollutants; habitat and wildlife degradation. Sources from irrigated agricultural runoff, sewage discharge, and industrial manufacturing.  Groundwater issues: Drinking water impairment, salt water intrusion, and synthetic organics from irrigated agriculture and other nonpoint sources, overdraft, and industrial discharge. | Steep upland areas with unstable geologies are prone to erosion during large storm events and could deposit sediment in rivers and floodplains. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling and gullying. | 1,047,981 acres/  1,637 square miles |
| San Joaquin River | Average precipitation is approximately 26 inches. Annual precipitation ranges from less than 11inches in the south and southwest area to approximately 35 inches of snowfall in the Sierra Nevada. | Prolonged high runoff, erosion, sedimentation and flooding are primarily a result of snowmelt from the Sierra Nevada. | San Joaquin River  Major tributaries:  Chowchilla River  Cosumnes River  Del Puerto Creek  Fresno River  Merced River  Mokelumne River  Orestimba Creek  Panoche Creek | Surface water issues: Erosion and sedimentation from roads, dairies and agriculture; and nonpoint source pollution from storm water runoff.  Groundwater issues: Drinking water impairment, salinity, VOCs from irrigated agriculture and dairy nonpoint sources, overdraft, and fuel tank leaks. | Erosion and sediment yields are generally low due to stable geology and abundant vegetative cover. Heavy storm rainfall and saturated soil conditions, coupled poor land use practices (e.g. timber harvesting, grazing, agriculture, and poor road construction) could result locally in high erosion and sediment yield. Wildfires could result in sedimentation of rivers from increased surface erosion. | 2,183,511 acres/ 3,412 square miles |
| South Coast | Average annual precipitation is approximately 18 inches. Annual precipitation ranges from 10 inches in the valley areas to approximately 40 inches in the mountains. | Most rivers and creeks are intermittent or ephemeral with minor runoff from snowmelt. Short duration, intense winter storms in steep upland watersheds are the primary cause for, and flooding in this region. Urbanization has resulted in drainages with high peak discharges and short lag times. | Carlsbad  Los Angeles River  Otay River  San Dieguito River  San Diego River  San Gabriel River  San Juan Creek  San Luis Rey River  Santa Ana River  Santa Clara River  Santa Margarita River  Santa Monica Bay  Sweetwater River  Tijuana River  Ventura River | Surface water issues: Erosion and sedimentation from agriculture, roads, ranching, and urban development; nonpoint source pollution from storm water runoff; erosion from inactive mines; agricultural runoff; mineral and gravel mining; nutrients; pathogens; heavy metals; hydromodification;  and individual waste water systems.  Groundwater issues: Drinking water impairment, salt water intrusion, toxic pollutants, and VOCs from industrial and agricultural runoff, overdraft, and underground storage and fuel tank leaks. | Typically low erosion and sediment yield due to urbanization. Steep channels and unstable geology, coupled with short duration, intense winter storms in steep upland watersheds can cause localized erosion and sediment yield from debris flows and mud flows. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying. | 1,564,805 acres/  2,445 square miles |
| South Lahontan | Average annual precipitation for the region is approximately 8 inches. Annual precipitation ranges from less  than 2 inches in Death Valley to approximately 25-50 inches in the mountains. | Lowland valley areas could experience high peak runoff in short and steep ephemeral drainages. Most watersheds are small and steep. Prolonged spring runoff and high base flow is typical of drainages in the Sierra Nevada. Most drainages are ephemeral and could experience rapid hydrograph response and resultant flooding. | Amargosa River  Antelope Valley  Mojave River  Mono Basin  Owens River | Surface water issues: Erosion and sedimentation from agriculture, roads, and grazing; nonpoint source pollution from storm water runoff;  acid drainage from inactive mines; and individual waste water systems.  Groundwater issues: Drinking water, salinity, and VOCs from mining drainage, overdraft, and fuel tank leaks. | Flashy storm flows with high peak discharge, lack of vegetation, poorly consolidated geology, and steep channel morphology  could result in debris flows, erosion and sediment yield. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying. | 556,482 acres/  870 square miles |
| Tulare Lake | Average annual precipitation is approximately 15 inches. Annual precipitation ranges from 13-14 inches for the Tulare Lake region to 25-50 inches in the mountains. | Prolonged spring runoff from rainfall and snowfall from mountainous areas and rising waters within typically dry lakes results in potential flooding. | Kaweah River  Kern River  Kings River  San Joaquin River  Tulare Lake  Tule River | Surface water issues: Erosion and sedimentation from agriculture, roads, rural development, and grazing; nonpoint source pollution from storm water runoff; and individual waste water systems.  Groundwater issues: Drinking water, salinity, toxic pollutants, and VOCs from waste water systems and septic tanks, overdraft, and agricultural and industrial runoff. | Overall erosion and sedimentation is low due to extensive vegetation and stable geology and soils, although poor land use practices have resulted in localized high erosion and sediment yields. | 1,536,646 acres/  2,401 square miles |

1. Sources: Central Coast RWQCB 2002; North Coast RWQCB 2003; DWR 2003, 2009; Lahontan RWQCB 2016; Mount 1995; North Coast RWQCB 2003

##### North Lahontan

The North Lahontan hydrologic region is located in northern to eastern central California and encompasses more than 6,100 square miles. The boundary extends north from the southern boundary of the Walker River in Mono County to the Oregon border and east to the Nevada border. This region includes portions of Alpine, El Dorado, Lassen, Modoc, Mono, Nevada, Placer, and Sierra counties. The northern area of the hydrologic region is characterized by flat valleys and arid high desert conditions where sagebrush and pinyon-juniper forests are dominant. The central and southern portions of the region are located along the eastern slopes of the Sierra Nevada, where mixed conifer forests are more common. The regional climate is characterized by dry, warm summer months with occasional thunderstorms; and cold, wet (snow or rain) winters. Elevations within the region range from 4,000 feet in northern flat valley areas to mountain peak elevations over 12,800 feet. Major mountain ranges include the Cascade Range and the Sierra Nevada mountains. The treatable landscape within this hydrologic region is chiefly located in mixed conifer forest and covers roughly 1,212 square miles (approximately 20 percent of the region).

##### Sacramento River

The Sacramento River hydrologic region is located in northern to central California and encompasses over 27,200 square miles. The boundary extends north from the Sacramento-San Joaquin Delta to the Oregon border. This region includes portions of Alpine, Amador, Butte, Colusa, Contra Costa, El Dorado, Glenn, Lake, Lassen, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba counties. The regional climate is characterized by hot, dry summer months; and cold, wet winters (primarily snow in the mountain areas (>5,000 feet) and rain in low lying areas). Vegetation consists of high desert communities in the arid north, inland mixed conifer forests in the mountains, oak and chaparral in the foothills, and grasslands in the central valley. Elevations within the region range from below sea level to mountain peak elevations over 7,000 feet. Major mountain ranges within the region include the California Coast Range and the Sierra Nevada mountains. The treatable landscape within this hydrologic region evenly distributed throughout mountainous areas and covers roughly 8,358 square miles (approximately 31 percent of the region).

##### San Francisco Bay

The San Francisco Bay hydrologic region is located in northern California and encompasses over 4,500 square miles. The boundary extends north from Southern Santa Clara County to Tomales Bay. The eastern boundary of this region is along the crest of the California Coast Range. This region includes portions of Alameda, Contra Costa, Marin, Napa, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, and Stanislaus counties. Due to marine influences, the coastal climate in this region is typically cool and foggy with smaller daily and seasonal temperature changes. Further inland, the climate is more continental resulting in warmer summers, colder winters, and greater daily and seasonal temperature variation. Vegetation consists of oak woodlands, annual grasslands, and montane chaparral. Elevations within the region range from sea level to mountain peak elevations over 4,000 feet. The major mountain range within the region is the California Coast Range. The treatable landscape within this hydrologic region is evenly distributed and covers roughly 1,637 square miles (approximately 36 percent of the region).

##### San Joaquin River

The San Joaquin River hydrologic region encompasses over 15,200 square miles and is located in central California between the Sacramento River and Tulare Lake hydrologic regions. The region is bordered to the west by the Diablo Range and to the east by the Sierra Nevada. This region includes portions of Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Fresno, Inyo, Madera, Mariposa, Merced, Mono, Sacramento, San Benito, San Joaquin, Santa Clara, Stanislaus, and Tuolumne counties. Valley areas experience hot and dry summers, and cool and wet winters. Mountain areas experience mild summer temperatures and cold winters with heavy snowfall in higher elevations. Vegetation varies from mixed conifer forests in the Sierra Nevada mountains, oak and chaparral in the foothills and coast range, and grasslands in the central valley. Elevations within the region range from near sea level to mountain peak elevations of nearly 14,000 feet. The major mountain ranges within the region are the Diablo Range and the Sierra Nevada. The treatable landscape within this hydrologic region is located on the east slope of the Coast Range and the west slope of Sierra Nevada mountains, and covers roughly 3,411 square miles (approximately 22 percent of the region).

##### South Coast

The South Coast hydrologic region is located in southern coastal California encompassing nearly 11,000 square miles. The boundary of the region extends north from the Mexico border to the Ventura-Santa Barbara county line and to the east to the Transverse and Peninsular ranges. This region includes all or portions of Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura counties. The regional climate is highly variable with a Mediterranean climate with warm, dry summers and mild, wet winters in the coastal and inland valley areas. Mountainous areas in this region have a Mediterranean to subtropical steppe climate, with greater ranges of seasonal maximum and minimum temperatures. Elevations within the region range from sea level to mountain peak elevations of nearly 9,000 feet. Major mountain ranges include the Transverse and Peninsular ranges. The treatable landscape within this hydrologic region is located primarily in mountainous areas outside of urban centers, and covers roughly 2,445 square miles (approximately 22 percent of the region).

##### South Lahontan

The South Lahontan hydrologic region is located in southeastern California encompassing nearly 26,700 square miles. The boundary of the region extends north from the Sierra Nevada, San Gabriel, San Bernardino, and Tehachapi Mountains to the drainage divide between Mono Lake and East Walker River; and to the east to the Nevada border. This region includes portions of Fresno, Inyo, Kern, Los Angeles, Madera, Mono, San Bernardino, Tulare and Tuolumne counties. The regional climate for areas east of the Sierra Nevada is hot desert to steppe with hot, dry summers and mild dry winters with little precipitation. Vegetation in the eastern foothills consists mostly of sagebrush, desert shrub, and pinyon-juniper forest, with small areas of fir-spruce on high peaks. Foothill communities give way to Mojave desert shrub to the east and south of the Sierra Nevada mountains. Elevations within the region range from 282 feet below sea level in Death Valley to 14,495 feet at the peak of Mount Whitney and the treatable landscape covers elevations between these extremes. Major mountain ranges include the Sierra Nevada, White, and Avawatz mountains; and Argus and Coso. The treatable landscape within this hydrologic region located entirely in the Sierra Nevada foothills and is roughly 870 square miles (approximately 3 percent of the region).

##### Tulare Lake

The Tulare Lake hydrologic region is located in central California within the southern portion of the Central Valley and encompasses nearly 17,000 square miles. This region is within the southern portion of the San Joaquin River Valley and includes portions of Fresno, Inyo, Kern, Kings, Los Angeles, Madera, Mono, Monterey, San Benito, San Luis Obispo, Tulare and Ventura counties. The regional climate varies for valley and mountainous areas. Valley areas experience hot, dry summers and cool, wet winters. Mountainous areas experience mild summers, with intermittent thunderstorms and cold winters with heavy snowfall above 5,000 feet elevation. Vegetation varies from mixed conifer forests in the Sierra Nevada mountains, oak and chaparral in the foothills and coast range, and grasslands in the central valley. Elevations within the region range from 50 feet above sea level at the Fresno Slough to 14,495 feet at the peak of Mount Whitney. Major mountain ranges include the Coast Range, Sierra Nevada, and the Tehachapi Mountains. The treatable landscape within this hydrologic region is located on the east slope of the Coast Range and the west slope of the Sierra Nevada mountains, and covers roughly 2,400 square miles (approximately 14 percent of the region).

#### Exisiting Vegetation Treatments in the treatable landscape

Treatment activities currently occur within the treatable landscape and sometimes result in effects to hydrology and water quality. As described in Chapter 1, “Introduction” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

### Regulatory Setting

#### Federal

##### Clean Water Act

The Clean Water Act (CWA) consists of the Federal Water Pollution Control Act of 1972 and subsequent amendments. The CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation’s waters.

###### Section 404

#### Section 404 of the CWA prohibits the discharge of fill material into waters of the United States, including many wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and EPA. To discharge dredged or fill material into waters of the United States, including wetlands that come within the definition of that term, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE. Waters of the U.S. are generally defined as “…waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters.”

###### Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point sources discharging pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. Two types of nonpoint source discharges are controlled by the NPDES program: discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems. The goal of the NPDES nonpoint source regulations is to improve the quality of stormwater discharged to receiving waters to the maximum extent practicable. RWQCBs in California are responsible for implementing the NPDES permit system (see the discussion of state regulations below).

###### Section 401

#### Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The federal government delegates water pollution control authority under CWA Section 401 to the states (and in California, ultimately to the RWQCBs).

###### Section 303

Section 303(d) of the CWA requires states to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of the pollutant that the water body can receive and still be in compliance with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. EPA must either approve a TMDL prepared by the state or disapprove the state’s TMDL and issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

##### Federal Antidegradation Policy

The Federal Antidegradation Policy was enacted to provide protection to high-quality water resources of national importance. It directs states to develop and adopt statewide antidegradation policies that include protecting existing instream water uses and maintaining a level of water quality necessary to protect those existing uses and the water quality of high-quality waters. In EPA’s Clean Water Act regulations regarding water quality standards (40 CFR Chapter 1, Section 131.12[a][3]), the criteria for requiring an antidegradation standard includes the following conditions:

* Existing instream water uses and a level of water quality necessary to maintain those uses shall be maintained and protected.
* Water quality will be maintained and protected in waters that exceed water quality levels necessary for supporting fish, wildlife, and recreational activities, and water quality, unless the State deems that water quality levels can be lowered to accommodate important economic or social development. In these cases, water quality levels can only be lowered to levels that support all existing uses.
* Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

#### State

##### State Water Resources Control Board

In California, SWRCB has broad authority over water quality control issues for the state. SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include the California Department of Public Health Services (formerly Department of Health Services) (for drinking water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Wildlife (CDFW) (formerly Department of Fish and Game), and the Office of Environmental Health and Hazard Assessment. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans.

##### Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB’s jurisdiction includes waters of the United States, as well as areas that meet the definition of “waters of the state.” “Waters of the state” is defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has the discretion to take jurisdiction over areas not federally protected under CWA Section 404 provided they meet the definition of waters of the state and the State Water Resources Control Board published a new set of procedures for discharges of dredged or fill material into waters of the state on March 22, 2019. Mitigation requiring no net loss of wetlands functions and values of waters of the state typically is required by the RWQCB.

The State Water Resources Control Board has adopted the following definition of wetlands:

*An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater or shallow surface water or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area’s vegetation is dominated by hydrophytes or the area lacks vegetation.*

##### State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described previously, SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy states:

a) Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

b) Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements.

##### Z’berg-Nejedly Forest Practice Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Z’berg-Nejedly Forest Practice Act (Forest Practice Act) may be pertinent as it relates to identifying operating methods and procedures that seek to protect fish, wildlife, forests, and streams within timber harvesting areas where qualifying CalVTP treatments may also be implemented. The Forest Practice Act is intended to achieve “maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment” (PRC Section 4513[b]). The regulations created by the Forest Practice Act define factors such as the: size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

##### California Fish and Game Code Section 1602 (Lake and Streambed Alteration)

CDFW is responsible for conserving, protecting, and managing California’s fish, wildlife, and native plant resources. Fish and Game Code Section 1602 states that an entity must notify CDFW prior to substantially diverting or obstructing the natural flow of, or substantially changing or using any material from the bed, channel, or bank of, any river, stream, or lake, or depositing or disposing of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. If CDFW determines that the proposed activity may substantially adversely affect an existing fish or wildlife resource, CDFW will issue a Lake or Streambed Alteration Agreement for that activity, that includes reasonable measures necessary to protect the resource, and the entity must conduct the activity in accordance with the Agreement.

##### Safe Drinking Water Act

As mandated by the Safe Drinking Water Act (Public Law 93-523), passed in 1974, EPA regulates contaminants of concern to domestic water supply. Such contaminants are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary maximum contaminant levels (MCLs). MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 established an accelerated schedule for setting drinking water MCLs. EPA has delegated to the California Department of Public Health Services the responsibility for California’s drinking water program. California Department of Public Health Services is accountable to EPA for program implementation and for adoption of standards and regulations that are at least as stringent as those developed by EPA. Title 22 of the California Code of Regulations (Article 16, Section 64449) defines secondary drinking water standards, which are established primarily for reasons of consumer acceptance (i.e., taste) rather than for health issues.

#### Local

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to hydrology and water quality may include city and county general plans and ordinances, grading codes, and water quality protection requirements for Municipal Separate Storm Sewer Systems. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the project is subject to them, as required by the SPR AD-3.

### Impact Analysis and Mitigation Measures

#### Analysis Methodology

Evaluation of potential hydrologic and water quality impacts is based on a review of existing information from documents and studies that address water resources in California. Information obtained from these sources was reviewed and summarized to describe existing conditions and to identify potential environmental impacts, based on the standards of significance presented in this section. Significance determinations assume that the projects implemented under the CalVTP would comply with relevant federal, state, and local ordinances and regulations and account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

* **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans, Community Wildfire Protection Plans, CAL FIRE Unit Fire Plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types, including treatment maintenance.
* **SPR AQ-3 Create Burn Plan**: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types, including treatment maintenance.
* **SPR BIO-1: Review and Survey Project-Specific Biological Resources.** The project proponent will require a qualified RPF or biologist to conduct a data review and reconnaissance-level survey prior to treatment and no more than one year prior to the submittal of the PSA for each treatment project. The data reviewed will include the biological resources setting, species and sensitive natural communities tables, and habitat information in this PEIR for the ecoregion(s) where the treatment will occur. It will also include review of the best available, current data for the area, including vegetation mapping data, species distribution/range information, CNDDB, California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California, relevant BIOS queries, and relevant general and regional plans. Reconnaissance-level biological surveys will be general surveys that include visual and auditory inspection for biological resources to help determine the environmental setting of a project site. The qualified surveyor will 1.) identify and document sensitive resources, such as riparian or other sensitive habitats, sensitive natural community, wetlands, or wildlife nursery site or habitat (including bird nests), and 2.) assess the suitability of habitat for special-status plant and animal species. The surveyor will also record any incidental wildlife observations. Habitat assessments will be completed at a time of year that is appropriate for identifying habitat and no more than one year prior to the submittal of the PSA~~roject Specific Analysis (Appendix PD-3)~~ for each treatment project, unless it can be demonstrated in the Biological Resources Discussion of the PSA that habitat assessments older than one year remain valid (e.g., site conditions are unchanged and no treatment activity has occurred since the assessment). Based on the results of the data review and reconnaissance-level survey, the project proponent, in consultation with a qualified RPF or biologist, will determine which one of the following best characterizes the treatment:

1. **Suitable Habitat Is Present but Adverse Effects Can Be Clearly Avoided**. If, based on the data review and reconnaissance-level survey, the qualified RPF or biologist determines that suitable habitat for sensitive biological resources is present but adverse effects on the suitable habitat can clearly be avoided through one of the following methods, the avoidance mechanism will be implemented prior to initiating treatment and will remain in effect throughout the treatment:
   1. by physically avoiding the suitable habitat, or
   2. by conducting treatment outside of the season when a sensitive resource could be present within the suitable habitat or outside the season of sensitivity (e.g., outside of special-status bird nesting season, during dormant season of sensitive annual or geophytic plant species, or outside of maternity and rearing season at wildlife nursery sites).

Physical avoidance will include flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway) to delineate the boundary of the avoidance area around the suitable habitat. For physical avoidance, a buffer may be implemented as determined necessary by the qualified RPF or biologist.

1. **Suitable Habitat is Present and Adverse Effects Cannot Be Clearly Avoided**. Further review and surveys will be conducted to determine presence/absence of sensitive biological resources that may be affected, as described in the SPRs below. Further review may include contacting USFWS, NOAA Fisheries, CDFW, CNPS, or local resource agencies as necessary to determine the potential for special-status species or other sensitive biological resources to be affected by the treatment activity. Focused or protocol-level surveys will be conducted as necessary to determine presence/absence. If protocol surveys are conducted, survey procedures will adhere to methodologies approved by resource agencies and the scientific community, such as those that are available on the CDFW webpage at: <https://www.wildlife.ca.gov/Conservation/Survey-Protocols>. Specific survey requirements are addressed for each resource type in relevant SPRs (e.g., additional survey requirements are presented for special-status plants in SPR BIO-7).

This SPR applies to all treatment activities and treatment types, including treatment maintenance.

* **SPR BIO-4: Design Treatment to Avoid Loss or Degradation of Riparian Habitat Function**. Project proponents, in consultation with a qualified RPF or qualified biologist, will design treatments in riparian habitats to retain or improve habitat functions by implementing the following within riparian habitats:
* Retain at least 75 percent of the overstory and 50 percent of the understory canopy of native riparian vegetation within the limits of riparian habitat identified and mapped during surveys conducted pursuant to SPR BIO-3. Native riparian vegetation will be retained in a well distributed multi-storied stand composed of a diversity of species similar to that found before the start of treatment activities.
* Treatments will be limited to removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming/limbing of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the riparian vegetation types characteristic of the region. This includes hand removal (or mechanized removal where topography allows) of dead or dying riparian trees and shrubs, invasive plant removal, selective thinning, and removal of encroaching upland species.
* Removal of large, native riparian hardwood trees (e.g., willow, ash, maple, oak, alder, sycamore, cottonwood) will be minimized to the extent feasible and 75 percent of the pretreatment native riparian hardwood tree canopy will be retained. Because tree size varies depending on vegetation type present and site conditions, the tree size retention parameter will be determined on a site-specific basis depending on vegetation type present and setting; however, live, healthy, native trees that are considered large for that type of tree and large relative to other trees in that location will be retained. A scientifically-based, project-specific explanation substantiating the retention size parameter for native riparian hardwood tree removal will be provided in the Biological Resources Discussion of the PSA. Consideration of factors such as site hydrology, erosion potential, suitability of wildlife habitat, presence of sufficient seed trees, light availability, and changes in stream shading may inform the tree size retention requirements.
* Removed trees will be felled away from adjacent streams or waterbodies and piled outside of the riparian vegetation zone (unless there is an ecological reason to do otherwise that is approved by applicable regulatory agencies, such as adding large woody material to a stream to enhance fish habitat, e.g., see *Accelerated Wood Recruitment and Timber Operations: Process Guidance from the California Timber Harvest Review Team Agencies and National Marine Fisheries Service*).
* Vegetation removal that could reduce stream shading and increase stream temperatures will be avoided.
* Ground disturbance within riparian habitats will be limited to the minimum necessary to implement effective treatments. This will consist of the minimum disturbance area necessary to reduce hazardous fuels and return the riparian community to a natural fire regime (i.e., Condition Class 1) considering historic fire return intervals, climate change, and land use constraints.
* Only hand application of herbicides approved for use in aquatic environments will be allowed and only during low-flow periods or when seasonal streams are dry.
* The project proponent will notify CDFW pursuant to California Fish and Game Code Section 1602 prior to implementing any treatment activities in riparian habitats. Notification will identify the treatment activities, map the vegetation to be removed, identify the impact avoidance identification methods to be used (e.g., flagging), and appropriate protections for the retention of shaded riverine habitat, including buffers and other applicable measures to prevent erosion into the waterway.
* In consideration of spatial variability of riparian vegetation types and condition and consistent with California Forest Practice Rules Section 916.9(v) (February 2019 version), a different set of vegetation retention standards and protection measures from those specified in the above bullets may be implemented on a site-specific basis if the qualified RPF and the project proponent demonstrate through substantial evidence that alternative design measures provide a more effective means of achieving the treatment ~~goals~~ objectives and would result in effects to the Beneficial Functions of Riparian Zones equal or more favorable than those expected to result from application of the above measures. Deviation from the above design specifications, different protection measures and design standards will only be approved when the treatment plan incorporates an evaluation of beneficial functions of the riparian habitat and with written concurrence from CDFW.

This SPR applies to all treatment activities and treatment types, including treatment maintenance.

* **SPR BIO-5**: **Avoid Environmental Effects of Type Conversion and Maintain Habitat Function in Chaparral and Coastal Sage Scrub.** The project proponent will design treatment activities to avoid type conversion where native coastal sage scrub and chaparral are present. An ecological definition of type conversion is used in the CalVTP PEIR for assessment of environmental effects: a change from a vegetation type dominated by native shrub species that are characteristic of chaparral and coastal sage scrub vegetation alliances to a vegetation type characterized predominantly by weedy herbaceous cover or annual grasslands. For the PEIR, type conversion is considered in terms of habitat function, which is defined here as the arrangement and capability of habitat features to provide refuge, food source, and reproduction habitat to plants and animals, and thereby contribute to the conservation of biological and genetic diversity and evolutionary processes (de Groot et al. 2002). Some modification of habitat characteristics may occur provided habitat function is maintained (i.e., the location, essential habitat features, and species supported are not substantially changed).

During the reconnaissance-level survey required in SPR BIO-1, a qualified RPF or biologist will identify chaparral and coastal sage scrub vegetation to the alliance level and determine the condition class and fire return interval departure of the chaparral and/or coastal sage scrub present in each treatment area.

For all treatment types in chaparral and coastal sage scrub, the project proponent, in consultation with a qualified RPF or qualified biologist will:

* Develop a treatment design that avoids environmental effects of type conversion in ~~coastal~~ chaparral and coastal sage scrub vegetation alliances, which will include evaluating and determining the appropriate spatial scale at which the proponent would consider type conversion, and substantiating its appropriateness. The project proponent will demonstrate with substantial evidence that the habitat function of chaparral and coastal sage scrub would be at least maintained within the identified spatial scale at which type conversion is evaluated for the specific treatment project.
* The treatment design will ~~seek to~~ maintain a minimum percent cover of mature native shrubs within the treatment area to maintain habitat function; the appropriate percent cover will be identified by the project proponent in the development of treatment design and be specific to the vegetation alliances that are present in the identified spatial scale used to evaluate type conversion. Mature native shrubs that are retained will be distributed contiguously or in patches within the stand. If the stand consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity, to the extent needed to avoid type conversion.

These SPR requirements apply to all treatment activities and all treatment types, including treatment maintenance.

Additional measures will be applied to ecological restoration treatment types:

* For ecological restoration treatment types, complete removal of the mature shrub layer will not occur in native ~~coastal~~ chaparral and coastal sage scrub vegetation types.
* Ecological restoration treatments will not be implemented in vegetation types that are within their natural fire return interval (i.e., time since last burn is less than the average time listed as the fire return interval range in Table 3.6-1) unless the project proponent demonstrates with substantial evidence that the habitat function of chaparral and coastal sage scrub would be improved.
* A minimum of 35 percent relative cover of existing shrubs and associated native vegetation will be retained at existing densities in patches distributed in a mosaic pattern within the treated area or the shrub canopy will be thinned by no more than 20 percent from baseline density (i.e., if baseline shrub canopy density is 60 percent, post treatment shrub canopy density will be no less than 40 percent). A different percent relative cover can be retained if the project proponent demonstrates with substantial evidence that alternative treatment design measures would result in effects on the habitat function of chaparral and coastal sage scrub that are equal or more favorable than those expected to result from application of the above measures.
* If the stand within the treatment area consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity.

These SPR requirements apply to all treatment activities and only the ecosystem restoration treatment type, including treatment maintenance.

A determination of compliance with the SB 1260 prohibition of type conversion in chaparral and coastal sage scrub is a statutory issue separate from CEQA compliance that may involve factors additional to the ecological definition and habitat functions presented in the PEIR, such as geographic context. It is beyond the legal scope of the PEIR to define SB 1260 type conversion and statutory compliance. The project proponent, acting as lead agency for the proposed later treatment project, will be responsible for defining type conversion in the context of the project and making the finding that type conversion would not occur, as required by SB 1260. The project proponent will determine its criteria for defining and avoiding type conversion and, in making its findings, may draw upon information presented in this PEIR.

* **SPR GEO-1 Suspend Disturbance during Heavy Precipitation:** The project proponent will suspend mechanical, prescribed herbivory, and herbicide treatments if the National Weather Service forecast is a “chance” (30 percent or more) of rain within the next 24 hours. Activities that cause mechanical soil disturbance may resume when precipitation stops and soils are no longer saturated (i.e., when soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur). Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials. This SPR applies only to mechanical, prescribed herbivory, and herbicide treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-2 Limit High Ground Pressure Vehicles:** The project proponent will limit heavy equipment that could cause soil disturbance or compaction to be driven through treatment areas when soils are wet and saturated to avoid compaction and/or damage to soil structure. Saturated soil means that soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur. If use of heavy equipment is required in saturated areas, other measures such as operating on organic debris, using low ground pressure vehicles, or operating on frozen soils/snow covered soils will be implemented to minimize soil compaction. Existing compacted road surfaces are exempted as they are already compacted from use. This SPR applies only to mechanical treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-3 Stabilize Disturbed Soil Areas:** The project proponent will stabilize soil disturbed during mechanical, ~~and~~ prescribed herbivory treatments, and prescribed burns that result in exposure of bare soil over 50 percent or more of the treatment area with mulch or equivalent immediately after treatment activities, to the maximum extent practicable, to minimize the potential for substantial sediment discharge. If mechanical,  ~~or~~ prescribed herbivory, or prescribed burn treatment activities could result in substantial sediment discharge from soil disturbed by machinery ~~or~~ animal hooves, or being bare, organic material from mastication or mulch will be incorporated onto at least 75 percent of the disturbed soil surface where the soil erosion hazard is moderate or high, and 50 percent of the disturbed soil surface where soil erosion hazard is low to help prevent erosion. Where slash mulch is used, it will be packed into the ground surface with heavy equipment so that it is sufficiently in contact with the soil surface. This SPR only applies to mechanical,  ~~and~~ prescribed herbivory, and prescribed burns that result in exposure of bare soil over 50 percent of the project area treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-4 Erosion Monitoring:** The project proponentwill inspect treatment areas for the proper implementation of erosion control SPRs and mitigations prior to the rainy season. If erosion control measures are not properly implemented, they will be remediated prior to the first rainfall event per SPR GEO-3 and GEO-8. Additionally, the project proponent will inspect for evidence of erosion after the first large storm or rainfall event (i.e., ≥ 1.5 inches in 24 hours) as soon as is feasible after the event. Any area of erosion that will result in substantial sediment discharge will be remediated within 48 hours per the methods stated in SPRs GEO-3 and GEO-8. This SPR applies only to mechanical, prescribed herbivory, and prescribed burning treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-5 Drain Stormwater via Water Breaks:** The project proponent will drain compacted and/or bare linear treatment areas capable of generating storm runoff via water breaks using the spacing and erosion control guidelines contained in Sections 914.6, 934.6, and 954.6(c) of the California Forest Practice Rules (February 2019 version). Where waterbreaks cannot effectively disperse surface runoff, including where waterbreaks cause surface run-off to be concentrated on downslopes, other erosion controls will be installed as needed to maintain site productivity by minimizing soil loss. ~~comply with 14 CCR 914 [934, 954].~~ This SPR applies only to mechanical, manual, and prescribed burn treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-6 Minimize Burn Pile Size:** The project proponent will not create burn piles that exceed 20 feet in length, width, or diameter, except when on landings, road surfaces, or on contour to minimize the spatial extent of soil damage. In addition, burn piles will not occupy more than 15 percent of the total treatment area (Busse et al. 2014). The project proponent will not locate burn piles in a Watercourse and Lake Protection Zone as defined in ~~14 CCR Section 916.5 of the California Forest Practice Rules~~SPR HYD-4. This SPR applies to mechanical, manual, and prescribed burning treatment activities and all treatment types, including treatment maintenance.
* **SPR GEO-7 Minimize Erosion:** To minimize erosion, the project proponent will:

1. Prohibit use of heavy equipment where any of the following conditions are present:

(i) Slopes steeper than 65 percent.

(ii) Slopes steeper than 50 percent where the erosion hazard rating is high or extreme.

(iii) Slopes steeper than 50 percent that lead without flattening to sufficiently dissipate water flow and trap sediment before it reaches a watercourse or lake.

1. On slopes between 50 percent and 65 percent where the erosion hazard rating is moderate, and all slope percentages are for average slope steepness based on sample areas that are 20 acres, or less, heavy equipment will be limited to:

(i) Existing tractor roads that do not require reconstruction, or

(ii) New tractor roads flagged by the project proponent prior to the treatment activity.

1. Prescribed herbivory treatments will not be used in areas with over 50 percent slope.

This SPR applies to all treatment activities and all treatment types, including treatment maintenance.

* **SPR GEO-8 Steep Slopes**: The project proponent will require a Registered Professional Forester (RPF) or licensed geologist to evaluate treatment areas with slopes greater than 50 percent for unstable areas (areas with potential for landslide) and unstable soils (soil with moderate to high erosion hazard). If unstable areas or soils are identified within the treatment area, are unavoidable, and will be potentially directly or indirectly affected by the treatment, a licensed geologist (P.G. or C.E.G.) will determine the potential for landslide, erosion, of other issue related to unstable soils and identity measures (e.g., those in SPR GEO-7) that will be implemented by the project proponent such that substantial erosion or loss of topsoil would not occur. This SPR applies only to mechanical treatment activities and WUI fuel reduction, non-shaded fuel breaks, and ecological restoration treatment types, including treatment maintenance.
* **SPR HAZ-1 Maintain All Equipment:** The project proponent will maintain all diesel- and gasoline-powered equipment per manufacturer’s specifications, and in compliance with all state and federal emissions requirements. Maintenance records will be available for verification. Prior to the start of treatment activities, the project proponent will inspect all equipment for leaks and inspect everyday thereafter until equipment is removed from the site. Any equipment found leaking will be promptly removed. This SPR applies to all treatment activities and treatment types, including treatment maintenance.
* **SPR HAZ-5 Spill Prevention and Response Plan:** The project proponent or licensed Pest Control Advisor (PCA) will prepare a Spill Prevention and Response Plan (SPRP) prior to beginning any herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants. The SPRP will include (but not be limited to):
* a map that delineates staging areas, and storage, loading, and mixing areas for herbicides;
* a list of items required in an onsite spill kit that will be maintained throughout the life of the activity;
* procedures for the proper storage, use, and disposal of any herbicides, adjuvants, or other chemicals used in vegetation treatment.

This SPR applies only to herbicide treatment activities and all treatment types, including treatment maintenance.

* **SPR HAZ-7 Triple Rinse Herbicide Containers:** The project proponent will triple rinse all herbicide and adjuvant containers with clean water at an approved site, and dispose of rinsate by placing it in the batch tank for application per 3 CCR Section 6684. The project proponent will puncture used containers on the top and bottom to render them unusable, unless said containers are part of a manufacturer’s container recycling program, in which case the manufacturer’s instructions will be followed. Disposal of non-recyclable containers will be at legal dumpsites. Equipment will not be cleaned, and personnel will not be washed in a manner that would allow contaminated water to directly enter any body of water within the treatment area or adjacent watersheds. Disposal of all herbicides will follow label requirements and waste disposal regulations. This SPR applies only to herbicide treatment activities and all treatment types, including treatment maintenance.
* **SPR HYD-1 Comply with Water Quality Regulations:** Project proponents must also conduct proposed vegetation treatments in conformance with appropriate RWQCB timber, vegetation and land disturbance related Waste Discharge Requirements (WDRs) and/or related Conditional Waivers of Waste Discharge Requirements (Waivers), and appropriate Basin Plan Prohibitions. Where these regulatory requirements differ, the most restrictive will apply~~The project proponent will comply with all applicable water quality requirements adopted by the appropriate Regional Water Quality Control Board and approved by the SWRCB (i.e., Basin Plan)~~. If applicable, this includes compliance with the conditions of general waste discharge requirements (~~G~~WDR) and waste discharge requirement waivers for timber or silviculture activities where these waivers are designed to apply to non-commercial fuel reduction and forest health projects. In general, ~~G~~WDR and Waivers ~~waivers~~ of waste discharge requirements for fuel reduction and forest health activities require that wastes, including but not limited to petroleum products, soil, silt, sand, clay, rock, felled trees, slash, sawdust, bark, ash, and pesticides must not be discharged to surface waters or placed where it may be carried into surface waters; and that Water Board staff must be allowed reasonable access to the property in order to determine compliance with the waiver conditions. The specifications for each ~~G~~WDR and Waiver vary by region. Regions 2 (San Francisco Bay), 4 (Los Angeles), 8 (Santa Ana), and 7 (Colorado River) are highly urban or minimally forested and do not offer ~~G~~WDRs or Waivers for fuel reduction or vegetation management activities. The current applicable ~~G~~WDRs and Waivers for timber and vegetation management activities are included in Appendix HYD-1. This SPR applies to all treatment activities and treatment types, including treatment maintenance.
* **SPR HYD-2 Avoid Construction of New Roads:** The project proponent will not construct or reconstruct (i.e., cutting or filling involving less than 50 cubic yards/0.25 linear road miles) any new roads (including temporary roads). This SPR applies to all treatment activities and treatment types, including treatment maintenance.
* **SPR HYD-3 Water Quality Protections for Prescribed Herbivory:** The project proponent will include the following water quality protections for all prescribed herbivory treatments:
* Environmentally sensitive areas such as waterbodies, wetlands, or riparian areas will be identified in the treatment prescription and excluded from prescribed herbivory project areas using temporary fencing or active herding. A buffer of approximately 50 feet will be maintained between sensitive and actively grazed areas.
* Water will be provided for grazing animals in the form of an on-site stock pond or a portable water source located outside of environmentally sensitive areas.
* Treatment prescriptions will be designed to protect soil stability. Grazing animals will be herded out of an area if accelerated soil erosion is observed.

This SPR applies to prescribed herbivory treatment activities and all treatment types, including treatment maintenance.

* **SPR HYD-4 Identify and Protect Watercourse and Lake Protection Zones:** The project proponent will establish Watercourse and Lake Protection Zones (WLPZs) on either side of watercourses as defined in the table below, which is based on~~in~~ 14 CCR Section 916 .5 of the California Forest Practice Rules (February 2019 version) ~~on either side of watercourses~~. WLPZ’s are classified based on the uses of the stream and the presence of aquatic life. Wider WLPZs are required for steep slopes.

Procedures for Determining Watercourse and Lake Protection Zone (WLPZ) widths

| Water Class | Class I | Class II | Class III | Class IV |
| --- | --- | --- | --- | --- |
| Water Class Characteristics or Key Indicator Beneficial Use | 1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or  2) Fish always or seasonally present onsite, includes habitat to sustain fish migration and spawning. | 1) Fish always or seasonally present offsite within 1000 feet downstream and/or  2) Aquatic habitat for nonfish aquatic species.  3) Excludes Class III waters that are tributary to Class I waters. | No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high-water flow conditions after completion of timber operations. | Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use. |
| WLPZ Width (ft) – Distance from top of bank to the edge of the protection zone | | | | |
| < 30 % Slope | 75 | 50 | Sufficient to prevent the degradation of downstream beneficial uses of water. Determined on a site-specific basis. | |
| 30-50 % Slope | 100 | 75 |
| >50 % Slope | 150 | 100 |

Source: 14 CCR Section 916.5 [936.5, 956.5] (February 2019 version)

The following WLPZ protections will be applied for all treatments:

* Treatment activities with WLPZs will ~~meet the overstory and understory vegetation retention guidelines and ground disturbance limitations described in 14 CCR Section 916.4 [936.4, 956.4] Subsection (b) and Section 916.5, including retention of at least 75 percent surface cover and undisturbed area.~~ retain at least 75 percent surface cover and undisturbed area to act as a filter strip for raindrop energy dissipation and for wildlife habitat. If this percentage is reduced, a qualified RPF will provide the project proponent with a site- and/or treatment activity-specific explanation for the percent surface cover reduction, which will be included in the PSA. After completion of the PSA and prior to or during treatment implementation, if there is any deviation (e.g., further reduction) from the reduced percent as explained in the PSA, this will be documented in the post-project implementation report (referred to by CAL FIRE as a Completion Report). This requirement is based on 14 CCR Section 916.4 [936.4, 956.4] Subsection (b)(6) (February 2019 version) and 14 CCR Section 916.5 (February 2019 version).
* Equipment, including tractors and vehicles, must not be driven in wet areas or WLPZs, except over existing roads or watercourse crossings where vehicle tires or tracks remain dry.
* Equipment used in vegetation removal operations will not be serviced in WLPZs, within wet meadows or other wet areas, or in locations that would allow grease, oil, or fuel to pass into lakes, watercourses, or wet areas.
* WLPZs will be kept free of slash, debris, and other material that harm the beneficial uses of water. Accidental deposits will be removed immediately.
* Burn piles will be located outside of WLPZs.
* No fire ignition (nor use of associated accelerants) will occur within WLPZs however low intensity backing fires may be allowed to enter or spread into WLPZs.
* ~~Large areas of bare soil within WLPZs that are exposed by treatment activities will be stabilized with mulching, rip-rap, grass seeding, or soil stabilizers prior to the beginning of the rainy season, as described in 14 CCR 916.7.~~Within Class I and Class II WLPZs, locations where project operations expose a continuous area of mineral soil 800 square feet or larger shall be treated for reduction of soil loss. Treatment shall occur prior to October 15th and disturbances that are created after October 15th shall be treated within 10 days. Stabilization measures shall be selected that will prevent significant movement of soil into water bodies and may include but are not limited to mulching, rip-rap, grass seeding, or chemical soil stabilizers.

Where mineral soil has been exposed by project operations on approaches to watercourse crossings of Class I, II, or III within a WLPZ, the disturbed area shall be stabilized to the extent necessary to prevent the discharge of soil into watercourses or lakes in amounts that would adversely affect the quality and beneficial uses of the watercourse.

Where necessary to protect beneficial uses of water from project operations, protection measures such as seeding, mulching, or replanting shall be used to retain and improve the natural ability of the ground cover within the WLPZ to filter sediment, minimize soil erosion, and stabilize banks of watercourses and lakes.

* Equipment limitation zones (ELZs) will be designated adjacent to Class III and Class IV watercourses with minimum widths of 25 feet where side-slope is less than 30 percent and 50 feet where side-slope is 30 percent or greater. An RPF will describe the limitations of heavy equipment within the ELZ and, where appropriate, will include additional measures to protect the beneficial uses of water.

This SPR applies to all treatment activities and treatment types, including treatment maintenance.

* **SPR HYD-5 Protect Non-Target Vegetation and Special-status Species from Herbicides:** The project proponent will implement the following measures when applying herbicides:
* Locate herbicide mixing sites in areas devoid of vegetation and where there is no potential of a spill reaching non-target vegetation or a waterway.
* Use only herbicides labeled for use in aquatic environments when working in riparian habitats or other areas where there is a possibility the herbicide could come into direct contact with water. Only hand application of herbicides will be allowed in riparian habitats and only during low-flow periods or when seasonal streams are dry.
* No terrestrial or aquatic herbicides will be applied within WLPZs of Class I and II watercourses, if feasible. If this is not feasible, hand application of herbicides labeled for use in aquatic environments may be used within the WLPZ provided that the project proponent notifies the applicable regional water quality control board no fewer than 15 days prior to herbicide application. The feasibility of avoiding herbicide application within WLPZ of Class I and II watercourses will be determined by the project proponent and may be based on whether doing so will preclude achieving CalVTP program objectives, including, but not limited to, protection of vulnerable communities. The reasons for infeasibility will be documented in the PSA.
* No herbicides will be applied within a 50-foot buffer of ESA or CESA listed plant species or within 50 feet of dry vernal pools.
* For spray applications in and adjacent to habitats suitable for special-status species, use herbicides containing dye (registered for aquatic use by DPR, if warranted) to prevent overspray.
* Application will cease when weather parameters exceed label specifications or when sustained winds at the site of application exceeds 7 miles per hour (whichever is more conservative);~~Spray application of herbicides will not be carried out when wind speeds are 7 miles per hour or greater.~~
* No herbicide will be applied during precipitation events or if precipitation is forecast 24 hours before or after project activities.

This SPR applies to herbicide treatment activities and all treatment types, including treatment maintenance.

* **SPR HYD-6 Protect Existing Drainage Systems:** If a treatment activity is adjacent to a roadway with stormwater drainage infrastructure, the existing stormwater drainage infrastructure will be marked prior to ground disturbing activities. If a drainage structure or infiltration system is inadvertently disturbed or modified during project activities, the project proponent will coordinate with owner of the system or feature to repair any damage and ~~ensure that~~ restore pre-project drainage conditions ~~are restored~~. This SPR applies to all treatment activities and treatment types, including treatment maintenance.

#### Thresholds of Significance

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on hydrology or water quality if it would:

* Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
* Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
* Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream of river or through the addition of impervious surfaces, in a manner which would:
* Result in substantial erosion or siltation on or off-site;
* Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
* Create or contribute runoff water which would exceed the capacity of exiting or planned stormwater drainage system or provide substantial additional sources of polluted runoff; or
* Impede or redirect flood flows.
* Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones; or
* Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

#### Issues Not Evaluated Further

The CalVTP would not create any impervious surfaces, which would interfere with groundwater recharge. Implementation of qualifying treatments under the proposed CalVTP would also not decrease groundwater supplies through extraction because the program would not include the construction of permanent facilities that would draw on groundwater. Therefore, issues related to groundwater supplies and groundwater management are not discussed further.

Additionally, qualifying treatments implemented under the proposed CalVTP would not include construction of buildings or other facilities or store materials on site where they could be inundated by tsunami, floodwater, or seiche. Therefore, the potential for release of pollutants due to project inundation is not discussed further.

#### Impact Analysis

Impact HYD-1: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Implementation of Prescribed Burning

Implementation of the CalVTP includes prescribed broadcast burning and pile burning in tree, shrub, and grass fuel types across the state. Prescribed broadcast burning would include fire behavior modeling and burning would be conducted when fuel moisture and environmental conditions allow for effective fuel reduction while reducing the risk of high severity burns. The patchwork of low and moderate intensity fire in a prescribed burn would preserve vegetated islands to capture runoff and sediment and buffers would be preserved to act as buffers around watercourses. Compared to forested and grassland environments, prescribed fire in chaparral and shrublands is more likely to result in severe burns and increased sediment loading. However, the proposed program would utilize prescribed burning in these vegetation types only when it is consistent with the natural fire return interval or when the project proponent clearly demonstrates that habitat function would be protected. Because the CalVTP includes SPRs incorporating best management practices to protect water quality, the potential for prescribed burns implemented under the CalVTP to adversely affect water quality would be **less than significant**.

###### General Effects of Fire on Water Quality

Fire (wildfire and prescribed burning), like any landscape scale disturbance, can result in adverse effects to water quality. However, the degree to which water quality is affected is dependent on several factors including the severity of the fire, the intensity of precipitation events following the fire, and the hydrologic connectivity of the burned area to downstream waterbodies.

Severe wildfires have resulted in catastrophic erosion rates and water quality effects, typically when intense burning by wildfires was followed by large rainfall events (Wallbink et al. 2004, Dahm et al. 2015). High severity burns generally consume all surface litter, plants, and branches (large woody debris). Stumps, logs, and trees will be deeply charred and black, often with 100 percent tree mortality. Characteristically, an area burned at high severity has extensive exposed mineral soil, often greater than 80 percent (Lewis et al. 2006). Wildfires in California typically occur in the summer and fall near the end of the dry season and are more likely to be high severity burns. Prescribed burning is typically planned for seasons where fuel moisture levels are high enough to slow the spread and reduce the intensity of fire. Because of this, the risk of water quality effects is typically lower for prescribed fires than for wildfire.

Prescribed burns are designed to be low-severity burns in confined areas, which leave fine fuels such as litter and small woody debris partially charred and consumed, and little mineral soil exposed (Lewis et al. 2006, Cawson et al. 2012). Prescribed burning in California’s conifer forests have showed little to no increase in erosion (MacDonald et al. 2004), whereas prescribed burning in chaparral vegetation causes a marked increase in runoff and erosion (Valeron and Meixner 2009, Wohlgemuth et al. 1999). The higher rates of erosion in chaparral are because prescribed fire in chaparral can burn at higher intensity, remove more surface organic material, and have a higher likelihood for post-fire water repellency (Hubbert et al. 2006). However, a 10-year study of prescribed burns and wildfire in chaparral found that sediment delivery from prescribed burns in chaparral environments produced only ten percent of the sediment that is produced after a wildfire in chaparral. Also, after prescribed burns, erosion levels typically return to pre-burn levels within 2 to 4 years (Wohlgemuth et al. 1999).

Fire affects the rate of runoff by removing the vegetation canopy that intercepts raindrops, reducing plant litter on the ground surface that slows overland flow, and creating water repellency in surface soils. The vegetation cover reduces runoff and erosion by intercepting rainfall, protecting the soil surface, and creating surface roughness which increases ponding and slows water movement. The amount of surface litter has a strong influence on infiltration and runoff rates and can account for nearly two-thirds of the variability in the amount of sediment carried in runoff (Cawson et al. 2012). A summary of multiple studies found that sediment yield increased exponentially when bare soil exceeded 60-70 percent (Cawson et al. 2012). Water repellency is created when organic materials such as plant litter and duff are vaporized by high heat. As organic vapors cool and condense, soils are coated by naturally occurring water repellent hydrocarbons (Lewis et al. 2006, Wallbrink et al. 2004). This phenomenon is typically observed after moderate to high severity burns where most or all of the fine fuels and surface litter are consumed (Lewis et al. 2006). Water repellency typically occurs within the upper two inches of the soil profile and persists for several weeks (Hubbert et al. 2006). The vegetation canopy in riparian areas also provides shade and cover for adjacent water bodies in addition to providing many other ecosystem services. During low intensity fires or backing fires, riparian areas can act as fire breaks due to their high fuel moisture content. However, the capacity of riparian vegetation to affect fire behavior depends on the environmental conditions driving the fire and the size, moisture content, and topography of the riparian area (Kobziar and McBride 2006). When fire intensity is high enough to destroy riparian vegetation, stream temperature, flow, and nutrient inputs may be increased (Kobizar and McBride 2006).

In addition to sediment, the runoff from burned areas often carries increased levels of nutrients, metals, and certain organic pollutants. Combustion of plants and natural materials releases metals, nitrogen compounds, phosphorus, calcium, magnesium, and potassium and toxic organic and inorganic compounds (Crouch et al. 2006, Wallbrink et al. 2004). These materials can be carried in runoff and in high enough concentrations can adversely affect water quality leading to changes in pH, decreased dissolved oxygen levels, and even toxicity. Fires may also burn vegetation adjacent to watercourses leading to greater inputs of solar radiation and increased water temperature. These changes would be greatest in small, shallow watercourses.

The degree to which a burned area is hydrologically connected to a water body has a strong influence on the potential for water quality effects. For instance, sediment eroded from an upper area of a catchment may be distributed and held in depressions or trapped by vegetation in unburned areas rather than being discharged into a water body. Conversely, roads, tracks, and skidpaths can become extensions of the drainage system and enhance the efficiency of runoff routing and sediment transport to streams (Wallbrink et al. 2004). In a low intensity burn, variations in fire severity and the presence of unburned areas create a mosaic of patches. Higher severity burns are often found on ridges and drier aspects, with lower severity or unburnt areas found in gullies and on wetter aspects (Cawson at al. 2012). This patchiness influences hydrologic connectivity with bare patches acting as sediment sources and vegetated areas as sediment sinks. Vegetated patches are most effective when they are located near to the catchment outlet or as buffers surrounding a waterbody (Cawson et al. 2012).

###### Potential Effects of the CalVTP

The CalVTP would use prescribed burning treatments in a manner that avoids the potential for the detrimental conditions of more intensive wildfires discussed above. Although pile burning would result in localized high severity burn conditions, pile sites would be limited in size (per SPR GEO-6) and dispersed throughout the landscape with unburned areas between each pile to act as buffers and to reduce hydrologic connectivity. Additionally, SPR HYD-4 prohibits the placement of burn piles within WLPZs~~, as defined by 14 CCR Section 916.5 of the California Forest Practice Rules~~. WLPZ’s vary in width depending on the steepness of the slope and the class of stream. As defined in SPR HYD-4, WLPZs for Class I streams (streams used for domestic water supply or providing fish habitat) range from 75 feet to 150 feet. For Class II streams (streams with fish habitat within 1,000 feet downstream or providing habitat for other aquatic species) WLPZs range from 50 feet to 75 feet). WLPZ widths for Class III and Class IV streams are determined on a site-specific basis to prevent the degradation of downstream water quality. Class III streams do not provide aquatic habitat but are hydrologically connected during normal high flow events to a Class I or Class II stream. Class IV streams are constructed channels. Broadcast burning implemented under the CalVTP would be conducted when fuel moisture and environmental conditions allow for effective understory and ladder fuel control while reducing the risk of high severity burns. In addition, all prescribed burns would include the development of a CAL FIRE burn plan with fire behavior modeling (SPR AQ-3) and no ignition points would be located within WLPZs (SPR HYD-4). To further protect streams and riparian habitats and avoid increases in water temperature, projects would implement SPR BIO-4 and MM BIO-3b which minimize streamside vegetation loss and require restoration where loss is unavoidable. These SPRs would reduce the potential for escaped fire or severe burns and would preserve unburned streamside buffers to capture runoff from treatment areas. Additionally, after completion of a prescribed burn SPR GEO-4 requires implementation of erosion controls prior to the next rainy season and inspection for evidence of erosion after the first large storm or rainfall event. Any areas of erosion that would result in substantial sediment discharge would be remediated.

The SPRs described above would minimize the likelihood that prescribed burning in tree and grass fuel types would result in adverse effects to water quality. However, in chaparral and shrub dominated environments the risk to water quality is greater due to the potential for severe burns and water repellency. The majority of shrub dominated environments within the treatable area occur in the South Lahontan, Colorado River, and South Coast hydrologic regions which are subject to flashy, high intensity storms which further increases the risk of sediment and ash-laden runoff reaching water bodies. The proposed program recognizes the additional risks associated with the use of prescribed fire in these environments and describes the likelihood of using prescribed burns for Wildland Urban Interface (WUI) or Ecological Restoration projects in shrub dominated environments as “Low” (see Table 2-3 in Chapter 2, Program Description). Additionally, SPR BIO-5 requires that treatments in chaparral and coastal sage environments be timed to mimic the natural fire return interval for that system and that treatments retain a minimum percent cover of mature native shrubs to maintain habitat function and avoid type conversion. As described in Section 3.6.1 of Section 3.6, “Biological Resources,” fires have increased substantially in coastal scrub and chaparral environments, resulting in conversion of shrub dominated habitats to annual grasslands dominated by nonnative species. All SPRs and mitigation measures described in the analysis of prescribed burning in grass and tree fuel types would also apply in shrub dominated environments. This would include fire behavior modeling (SPR AQ-3), location of burn piles and fire ignition sites outside of WLPZs (SPR HYD-4), protection of streamside vegetation and riparian areas (SPR BIO-4 and MM BIO-3b) and implementation of erosion control and erosion monitoring (SPR GEO-4). Because of these protections and because the proposed program would only utilize prescribed burning in shrub dominated habitats when the treatment is consistent with natural fire return interval or when the project proponent demonstrates that habitat function will be maintained, the program would not create an additional risk to water quality from prescribed burning.

###### Summary

The proposed program would include prescribed broadcast burning and pile burning in forests, shrublands, and grasslands across the state. High intensity fires can result in severe burns where soils become water repellent and increased runoff carries ash, sediment, and debris into downstream watercourses. However, the prescribed burning that would be implemented under the CalVTP would include fire behavior modeling (for broadcast burns) and burning would be conducted when fuel moisture and environmental conditions allow for effective fuel reduction while reducing the risk of high severity burns. The patchwork of low and moderate intensity fire in a prescribed burn would preserve vegetated islands to capture runoff and sediment and WLPZs would be persevered to act as buffers around watercourses. Although prescribed fire in chaparral and shrubland environments is more likely to result in severe burns and increased sediment loading, qualifying treatments under the CalVTP would implement prescribed burning in these vegetation types only when it is consistent with the natural fire return interval or when the proponent can demonstrate with substantial evidence that habitat function will not be degraded. Implementation of these SPRs would avoid and minimize the potential for substantial water quality degradation from prescribed burning. This impact would be **less than significant**.

##### Mitigation Measures

No mitigation is required for this impact.

Impact HYD-2: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Implementation of Manual or Mechanical Treatment Activities

The proposed CalVTP includes manual and mechanical treatment activities to reduce wildfire risk within the treatable landscape. All qualifying manual and mechanical treatments implemented under the CalVTP would integrate SPRs into treatment design to protect watercourses, limit equipment use on wet soils or steep slopes, stabilize highly disturbed areas, prevent concentration of runoff in non-shaded fuel breaks, and prevent spill or leaks from equipment. Implementation of SPRs would avoid and minimize the risk of substantial degradation to surface or groundwater quality from manual or mechanical treatment activities; this impact would be **less than significant**.

The proposed program would include manual and mechanical treatment activities to reduce fuel loading within the treatable area. Manual treatment activities are unlikely to result in ground disturbance or adverse effects to water quality. As described in Impact HYD-1, piles created by hand treatment crews would be hydrologically isolated and would not be placed within WLPZs.

The mechanical vegetation removal activities that would be used in the implementation of WUI fuel reduction, ecological restoration, and shaded fuel break treatment types would use heavy equipment and would likely create disturbance similar to timber harvest and forest health projects. For this reason, the SPRs incorporate relevant elements of the California Forest Practice Rules pertaining to erosion control and protection of waterbodies. The vegetation removal and chipping activities within the treatment area could loosen and disturb soils, remove ground surface litter in some areas exposing the soil surface and facilitating erosion, and compact soils so that they are not able to infiltrate or filter runoff. Some activities, such as chaining and tilling would loosen soils at depths several inches below the soil surface. Rain of sufficient intensity and duration could dislodge soil particles, generate runoff, and cause localized erosion. The most effective water quality protections are avoidance of sensitive areas and providing undisturbed buffers between work areas and watercourses. As discussed above, the proposed program would incorporate the WLPZ protections ~~defined in 14 CCR Section 916 .5 of the California Forest Practice Rules~~ (SPR HYD-4). Additionally, SPR BIO-1 requires that a qualified RPF or biologist identify sensitive habitats such as wetlands, wet meadows, or riparian areas as well as a suitable buffer area for avoidance during project activities. This buffer would act as a filter to slow runoff from adjacent treatment areas, allow infiltration of stormwater, and trap sediment that could otherwise be carried into surface waters. SPR GEO-1 and SPR GEO-2 limit ground disturbance during precipitation or heavy equipment operation over saturated soils, when such activity could produce ruts where runoff could concentrate. Equipment operation would be limited on steep or unstable slopes (SPR GEO-7 and SPR GEO-8) to reduce the potential for erosion. Additionally, highly disturbed areas would be stabilized with mulch (SPR GEO-3) and treatment areas would be inspected for erosion and remediated prior to the rainy season and following the first large storm or rainfall event (SPR GEO-4). Finally, qualifying projects under the CalVTP would comply with all State and Regional water quality regulations, including conditions of waste discharge requirement waivers that are applicable to fuel reduction and fire prevention activities (SPR HYD-1). These waivers (presented in Appendix HYD-1) include supplemental requirements for water quality protection to ensure that project activities do not conflict with the regional water quality control plan.

The creation of non-shaded fuel breaks would involve extensive ground disturbance and removal of all vegetation within the treatment area. The loss of vegetative canopy and surface litter would result in an increase in stormwater runoff from these treatment areas, potentially carrying high sediment loads. Non-shaded fuel breaks would typically be placed on ridgelines where there is little contributing watershed area, however in some cases natural topography could direct stormwater to flow down the length of the fuel break where it could become concentrated. SPR GEO-5 incorporates relevant elements of the California Forest Practice Rules Section 914.6 (February 2019 version) which prescribes the use of waterbreaks to divert runoff from fuel breaks and roads into adjacent areas where it can infiltrate naturally. Waterbreaks would be spaced every 50 to 300 feet depending on the slope and erosion hazard rating of the underlying soil. Where waterbreaks cannot effectively disperse surface runoff, other erosion controls would be implemented as needed. Waterbreaks are required to be installed upslope of watercourses regardless of the maximum distances specified in California Forest Practice Rules Section 914.6 (February 2019 version), which would help prevent concentrated runoff from being directed into a stream or drainage. Additionally, SPR HYD-4 prevents the operation of equipment, and thus the construction of non-shaded fuel breaks, within WLPZs. As discussed above, the protection of WLPZs would provide a buffer area to capture runoff and sediment and protect surface water resources.

The equipment used for mechanical vegetation removal treatments require the use of fuels and lubricants. Qualifying treatments implemented under the CalVTP would control the potential risks of spills and leaks through application of SPRs HYD-5, which requires that equipment be fueled and serviced outside of WLPZs and wet areas, and SPR HAZ-1, which requires that all equipment be maintained and regularly inspected for leaks. Additionally, SPR HAZ-5 requires that the project proponent prepared a Spill Prevention and Response Plan and maintain a spill kit onsite. Implementation of these SPRs would prevent spills of fuels and lubricants onto soils that could be carried by runoff into adjacent waterbodies.

###### Summary

Qualifying projects implemented under the CalVTP would be required to implement SPRs that protect watercourses, limit equipment use on wet soils or steep slopes, stabilize highly disturbed areas, prevent concentration of runoff in non-shaded fuel breaks, and prevent spill or leaks from equipment. Therefore, the risk of substantial degradation to surface or groundwater quality from manual and mechanical treatments would be avoided and minimized; this impact would be **less than significant**.

##### Mitigation Measures

No mitigation is required for this impact.

Impact HYD-3: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through Prescribed Herbivory

The proposed program includes the use of prescribed herbivory to reduce fuels. Qualifying treatments under the proposed CalVTP would incorporate livestock management best practices in SPR HYD-3 which exclude grazing animals from sensitive areas, provide alternative water sources, and move animals when erosion is observed. For these reasons, the risk of substantial degradation to surface or groundwater quality from prescribed herbivory would be **less than significant**.

The proposed CalVTP includes the use of prescribed herbivory to treat vegetation. When allowed to move according to their own preferences, grazing animals will often congregate near water sources and in riparian areas where vegetation is lusher and more abundant. The potential for water quality effects from prescribed herbivory can be effectively controlled through active grazing management and application of best practices (Freitas et al. 2014, Higgins et al. 2011). Relevant best practices are encompassed in SPR HYD-3 and include active herding to prevent livestock from lingering in riparian areas, establishing riparian buffers where livestock are excluded, fencing streams and providing access to alternative water sources. Implementation of this SPR would avoid impacts to water quality caused by the persistence of grazing animals in riparian areas for extended periods of time, such as denuding of vegetation, loss of soil structure and increased sedimentation, and accumulation of manure and urine which contribute nutrients and pathogens to adjacent waterbodies (Higgins et al. 2011). The action of animal hoofs can lead to erosion of stream banks and on gentle slopes trampling of moist soils can create soil compaction, increasing the likelihood of runoff. Additionally, SPR HYD-3 limits stream access points and crossings which would avoid and minimize water quality degradation resulting from the concentration of runoff and alteration of drainage patterns caused by the creation of new trails when animals move across the stream to access water, shade or new grazing areas.

Because qualifying prescribed herbivory projects implemented under the CalVTP would exclude grazing animals from sensitive areas, provide alternative water sources, and move animals when erosion is observed, the risk of substantial degradation to surface or groundwater quality from prescribed herbivory would be avoided and minimized; this impact would be **less than significant**.

##### Mitigation Measures

No mitigation is required for this impact.

Impact HYD-4: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Ground Application of Herbicides

The CalVTP would ensure that herbicides are applied according to the manufacturer’s label directions and consistent with program SPRs which limit herbicide use in sensitive areas or under conditions that could lead to misapplication and require each project to be prepared to respond to a spill. Because qualifying projects would integrate these protective measures into treatment design, risk of substantial degradation to surface or groundwater quality from herbicide application would be avoided and minimized; this impact would be **less than significant**.

###### General Effects of Herbicides on Water Quality

In general, the use of herbicides can affect water quality through off-site movement of herbicides from runoff, leaching, drift, and misapplication or spills. Surface water can be affected by any of these means but only leaching has the potential to degrade groundwater. Site conditions, chemical characteristics, and application technique are other factors that can influence how likely an herbicide is to degrade water quality.

The first line of protection for water quality is the herbicide product label. Not all herbicides act the same way in the environment; some are active for only a short time while others may persist for years, they also have varying degrees of water solubility and soil sorption. Additionally, each herbicide may have several formulations for specific uses. Because of this complexity, each herbicide product carries a legally enforceable label which provides critical information about product use. Before an herbicide can be registered for sale, EPA requires extensive scientific data on the potential health and environmental effects. EPA evaluates the data and ensures that that label describes a set of conditions, directions, and precautions that define how and where the product can be safely used. Following the directives of the product label greatly reduces the potential for herbicides to be applied in a way that contaminates water resources.

Herbicides can be carried in stormwater runoff or carried through soils to leach into groundwater. The potential for leaching and runoff contamination is dependent on the available water in the soil, the soil’s permeability, the proximity to surface or groundwater, and the length of time that the herbicide remains active in the environment. Herbicides applied to wet soil, areas of shallow groundwater, or applied when significant precipitation is expected are more likely to be problematic.

In addition to transport in runoff, herbicides can reach water through drift, which is the airborne movement of herbicides beyond the treatment area. The risk of drift is affected by the application technique and weather conditions. Aerial or boom applications are most likely to reach water through drift because the herbicide must settle through the air to reach the treatment area. Spot and localized treatments are less likely to drift because these applications are targeted at specific plants and less herbicide is applied.

###### Potential Effects of the CalVTP

Qualifying treatments under the proposed CalVTP could use herbicides to prevent the growth or regrowth of target species. SPR HYD-5 prohibits herbicide application during precipitation or if precipitation is forecast 24 hours before or after project activities. Some formulations may require longer precipitation-free windows, as required by the label, which would be adhered to by applicators. Additionally, SPR HYD-5 prohibits non-aquatic herbicide formulations from being applied within 50 feet of a waterbody riparian area or wetland and prohibits the use of all herbicides within WLPZs without notification to the applicable regional water quality control board. These precautions would avoid and minimize the potential for herbicides to leach into groundwater or contaminate stormwater runoff.

The CalVTP does not include aerial application of herbicides. Broadcast applications of herbicide could occur using a boom applicator attached to an all-terrain vehicle or tractor. SPR HYD-5 prohibits spray applications of herbicides when wind speeds are 7 miles per hour or greater and prohibits herbicide application within 50 feet of surface water or wet meadows for non-aquatic formulations. SPRs BIO-4 and HYD-5 allow~~s~~ only hand application of herbicides in riparian areas. These protections along with compliance with label requirements would avoid and minimize the potential for spray drift from herbicides to impact water quality.

Although the protections described above would prevent impacts to water quality during herbicide application, the accidental misapplication or spill of an herbicide could degrade water quality. The potential for water quality degradation from an accidental misapplication or spill would depend on the location and site conditions, herbicide formulation, and quantity of material. In addition to the label requirements for storage, transport, mixing and container disposal, SPR HAZ-5 requires that all projects implemented through the proposed program develop a Spill Prevention and Response Plan and that projects maintain an onsite spill kit throughout the life of the activity. SPR HAZ-7 also includes requirements for rinsing and disposal of herbicide containers and requires that equipment and personnel washing occur in a manner that protects water resources. These protections would avoid and minimize the potential for misapplication or spills of herbicides to adversely affect water quality.

As discussed above, qualifying treatments under the CalVTP would use herbicides in accordance with the manufacturer’s label directions and implement all relevant SPRs, which would reduce the potential for contamination of surface or groundwater resources. Therefore, risk of substantial degradation to surface or groundwater quality from herbicide application would be avoided and minimized; this impact would be **less than significant**.

##### Mitigation Measures

No mitigation is required for this impact.

Impact HYD-5: Substantially Alter the Existing Drainage Pattern of a Treatment Site or Area

Treatments implemented under the CalVTP would include ground disturbing activities that could intersect existing drainage infrastructure at treatment sites. As discussed in Impacts HYD-1 through HYD-4, prescribed burning, prescribed herbivory, and most forms of mechanical vegetation removal would have minor effects on site drainage. Non-shaded fuel breaks constructed along roadways could intersect existing roadway drainage systems. SPR HYD-6 requires that all projects avoid disturbance of existing drainage systems and maintain pre-treatment drainage conditions. Therefore, qualifying treatments implemented under the CalVTP would not substantially alter the existing drainage pattern of a treatment site or area. This impact would be **less than significant**.

Treatments implemented under the CalVTP would include ground disturbing activities that could intersect existing drainage patterns to varying degrees. Prescribed fire, prescribed herbivory, and most forms of mechanical vegetation removal would have only minor effects on site drainage with implementation of SPRs, as discussed in Impacts HYD-1 through HYD-4. However, the extensive ground disturbance required for creation of non-shaded fuel breaks warrants further discussion related to alteration of drainage patterns.

Non-shaded fuel breaks would typically be located along ridge lines or along roads. As discussed in Impact HYD-2, the potential for non-shaded fuel breaks to modify local runoff patterns would be avoided and minimized through the implementation of SPRs GEO-5 and HYD-4. SPR GEO-5 ~~incorporates California Forest Practice Rules Section 914.6 which~~ prescribes the use of waterbreaks to divert runoff from fuel breaks and roads into adjacent areas where it can infiltrate naturally. HYD-4 prohibits the placement of burn piles within WLPZs, as defined by 14 CCR Section 916.5 of the California Forest Practice Rules (February 2019 version), which would avoid diversion of runoff that could result in adverse alteration of a drainage system. SPR HYD-6 would prevent the diversion of runoff or disturbance of existing drainage systems to avoid impacts from the implementation of non-shaded fuel breaks adjacent to roadways, which typically have existing roadway drainage or stormwater management systems. This SPR requires that ground disturbing activities, including blading for the construction of non-shaded fuel breaks, would avoid disturbance of roadway drainage infrastructure and would ensure that pre-project drainage conditions are maintained. Therefore, qualifying treatments implemented under the CalVTP would not substantially alter the existing drainage pattern of a treatment site or area. This impact would be **less than significant**.

##### Mitigation Measures

No mitigation is required for this impact.

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