

28. Public Health and Environmental Hazards

28.1 Introduction

This chapter describes hazardous materials and other environmental hazards, such as wildland fires and mosquito/vector-borne illnesses that present risks to human health or the environment within the Extended, Secondary, and Primary study areas. Descriptions and maps of these three study areas are provided in Chapter 1 Introduction. Other hazards, such as flooding, dam failure, and issues related to public services (e.g., fire protection, law enforcement, emergency services), are addressed in other chapters in this EIR/EIS.

Permits and authorizations for public health and environmental hazards are presented in Chapter 4 Environmental Compliance and Permit Summary. The regulatory setting for public health and environmental hazards is presented in Appendix 4A Environmental Compliance.

Potential local and regional impacts from constructing, operating, and maintaining the alternatives were described and compared to applicable significance thresholds. Mitigation measures are provided for identified significant or potentially significant impacts, where appropriate.

28.2 Environmental Setting/Affected Environment

28.2.1 Extended Study Area

28.2.1.1 Hazardous Materials

Hazardous materials are defined in Section 66260.10, Title 22, of the California Code of Regulations (CCR) as:

A substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of or otherwise managed.

In addition, California Health and Safety Code Section 25501 defines a hazardous material as follows:

Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or environment.

“Hazardous wastes” are defined in the California Health and Safety Code Section 25141(b) as wastes that:

...because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality

or an increase in serious illness [or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous materials contamination throughout the Extended Study Area has resulted from a variety of activities. These activities include the following influences:

- Agriculture operations that include the storage and application of pesticides, herbicides, and fertilizers, and production activities in farming operations
- Urban land uses that generate, store, or transport hazardous materials in the industrial, commercial, and residential setting on both land and water
- Historical mining operations

Potential sources of hazardous material and waste that may exist in the agricultural, urban, and historical mining areas throughout the Extended Study Area may be present in a variety of common contexts, including:

- Petroleum hydrocarbons
- Landfills or solid waste disposals sites
- Volatile organic carbons
- Wastewater and wastewater treatment plants
- Herbicide, insecticides, fungicides, and other pesticides
- Contaminated aggregate (such as mercury-contaminated)
- Underground storage tanks
- Stormwater runoff structures
- Utility poles
- Abandoned mines

Superfund is the name given to the national environmental program that was established to address abandoned hazardous waste sites. It is also the name of the fund established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended. This law was enacted because of the discovery of toxic waste dumps. California has 94 Superfund sites; there are designated Superfund sites in 26 of the counties included in the Extended Study Area. The California Department of Toxic Substances Control (DTSC) oversees the State Superfund sites and also administers the U.S. Environmental Protection Agency (USEPA) Brownfields Program. It strives to clean up and redevelop potentially contaminated lands, making it easier for such lands to become functioning parts of their communities. California has 67 Brownfields sites statewide; there are designated Brownfields sites in 11 of the counties included in the Extended Study Area. Refer to Appendix 28A California Superfund and Brownfield Sites for a list of Superfund and Brownfields sites throughout California (USEPA, 2013).

In addition to the hazardous material contamination issues noted above (agriculture and mining), the following are also areas of concern: quarries, railroads, and private water wells and septic systems.

28.2.1.2 Wildland Fires

Wildland fires pose a hazard to rural and urban development, infrastructure, and natural resources. Numerous factors, such as topography, vegetation characteristics, fuel load, and climate contribute to the degree of fire hazard throughout the State. Based on a review of the California Department of Forestry

and Fire Protection's (CAL FIRE) statewide map of fire hazard severity zones, the Central Valley Project (CVP) and State Water Project (SWP) service areas within the Extended Study Area include lands designated with a fire hazard severity ranging from moderate to very high. In general, the service areas located in the lower foothills that surround the Central Valley include lands designated as moderate risk; the service areas located in the San Francisco Bay area and in the adjacent East Bay and coastal counties include lands designated as high risk; and the service areas located in Shasta County, in Southern California, and in the higher elevations of Tehama County and the eastside counties include lands designated as very high risk for wildland fire (CAL FIRE, 2007a). All of these areas also include identified communities at risk from wildfire. Communities at risk from wildfire are those located within 1.5 miles of areas of high or very high risk for wildland fire (CAL FIRE, 2001).

28.2.1.3 Mosquitoes, Other Vectors, and Nuisance Problems

Mosquitoes

Several species of mosquitoes are common in California. Each species has a season when it is most active. Depending on the California region, some species may be active during most or all of the year. Each mosquito species has a range of preferred hosts, and most species feed on more than one type of host. Mosquitoes have blood meal hosts that range from reptiles, amphibians, mammals, birds, to humans. Protein from a host's blood is used by the female mosquito to produce eggs.

Mosquitoes carry diseases that afflict humans. They also transmit several diseases and parasites that dogs, birds, and horses are susceptible to. These diseases include protozoan diseases, such as malaria and dog heartworm, and viruses such as West Nile virus and Eastern equine encephalitis¹ (American Mosquito Control Association, 2013).

Mosquito breeding habitat is briefly characterized below to aid in understanding how mosquito-borne diseases are spread. According to a white paper by the Society of Wetland Scientists (2009), female mosquitoes can be classified into two general groups based on their egg-laying and hatching behavior, namely, the floodwater habitat mosquitoes or the permanent aquatic habitat mosquitoes.

Floodwater mosquito eggs are deposited on moist substrate and do not hatch until subsequently inundated. They include mosquitoes in the genera *Aedes*, *Anopheles*, and *Ochlerotatus* that are primarily daytime mosquitoes. These mosquitoes can be significant vectors for diseases.

Permanent aquatic habitat female mosquitoes lay eggs on stagnant warm water surfaces, which hatch after 3 to 5 days. Mosquitoes in the genera *Culex*, *Culisteta*, and *Orthopodomyia* are included in this group. Many species in this group are active at dusk and can feed on both humans and livestock. Conditions conducive to permanent aquatic habitat are shallow stagnant ponds with emergent vegetation, standing rain puddles, and poorly drained or flooded agricultural fields.

The mosquito species that are found within the counties that comprise the Extended Study Area are listed in Table 28-1.

¹ Dengue and yellow fever are also mosquito-vectored diseases; however, they have not been reported in California. Yellow fever occurs only in tropical areas of Africa and the Americas (American Mosquito Control Association, 2013).

Other Vectors and Nuisance Problems

Stinging Insects

Stinging insects, such as bees, yellowjackets, paper wasps, and stinging ants (all found within the Extended Study Area), can cause injury to humans ranging from sharp temporary pain to anaphylaxis shock leading to death. Stinging insects can be divided into social (those that live in colonies) and non-social (Mussen, 2011a). Non-social stinging insects are individual insects that tend to avoid human contact by fleeing. Social stinging insects include the western yellowjacket (*Vespula pennsylvanica*), the German yellowjacket (*Vespula germanica*), the prairie yellowjacket (*Vespula atropilosa*), the European honey bee (*Apis mellifera*), and fire ants (*Solenopsis* spp.). The red imported fire ant (*Solenopsis invicta*) is particularly aggressive and can cause injury and damage to humans, crops, and livestock. Generally, social stinging insects are not aggressive to humans unless perceived as a threat to their nest and foraging activities (Mussen, 2011a, 2011b). In addition, stinging insects are attracted to food sources such as trash receptacles, outdoor cooking areas, and picnic areas.

European honey bees are used by beekeepers in California for honey production and crop pollination although they are nonnative to the Americas. Several different subspecies of the European honey bee now exist throughout the United States. The Africanized honey bee² has been in California since 1994 (Los Angeles County West Vector Control District, 2012). Africanized honey bees have colonized in the Extended Study Area in Kings, Madera, San Luis Obispo, Santa Barbara, and Tulare counties.

Yellowjackets and paper wasps are beneficial insects. Yellowjackets and the European paper wasp are often confused, but have distinct differences. Most of the time, yellowjackets are not aggressive and will not harm humans if they stay out of their way. European paper wasps are more easily provoked than other wasps, and will more readily sting when someone nears their nest. In the summer months, foraging yellowjackets may become a nuisance in parks, campgrounds, and other areas. Paper wasps may become a nuisance when they build a nest on or near homes (Sacramento-Yolo Mosquito and Vector Control District, 2011).

Stinging ants are nonnative but were found in California in 1997. Since then, they have rapidly spread throughout central and Southern California and because of their potential for substantial injury and damage to humans, crops, and livestock, several Southern California counties (Riverside, Orange, Los Angeles, and San Diego) have established quarantines to confine further spreading (Jetter et al., 2002).

Ticks, Liver Flukes, and Conenose Bugs

Ticks are small insect-like creatures most often found in naturally vegetated areas. They feed by attaching to animals and humans, sticking their mouthparts into the skin, and sucking blood for up to several days. Ticks can be vectors for disease, particularly Lyme disease. Ticks have four life cycle stages: egg, larva, nymph, and adult. Only the nymph and adult ticks can transmit the bacteria that eventually cause Lyme and other diseases (Lane, 2008).

² The Africanized honey bee is a cross-breed of the African honey bee and the European honey bee.

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There are 47 species of ticks in California, but only six to eight species are known to commonly bite humans (Lane, 2008). Although the western black-legged tick (*Ixodes pacificus*) is the only species that carries the bacteria which cause Lyme disease, other diseases can be transmitted by the other human-biting ticks. For example, Rocky Mountain spotted fever can be transmitted by the American dog tick (*Dermacentor variabilis*) and the Rocky Mountain wood tick (*Dermacentor andersoni*). Bacteria causing Colorado tick fever and Tularemia can be transmitted by the Pacific Coast tick (*Dermacentor occidentalis*) (Lane, 1990).

Liver flukes and conenose bugs exist throughout the Extended Study Area. Liver flukes infect mammals (both humans and animals) when the human/animal drinks contaminated water or ingests raw watercress or other aquatic plants that are contaminated with immature parasite larvae. The immature larval flukes migrate through the intestinal wall, the abdominal cavity, and the liver tissue into the bile ducts where they develop into mature adult flukes. The adult flukes lay eggs, which are passed out in the infected human/animal feces. The eggs hatch in fresh water and infect a snail host by penetrating its shell. The eggs develop within the snail and attach to aquatic plants, and the cycle continues (Centers for Disease Control and Prevention, 2010).

Conenose bugs are also known as kissing bugs. They are a bloodsucking parasite of a wide variety of domestic and wild animals and humans. In California, these bugs are most prevalent in the foothill areas surrounding the Central Valley and in the foothills and desert areas of Southern California. The only important species in California is the western bloodsucking conenose (*Triatoma protracta*). It lives in the nests of wood rats, but also flies into homes. The bites are not painful, but can produce an allergic reaction. Typically, bites occur at night while victims are sleeping (Greenberg and Klotz, 2002).

Rodents and Flies

Other vectors transmitting disease in the Extended Study Area include rodents and flies. Hantavirus Cardiopulmonary Syndrome Disease (HCSD) is a potentially fatal disease caused by the Sin Nombre virus, which can be carried by wild rodents. In California, only wild deer mice (*Peromyscus* spp.) carry the Sin Nombre virus. Because these deer mice are present throughout California, the California Department of Public Health routinely tests rodents for the presence of the virus. During 2011, although the virus was present in 8 percent of the rodents tested (primarily in San Diego County), no cases of HCSD were reported (California Department of Public Health [CDPH], 2012).

Plague is a bacterial disease caused by the bacterium *Yersinia pestis* and is transmitted by wild rodents. Humans can contract the disease if bitten by the fleas of an infected rodent, or through direct contact with a sick rodent. In California, the most common carriers of plague are ground squirrels, chipmunks, woodrats, and mice. The California Department of Public Health routinely tests rodents for the presence of antibodies to *Yersinia pestis*. During 2012, seven ground squirrels and 28 chipmunks tested positive for the antibodies. No human cases of plague were reported (CDPH, 2013).

Nuisance flies are insects that are annoying or can spread disease. All nuisance flies are of the Order Diptera and are found throughout California. Common nuisance flies include midges, house, deer, and horse flies. Flies become a problem when they congregate on dead animals, feces, or garbage, and then transfer pathogens to humans and animals (CDPH, 2010).

Rattlesnakes

The rattlesnake is California's only native venomous snake. California rattlesnake species include the western rattlesnake (*Crotalus oreganus*) found throughout California (with the exception of the desert), and the following species found in Southern California: western diamondback (*Crotalus atrox*), sidewinder (*Crotalus cerastes*), speckled rattlesnake (*Crotalus mitchellii*), red diamond rattlesnake (*Crotalus ruber*), Mojave rattlesnake (*Crotalus scutulatus*), and the Panamint rattlesnake (*Crotalus stephensi*) (California Department of Fish and Game, 2012). In California, rattlesnakes are found from sea level to the inland prairies and desert areas and to the mountains at elevations of more than 10,000 feet (California Department of Fish and Wildlife, 2013).

Most rattlesnakes forage for prey in or near brushy or tall grass areas, rock outcrops, rodent burrows, around and under surface objects, and sometimes in the open. Adults eat live prey, primarily rodents; the young take mostly lizards and young rodents (Salmon et al., 2004). Rattlesnakes are generally not aggressive, but will strike when threatened or deliberately provoked. Most snake bites occur on the hands, ankles, or feet when a rattlesnake is handled or accidentally touched by someone walking or climbing. Rattlesnakes cause serious injury to humans on rare occasions. In the United States, out of the approximately 800 rattlesnake bites reported annually, one to two are fatal. Most bites occur between the months of April and October (California Department of Fish and Wildlife, 2013).

Poison Oak

Poison oak (*Toxicodendron diversilobum*), which can take the form of a shrub or climbing vine, is widespread in California and grows in a variety of habitats. Direct contact with the oil from poison oak leaves or stems can cause an allergic skin reaction (dermatitis) in humans that typically lasts for 10 days. An allergic reaction can also occur through indirect contact with the plant, such as by touching contaminated clothing or pets. Poison oak is considered to be the most hazardous plant in California due to the number of working hours lost as a result of the dermatitis it causes (DiTomaso and Lanini, 2009).

Giardia and Swimmer's Itch

The vectors that transmit Giardia and Swimmer's Itch occur throughout the Extended Study Area. Giardia (also known as beaver fever, backpacker disease, and Giardiasis) is caused by the microscopic parasite *Giardia lamblia* and is considered to be one of the most common sources of waterborne illness. The parasite lives in the intestines of warm-blooded animals and is transmitted from host to host when it is ingested. The parasite attaches itself to the host's intestine and causes gastrointestinal symptoms that can last from 2 weeks to 2 months. *Giardia* is typically passed to humans when they drink surface water that is contaminated by grazing cattle or game animals (Hairston, no date).

Swimmer's itch (also called cercarial dermatitis) is a rash that is caused by an allergic reaction to certain parasites (cercaria)³ that infect some birds and mammals. The parasites are released from infected snails into fresh and salt water (including lakes, ponds, and oceans). If the parasite comes into contact with a swimmer, it burrows into the skin, causing an allergic reaction and rash. Swimmer's itch occurs more frequently during the summer months (Centers for Disease Control and Prevention, 2012).

Appendix 28B Mosquitoes and Other Vectors describes vectors found within California and nuisance problems associated with them.

³ The free-swimming parasitic larva of a trematode worm.

28.2.2 Secondary Study Area

28.2.2.1 Hazardous Materials

The Secondary Study Area also covers a large and diverse geographical area, and the causes of concern are similar to that described for the Extended Study Area. In addition, the hazardous material contamination issues noted in the Extended Study Area also relate to the Secondary Study Area and are discussed in detail below.

Dredging, Mining, and Mercury

Mercury contamination from the inorganic mercury used in historical gold mines represents a potential risk to human health and the environment. Inorganic mercury is converted by microorganisms in soil and sediments (in air or water) to organic methylmercury, which is a neurotoxin that attacks the central nervous system and causes numerous developmental and other problems. Methylmercury then bioaccumulates⁴ in the food chain. High levels of methylmercury contamination in fish, amphibians, and invertebrates downstream of the hydraulic mines are a consequence of historical mercury use (U.S. Geological Survey [USGS], 2000).

Mercury was a key element in the California Gold Rush because of its role in separating precious metals, such as gold and silver, from contaminants. The extensive panning activity along California's streams soon exhausted the readily available gold and led to the development of hydraulic mining. Hard rock mining and dredging was also initiated during this period. A significant step in all of these procedures involved the use of large quantities of mercury (University of California, Davis, 2010).

To enhance gold recovery from hydraulic mining, hundreds of pounds of liquid mercury were added to riffles and troughs in a typical sluice. The high density of mercury allowed gold and gold-mercury amalgam to sink while sand and gravel passed over the mercury and through the sluice. Large volumes of turbulent water flowing through the sluice caused many of the finer gold and mercury particles to wash through and out of the sluice before they could settle in the mercury-laden riffles. A modification known as an undercurrent reduced this loss. The finer grained particles were diverted to the undercurrent, where gold was amalgamated on mercury-lined copper plates. Most of the mercury remained on the copper plates; however, some was lost to the flowing slurry and was transported to downstream environments (USGS, 2000).

Loss of mercury in the mining process resulted in highly contaminated sediments at mine sites. Elevated mercury concentrations in present-day mine waters and sediments indicate that hundreds to thousands of pounds of mercury remain at each of the many sites affected by hydraulic mining (USGS, 2000).

Hydraulic mines were operated on a large scale from the 1850s to the 1880s in the northern Sierra Nevada region. In 1884, the Sawyer Decision prohibited discharge of mining debris in the Sierra Nevada region, but not in the Klamath-Trinity Mountains where hydraulic mining continued until the 1950s.

Underground mining of placer deposits and of hard rock gold-quartz vein deposits produced most of California's gold from the mid-1880s to the early 1900s. Dredging of gold-bearing sediments in the Sierra Nevada foothills has been an important source of gold since the early 1900s (USGS, 2000).

⁴ The gradual build-up of toxins in an organism at levels higher than those that occur in the surrounding environment.

The American, Bear, Yuba, and Feather River watersheds each have been affected by hydraulic mining. In the northwestern Sierra Nevada, the highest average levels of mercury bioaccumulation occur in the Bear River and South Yuba River watersheds (USGS, 2000).

Acid mine drainage is also an issue within the Secondary Study Area. In particular, the Iron Mountain Mine Superfund site in Shasta County operated within the Spring Creek watershed from the 1860s to the 1960s. The mine extracted iron, silver, gold, copper, zinc, and pyrite. This historical mining activity at the mine fractured the mountain, exposing minerals in the mountain to surface water, rain water, and oxygen. When pyrite is exposed to moisture and oxygen, sulfuric acid forms. The sulfuric acid flows through the mountain and leaches out copper, cadmium, zinc, and other heavy metals. Much of this acidic mine drainage ultimately is channeled into the Spring Creek Reservoir by creeks surrounding the mine. Reclamation periodically releases the stored acid mine drainage into Keswick Reservoir. Planned releases are timed to coincide with the presence of diluting releases of water from Shasta Dam. On occasion, uncontrolled spills and excessive waste releases have occurred when Spring Creek Reservoir reached capacity. Without sufficient dilution, this results in the release of harmful quantities of heavy metals into the Sacramento River. Since 1940, high levels of contamination in the Sacramento River have caused numerous fish kills. The low pH level and the heavy metal contamination from the mine have caused the virtual elimination of aquatic life in sections of Slickrock Creek, Boulder Creek, and Spring Creek. The continuous release of metals from the mine has contributed to a steady decline in the fisheries population in the Sacramento River (USEPA, 2011). In 1989, USEPA ordered the potentially responsible parties to implement emergency response corrective measures. Since then, USEPA has issued required cleanup actions under an Administrative Order, including a treatment system for the Boulder Creek Watershed and implementation of the collection and treatment system for acid mine drainage discharges. Cleanup has included installation of a full-scale neutralization system, capping of areas of the mine, and collection of contaminated runoff for treatment. Cleanup activities and additional studies continue and have increased the ability to manage the continuing release of contaminants from the site to minimize impacts to the Sacramento River (USEPA, 2016).

Quarrying

Quarrying can substantially modify the routing of groundwater recharge, causing water quality degradation. Commonly, the first impact of quarrying is to remove the overlying vegetation and soil. In temperate areas, removing vegetation and soil reduces evapotranspiration and increases the effective rainfall. Unless measures are taken to control runoff and sedimentation, deterioration of groundwater is likely (USGS, 2001).

Engineering activities associated with quarrying can directly change the course of surface water. Sinkholes created by quarrying can intercept surface water flow. Groundwater pumping from quarries changes gaining streams (volume is contributed to by groundwater) to losing streams (volume decreases as it flows downstream), and can drain other nearby surface water features such as ponds and wetlands. Similarly, blasting can modify groundwater flow, which ultimately can modify surface water flow. Discharging quarry water into nearby streams can increase flood recurrence intervals (USGS, 2001).

The risk of groundwater pollution may increase if the direction of groundwater flow is modified. New source areas of recharge may be introduced, and those sources may contain contaminated water. This situation can arise because of groundwater pumping, or can occur if old choked passages are flushed and become operational again (USGS, 2001).

Railroads

Although rail transport is generally considered a safe form of shipment, there are various possibilities for accidents and breakdowns to occur. Trains are heavy, unable to deviate from the track, and require a great distance to stop. Accidents include derailments, head-on collisions with other trains, collisions with road vehicles, and hazardous material spills into waterways. Any train derailment that results in a release or threatened release of contaminants is considered a major hazardous material spill (National Transportation Safety Board, 2010).

Some historical railroad operations involved the use of chemicals that may have resulted in contamination. The most commonly reported contamination along rail lines includes metals, pesticides⁵ (such as lead arsenate), and constituents of oil or fuel (petroleum products). These chemicals have been associated with normal railroad operations and are likely to be found anywhere along the line. An example is arsenic (up to 10 times natural background levels) may be present in the soil along a right-of-way from old railroad ties dipped in an arsenic solution, arsenic weed-control sprays, and arsenic-laced slag used as railroad bed fill. Lubricating oil and diesel that dripped from the trains are likely sources of the petroleum product found along the lines. Other sources of contaminants associated with historical railroad operation may include coal ash from engines, creosote from ties, and polynuclear aromatic hydrocarbons (“PAHs”) from the diesel exhaust (Commonwealth of Massachusetts Department of Environmental Protection, 2011).

Agriculture

Agriculture is a major land use in the Secondary Study Area, and a wide variety of crops are grown year-round. Long-term use of agricultural chemicals, including pesticides, herbicides, fertilizers, and crop-specific additives can lead to toxic buildup of residues in the soil (California Department of Water Resources [DWR], 2010).

Water Wells and Septic Systems

Communities in rural areas may rely on septic systems and water wells. Failure of septic systems can result in pollution of the soil and groundwater (Marin County, 2005). Abandoned, unsecured, or damaged underground water wells or piping systems can serve as a potential conduit for soil and groundwater contamination (DWR, 2010).

28.2.2.2 Wildland Fires

Similar to that described for the Extended Study Area, wildland fires within the Secondary Study Area also pose a hazard to rural and urban development, infrastructure, and natural resources. Based on a review of CAL FIRE’s statewide map of fire hazard severity zones, the lands surrounding the waterbodies included within the Secondary Study Area are designated with a fire hazard severity ranging from moderate to very high. The lands surrounding Trinity Lake, Trinity River, Klamath River, Whiskeytown Lake, Lewiston Lake, Spring Creek, Clear Creek, Shasta Lake, and Keswick Reservoir are designated as very high risk for wildland fire (CAL FIRE, 2007a).

⁵ The application of pesticides consistent with their labeling is excluded from the definition of a “release” under M.G.L. Chapter 21E.

The lands surrounding the Sacramento River downstream of Shasta Dam, the Sutter Bypass, and the Yolo Bypass are largely unzoned for fire hazard, with intermittent areas designated as moderate risk for wildland fire. The lands surrounding Lake Oroville are designated as very high risk, and the lands surrounding the Feather River downstream of Oroville Dam are designated as high risk near the dam, and as moderate risk for the rest of the river. The lands surrounding Folsom Lake are designated as moderate risk for wildland fire, and the American River downstream of Folsom Dam is largely unzoned for fire hazard, with intermittent areas designated as moderate risk for wildland fire (CAL FIRE, 2007a).

The lands surrounding the Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, and San Francisco Bay are mostly unzoned for fire hazard, with intermittent areas designated as moderate or high risk for wildland fire (CAL FIRE, 2007a).

All of these waterbodies are surrounded intermittently by identified communities at risk from wildfire. Numerous identified communities at risk from wildfire are located in the vicinity of Trinity Lake, Shasta Lake, and Lake Oroville (CAL FIRE, 2001).

28.2.2.3 Mosquitoes, Other Vectors, and Nuisance Problems

Because much of the Secondary Study Area is included within the Extended Study Area, the mosquito, other vectors, and nuisance problem concerns for the Extended Study Area are also applicable to the Secondary Study Area. The mosquito species that are found within the counties that comprise the Secondary Study Area are listed in Table 28-2.

28.2.3 Primary Study Area

28.2.3.1 Hazardous Materials

Hazardous material contamination issues noted in the Extended and Secondary study areas may also apply to the Primary Study Area, depending upon proximity. There are no designated Superfund or Brownfields sites located within the Primary Study Area. Hazardous material contamination issues specific to the Primary Study area are discussed below.

Environmental Contamination Assessment Methodology

Assessing environmental contamination within a property can be accomplished through the Phase I Environmental Site Assessment process. Phase I Environmental Site Assessments are performed in conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) E1527-05 standard practice and the requirements set forth in Title 40, Part 312 of the Code of Federal Regulations (CFR).

Table 28-2
Distribution of Mosquitoes in Counties that Comprise the Secondary Study Area

County	Mosquito Species																														
	Aedes		Ochlerotatus								Anopheles					Culex						Culiseta			Others						
	<i>hemiteleus</i>	<i>vexans</i>	<i>bicristatus</i>	<i>dorsalis</i>	<i>fitchii</i>	<i>hexodontus</i>	<i>Increpitus complex</i>	<i>melanimon</i>	<i>nigromaculis</i>	<i>sierrensis</i>	<i>squamiger</i>	<i>sticticus</i>	<i>franciscanus</i>	<i>freeborni</i>	<i>hermsi</i>	<i>occidentalis</i>	<i>punctipennis</i>	<i>apicalis</i>	<i>boharti</i>	<i>erythrothorax</i>	<i>pipiens/quinque</i>	<i>reevesi</i>	<i>stigmatosoma</i>	<i>tarsalis</i>	<i>territans</i>	<i>thriambus</i>	<i>incidens</i>	<i>inornata</i>	<i>particeps</i>	<i>Cq. perturbans</i>	<i>Cr. signifera</i>
Del Norte	X			X			X			X		X	X		X	X	X	X	X	X		X	X	X		X	X	X	X		
Humboldt		X	X	X	X		X			X		X	X		X	X	X	X	X	X		X	X	X		X	X	X	X		
Marin			X	X			X		X	X		X	X		X	X	X	X	X	X	X	X	X		X	X	X				
San Francisco									X						X				X			X				X	X	X			
San Mateo			X	X			X			X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	
Sonoma			X	X			X	X	X	X		X	X		X	X	X	X	X	X		X	X		X	X	X			X	
Trinity			X		X	X	X		X	X		X	X			X	X	X				X	X	X		X	X	X	X		
Yuba		X					X	X	X	X		X	X			X	X	X	X	X		X	X	X	X	X	X	X	X	X	

Note:

See Table 28-1 for 14 additional counties that are located within the Secondary Study Area.

Source: Mosquito and Vector Control Association of California, 2003.

The purpose of a Phase I Environmental Site Assessment, as specified by ASTM E1527-05 standard practice is to identify “recognized environmental conditions”. This standard defines the term “recognized environmental conditions” as:

“...the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws...The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies” (ASTM, 2005).

The Phase I Environmental Site Assessment process includes information obtained from the following activities: a site reconnaissance, historical review of land use, review of land title records, consultation with local environmental health officials, contact with the land owners, review of available maps and records, and review of federal and State environmental databases (ASTM, 2005).

A review of federal and State databases can be accomplished through an environmental database search. BBL Environmental Information (BBL) was contracted to conduct a database search for the Primary Study Area. The resulting report identified reported sources of hazardous materials contamination existing within the footprints of the Sites Reservoir Project (Project) features.

Only the database portion of the Phase I process was conducted for this EIR/EIS. A full Phase I Environmental Site Assessment would be conducted prior to property acquisition and would be presumed to be valid for 180 days. After that period, it would not be used without a current investigation of conditions likely to affect recognized environmental conditions on the property, which may have changed materially since the assessment was first conducted (ASTM, 2005) (see 3.4.2 Environmental Site Assessment).

Database Search Methodology

A record search determines if any reported sources of hazardous materials contamination exists within an approximate minimum search distance (ASTM, 2005). An extensive list of federal, State, and local regulatory agencies’ published databases was reviewed; a complete listing of the records is included in Appendix 28C Environmental Records Searches. While the ASTM E1527 standard was updated in 2013, the database search conducted for this assessment provided the appropriate information for assessing the existing conditions and affected environment.

A standard ASTM record search uses a 1-mile radial search from the center of a property, but because of the large size and irregular shape of the Primary Study Area, modified search patterns were performed.

To ensure complete coverage of the locations of all of the Primary Study Area Project facilities, the record search was divided into two separate reports: the Sites Reservoir Environmental Record Search Report and the Funks Reservoir/Delevan Pipeline Environmental Record Search Report⁶ (Appendix 28C Environmental Records Searches). All Primary Study Area Project facilities were included in the database

⁶ Some overlap may occur between the two reports.

record searches, with the exception of the Glenn-Colusa Irrigation District (GCID) Main Canal facilities modifications.

Database Search Results

The sites identified in the record search reports as having known environmental concerns are discussed below and identified by their respective Environmental Record Search Report map ID number. Various agencies issue operating permits or regulate the handling, movements, storage, and disposal of hazardous materials and require mandatory reporting. Inclusion of properties in this section of the Environmental Record Search Report does not imply that an environmental problem exists presently or has in the past. All sites with operating permits are included only in the full record search reports (Appendix 28C Environmental Records Searches).

Sites Reservoir and Related Project Facilities

Sixteen records were identified in the Sites Reservoir Environmental Record Search Report (Appendix 28C Environmental Records Searches), representing 15 separate sites. Ten sites have operating permits. The remaining five sites have environmental concerns and are mentioned below.

Four sites were identified from the Mineral Industry Location System (MILS), a database maintained by the U.S. Bureau of Mines. The MILS covers over 200,000 mineral occurrences, deposits, mines, and processing plants in the U.S. The information is used to support government agencies that have land use planning responsibilities. These agencies look to the Bureau of Mines both for mineral resource assessments and for help identifying and remediating inactive and abandoned mine hazards.

- Map ID 2: An unnamed location and operation, but identified chromium as a commodity. The closest Project facility is the proposed South Bridge west approach road on the west side of the Project. The site is located outside of the Project Buffer.
- Map ID 4: Sandstone Company Quarry, a surface operation producing sand and gravel. The closest Project facility is the proposed Com Road on the eastern border of the Project. The site is located outside of the road right-of-way.
- Map ID 6: McGilvray Quarry, a surface operation producing sand and gravel that is closed. The quarry is located on the eastern border of the Project, between Maxwell Sites Road, the proposed Sulphur Gap Road, and the proposed Com Road. The site is located outside of the road right-of-way.
- Map ID 7: Talbot, an underground operation producing stone. The closest Project facility is the proposed Saddle Dam 6 on the northern border of the Project. This site is located within the Project Buffer.

One site was identified from the Emergency Response Notification System (ERNS), a national computer database used to store information on unauthorized releases of oil and hazardous substances. There were two incidences where unauthorized releases of oil and hazardous substances occurred at this site.

- Map ID 8: Delevan Compressor Station, located at 5001 Delevan Road in Maxwell, California. On June 24, 2007, 250 gallons of turbine oil were released from a gas turbine onto a concrete structure because of equipment failure. On May 2, 2005, 220 gallons of turbine oil were released into a secondary containment area because of a broken hydraulic pipe. Cleanup was completed. The western end of the proposed Delevan Pipeline and the Terminal Regulating Reservoir (TRR) facilities are located in proximity to this identified site.

Funks Reservoir and Related Project Facilities

Fifty records were identified in the Funks Reservoir and Delevan Pipeline Environmental Record Search Report (Appendix 28C Environmental Records Searches), representing 46 separate sites. Thirty-six sites are identified as having operating permits. The remaining 10 sites have known environmental concerns, but only three are located within the search boundaries. These three sites are discussed below and identified by their Environmental Record Search Report map ID number.

The following sites were identified from MILS and the Emergency Response Notification System, respectively:

- Map ID 2: Compton Landing, an unnamed operation in Colusa, California, lists its commodity as natural gas. The closest Project facilities are the proposed Delevan Pipeline Intake Facilities and Delevan Pipeline Discharge Facility at the eastern end of the proposed Delevan Pipeline.
- Map ID 21: An unnamed site at McDermott and Delevan roads in Delevan, California. A spill of 20 percent aqua ammonia (unknown quantity) occurred into an irrigation canal from an overturned truck. The spill date is unknown. The closest Project facilities are the western portion of the proposed Delevan Pipeline and the TRR facilities.

The site mentioned below was listed in the Toxic Releases database. The California Regional Water Quality Controls Boards or local Department of Health Services tracks toxic releases to the environment. These lists are known as Unauthorized Releases, Spills, Leaks, Investigations, and Cleanups, Non-Tank Releases, Toxics List or similar, depending on the local agency.

- Map ID 16: JR Simplot Soil Builders, located on old Highway 99 at Lenahan Road in Maxwell, California. No additional information regarding type of incident was available. Status is inactive. The nearest Project facility is the proposed Delevan Pipeline.

Numerous permitted Underground Storage Tanks (USTs) were identified in the two record search reports. Three USTs were found within the footprint of the Project. Not all UST locations are known. In addition, there is the possibility of unidentified USTs because of the remote location and history of agricultural activity in the area.

The town of Sites is located within the footprint of the Project. Existing residences, outbuildings, and roads are associated with the town. No site reconnaissance was conducted for this analysis to assess the potential hazardous material concerns related to these structures; therefore, further investigation is recommended prior to property acquisition. Hazardous material concerns within the Primary Study Area that were not identified through the BBL record search include septic systems, water wells, a railroad, a quarry, and agricultural activity. The potential hazards associated with these issues are discussed in Section 28.2.2.1.

Hazardous material concerns within the Primary Study Area not documented in the BBL reports include historical salt mining and oil wells. Salt mining occurred in the Antelope Valley beginning in the 1860s and continued until 1900. In addition, oil was discovered in the spring of 1865 in Colusa County. Several test wells were drilled in the area, but did not prove profitable.

Arsenic is also a hazardous material concern not identified in the BBL reports. High arsenic levels have been found in areas located within the Primary Study Area. Salt Lake, which is located within the northeastern portion of the Project footprint (inundation area), has high arsenic levels. Funks Creek and

Stone Corral Creek have levels of arsenic that exceed the California Public Health Goal, but meet the USEPA arsenic rule. Water samples from the Tehama-Colusa Canal and GCID Main Canal intakes, the Colusa Basin Drain, and from the Sacramento River near Moulton Weir exceed the human toxicity criteria for arsenic.

28.2.3.2 Wildland Fires

Wildland fires within the Primary Study Area pose a hazard to rural development, infrastructure, and natural resources given the presence of dry grasses and vegetation throughout the Primary Study Area in the summer and early fall months. The lands surrounding the proposed TRR Pipeline, TRR and associated facilities, Delevan Pipeline Electrical Switchyard, Delevan Pipeline, and Delevan Pipeline Intake/Discharge Facilities, which are intensively managed agricultural lands, are unzoned for fire hazard. The lands surrounding the locations of the proposed GCID Main Canal Facilities Modifications are also unzoned for fire hazard. The remaining Project facilities within the Primary Study Area are surrounded by lands designated as moderate risk for wildland fire (CAL FIRE, 2007b).

The identified community at risk for wildfire that is located closest to the defined Primary Study Area is the town of Lodoga (CAL FIRE, 2001).

28.2.3.3 Mosquitoes and Other Vectors

Mosquitoes

Mosquito species found in Glenn and Colusa counties are listed in Table 28-3.

Table 28-3
Distribution of Mosquitoes in Counties that Comprise the Primary Study Area

County	Mosquito Species																		
	<i>Aedes</i>	<i>Ochlerotatus</i>					<i>Anopheles</i>			<i>Culex</i>					<i>Culiseta</i>				
	<i>vexans</i>	<i>dorsalis</i>	<i>inorepitus complex</i>	<i>melanimon</i>	<i>nigromaculis</i>	<i>sierrensis</i>	<i>sticticus</i>	<i>franciscanus</i>	<i>freeborni</i>	<i>punctipennis</i>	<i>apicalis</i>	<i>boharti</i>	<i>erythrothorax</i>	<i>pipiens/quinque</i>	<i>stigmatosoma</i>	<i>tarsalis</i>	<i>thriambus</i>	<i>incidens</i>	<i>inornata</i>
Colusa	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	
Glenn	X			X	X	X		X	X		X	X	X	X	X	X	X	X	X

Source: Mosquito and Vector Control Association of California, 2003.

Appendix 28B Mosquitoes and Other Vectors describes these mosquito species, their season of activity, preferred host, and habitat, as well as several mosquito-borne diseases. Pondered water habitat is limited throughout the Antelope Valley for much of the year but is most prevalent adjacent to and within stock watering ponds and irrigation water conveyance facilities within the Primary Study Area.

Other Vectors and Nuisance Problems

Stinging Insects, Ticks, Liver Flukes, Conenose Bugs, Rodents, Rattlesnakes, Flies, Poison Oak, Giardia, and Swimmer's Itch

The western yellowjacket and the German yellowjacket, as well as the European honeybee, inhabit Glenn and Colusa counties. Stinging ants are also a concern in Glenn and Colusa counties, particularly the red imported fire ant. The Pacific Coast tick, the American dog tick, and the western black-legged tick inhabit Glenn and Colusa counties (Cavier, 2004, pers. comm.; Kiely, 2004, pers. comm.). Ticks were incidentally observed during Project field surveys. As indicated previously, in California, only wild deer mice carry the Sin Nombre virus. Deer mice are present in Glenn and Colusa counties, but of the rodents tested in the fall and winter of 2011, there were no cases of the Sin Nombre virus antibodies present (CDPH, 2012). Deer mice were captured during Project field surveys in annual grassland, oak woodland, riparian, and chaparral habitat.

The California ground squirrel, which as indicated previously can carry plague, was observed during Project field surveys throughout the Primary Study Area in annual grassland and oak woodland habitat. Western rattlesnakes were also frequently observed during Project field surveys in annual grassland and oak woodland habitats. All nuisance flies are found throughout California. The olive fruit fly is common in areas where olive trees are abundant, such as in the orchards in Glenn and Colusa counties. Although these flies are not known to transmit disease, they can damage the olive fruit and make it unusable for commercial olive oil and olive production (CDPH, 2010).

Poison oak was observed in the Primary Study Area during Project field surveys, typically associated with oak woodland and riparian habitat.

Giardia has occurred within Glenn and Colusa counties. Liver flukes, conenose bugs, and the parasites that cause Swimmer's Itch also occur within Glenn and Colusa counties. Appendix 28B Mosquitoes and Other Vectors describes these vectors and the nuisance problems associated with them.

28.3 Environmental Impacts/Environmental Consequences

28.3.1 Evaluation Criteria and Significance Thresholds

Significance criteria represent the thresholds that were used to identify whether an impact would be potentially significant. Appendix G of the *CEQA Guidelines* suggests the following evaluation criteria for hazards and hazardous materials:

Would the Project:

- Create a potentially significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- Create a potentially significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?

- Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and as a result, would it create a potentially significant hazard to the public or the environment?
- Result in a safety hazard for people residing or working in the Project area (for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport)?
- Result in a safety hazard for people residing or working in the Project area (for a project within the vicinity of a private airstrip)?
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
- Expose people or structures to a potentially significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The evaluation criteria used for this impact analysis represent a combination of the Appendix G criteria and professional judgment that considers current regulations, standards, and/or consultation with agencies, knowledge of the area, and the context and intensity of the environmental effects, as required pursuant to the National Environmental Policy Act (NEPA). For the purposes of this analysis, an alternative would result in a potentially significant impact if it would result in any of the following:

- Creation of a potentially significant public or environmental hazard from the routine transport, use, or disposal of hazardous materials.
- Creation of a potentially significant public or environment hazard from the release of hazardous materials into the environment.
- Effects from hazardous emissions or hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.
- Creation of a potentially significant hazard to the public or the environment from the Project being located on a listed hazardous materials site.
- Effects on adopted emergency response plan or emergency evacuation plan implementation.
- Exposure of people or structures to a potentially significant risk of loss, injury, or death from wildland fires.
- Creation of a safety hazard for people residing or working in the Project area (if located within an airport land use plan, or within 2 miles of a public airport or public use airport if no plan has been adopted).
- Creation of a safety hazard for people residing or working in the Project area (if located within the vicinity of a private airstrip).

In addition to addressing the impacts listed above, this chapter also evaluates the public health hazards from mosquitoes, other vectors, and nuisance problems. For the purposes of this analysis, an alternative would result in a potentially significant impact if it would result in the following:

- Exposure of people to an increased risk of mosquito-borne or other vector-borne illnesses, or increased exposure to nuisance problems.

28.3.2 Impact Assessment Assumptions and Methodology

Combinations of Project facilities were used to create Alternatives A, B, C, C₁, and D. In all resource chapters, the Sites Project Authority (Authority) and Reclamation described the potential impacts associated with the construction, operation, and maintenance of each of the Project facilities for each of the five action alternatives. Some Project features/facilities and operations (e.g., reservoir size, overhead power line alignments, provision of water for local uses) differ by alternative, and are evaluated in detail within each of the resource areas chapters. As such, the Authority has evaluated all potential impacts with each feature individually, and may choose to select or combine individual features as determined necessary.

Impacts associated with the construction, operation, and maintenance for Alternative C₁ would be the same as Alternative C and are therefore not discussed separately below.

28.3.2.1 Assumptions

The following assumptions were made regarding Project-related construction, operation, and maintenance impacts on public health and environmental hazards:

- Direct Project-related construction, operation, and maintenance activities would occur in the Primary Study Area.
- Direct Project-related operational activities would occur in the Secondary Study Area.
- The only direct Project-related construction activity that would occur in the Secondary Study Area is the installation of two additional pumps into existing bays at the Red Bluff Pumping Plant.
- The only direct Project-related maintenance activity that would occur in the Secondary Study Area is the sediment removal and disposal at the Red Bluff Pumping Plant intake location.
- No direct Project-related construction or maintenance activities would occur in the Extended Study Area.
- Direct Project-related operational effects that would occur in the Extended Study Area are related to San Luis Reservoir operation; increased reliability of water supply to agricultural, municipal, and industrial water users; and the provision of an alternate Level 4 wildlife refuge water supply. Indirect effects on the operation of certain facilities that are located in the Extended Study Area, and indirect effects on the consequent water deliveries made by those facilities, would occur as a result of implementing the alternatives.
- The existing bank protection located upstream of the proposed Delevan Pipeline Intake/Discharge Facilities would continue to be maintained and remain functional.
- No additional channel stabilization, grade control measures, or dredging in the Sacramento River at or upstream of the Delevan Pipeline Intake/Discharge Facilities would be required.

28.3.2.2 Methodology

Existing conditions and the future No Project/No Action alternatives were assumed to be similar in the Primary Study Area given the generally rural nature of the area and limited potential for growth and development in Glenn and Colusa counties within the 2030 study period used for this EIR/EIS as further described in Chapter 2 Alternatives Analysis. As a result, within the Primary Study Area, it is anticipated that the No Project/No Action Alternative would not entail material changes in conditions as compared to the existing conditions baseline.

With respect to the Extended and Secondary study areas, the effects of the proposed action alternatives would be primarily related to changes to available water supplies in the Extended and Secondary study areas and the Project's cooperative operations with other existing large reservoirs in the Sacramento watershed, and the resultant potential impacts and benefits to biological resources, land use, recreation, socioeconomic conditions, and other resource areas. The Department of Water Resources has projected future water demands through 2030 conditions that assume the vast majority of CVP and SWP water contractors would use their total contract amounts, and that most senior water rights users also would fully use most of their water rights. This increased demand in addition to the projects currently under construction and those that have received approvals and permits at the time of preparation of the EIR/EIS would constitute the No Project/No Action Condition. As described in Chapter 2 Alternative Analysis, the primary difference in these projected water demands would be in the Sacramento Valley; and as of the time of preparation of this EIR/EIS, the water demands have expanded to the levels projected to be achieved on or before 2030.

Accordingly, existing conditions and the No Project/No Action alternatives are assumed to be the same for this EIR/EIS and as such are referred to as the Existing Conditions/No Project/No Action Condition, which is further discussed in Chapter 2 Alternatives Analysis. With respect to applicable reasonably foreseeable plans, projects, programs and policies that may be implemented in the future but that have not yet been approved, these are included as part of the analysis of cumulative impacts in Chapter 35 Cumulative Impacts.

Hazardous Materials and Wildland Fires

Identification of existing hazardous material contamination at Project facility locations was conducted by reviewing a list of federal, State, and local regulatory agencies' published databases and comparing that information to the Project's footprint.

A review of Fire Hazard Severity Zones (CAL FIRE, 2001, 2007a, 2007b) was conducted to determine wildland fire safety hazards.

A review of County Zoning Maps (Glenn County, 2006; Colusa County, 2011) was conducted to determine airport zones within the Primary Study Area.

Mosquitoes, Other Vectors, and Nuisance Problems

The evaluation of potential impacts on the public's health from the possible exposure to mosquitoes or other vectors and their associated ailments, as well as to nuisance problems due to implementation of the Project, was a multi-step process and included the following:

- Determining the types of vector habitats that would be created from the Project facilities

- Determining at which Project facilities the public would have access to those vector habitats, or to habitats that support nuisance species
- Assessing whether the public's exposure to such vector or nuisance species habitats would result in a potentially significant impact

28.3.3 Topics Eliminated from Further Analytical Consideration

Within the Extended and Secondary study areas, no Project-related activities would expose people residing or working in the vicinity of the Project facilities to an aircraft safety hazard because of the distance of existing public airports or private airstrips to the Project facilities. Therefore, potential impacts related to aircraft safety hazards (**Impact Pub Health-7** and **Impact Pub Health-8**) are not discussed further for these two study areas.

Within the Primary Study Area, a public airport is located near the proposed modifications to the GCID Main Canal facilities. Potential impacts related to aircraft safety hazards (**Impact Pub Health-7**) are discussed for that Project facility only. There are no private airstrips in the vicinity of the Primary Study Area facilities. Therefore, potential impacts related to private airstrip safety hazards (**Impact Pub Health-8**) are not discussed further for this study area.

28.3.4 Impacts Associated with Alternative A

28.3.4.1 Extended Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Agricultural Water Use, Municipal and Industrial Water Use, Wildlife Refuge Water Use, and San Luis Reservoir

Impact Pub Health-1: Create a Significant Public or Environmental Hazard from the Routine Transport, Use, or Disposal of Hazardous Materials

Because there would be no direct Project-related construction or maintenance occurring in the Extended Study Area, there would be no direct or indirect impacts on public health related to hazardous materials in the Extended Study Area. Therefore, there would be **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

No direct Project-related construction or maintenance activities would occur in the Extended Study Area associated with or having an effect on hazardous waste transport, use, or disposal. Therefore, there would be **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Increased agricultural water supply reliability associated with Project operations is not anticipated to substantially influence cropping patterns, such as from annual crops to orchards and associated use of pesticide types. Crop type and plantings are driven by various factors including individual landowner decisions and market conditions. Anticipated Project operations are not expected to create a hazard, resulting in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-2: Create a Significant Public or Environmental Hazard from the Release of Hazardous Materials into the Environment

Refer to the **Impact Pub Health-1** discussion. The discussion also applies to the release of hazardous materials into the environment.

Impact Pub Health-3: Effects from Hazardous Emissions or Hazardous Materials, Substances, or Wastes within 0.25 Mile of an Existing or Proposed School during Project Construction, Operation, or Maintenance

No Project construction, operation, or maintenance activities would occur within 0.25 mile of a school site in the Secondary Study Area, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-4: Create a Significant Hazard to the Public or the Environment from the Project Being Located on a Listed Hazardous Materials Site

No Project-related construction would occur in the Extended Study Area. Consequently, no listed hazardous materials sites would be affected. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-5: Effects on Adopted Emergency Response Plan or Emergency Evacuation Plan Implementation

There would be no direct Project-related construction or maintenance occurring in the Extended Study Area. Operation at San Luis Reservoir would be modified to accommodate the Project operation, which would result in more frequent and larger surface water elevation fluctuations at the reservoir. The ability of emergency responders to respond to future emergencies or evacuations is not expected to change from existing conditions as a result of those changes in operations. Increased water supply reliability to agricultural, municipal, and industrial users, as well as an alternate supply of wildlife refuge water, would have no effect on emergency response or evacuation plans. Therefore, there would be **no impact**, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-6: Expose People or Structures to a Significant Risk of Loss, Injury, or Death from Wildland Fires

Operations at San Luis Reservoir would be modified with implementation of Alternative A, but would not be expected to change any existing wildland fire risk to people and structures at the reservoir. Similarly, increased water supply reliability to agricultural, municipal, and industrial users, as well as an alternate supply of wildlife refuge water, would not change existing wildland fire risk. Operational changes within the Extended Study Area would, therefore, result in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-9: Expose People to an Increased Risk of Mosquito-borne or Other Vector-borne Illnesses, or Increased Exposure to Nuisance Problems

Alternative A does not include any construction or subsequent maintenance of Project-related facilities within the Extended Study Area, so there would be **no impact** from increased exposure to nuisance problems, or from existing mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses within the Extended Study Area from those activities, when compared to the Existing Conditions/No Project/No Action Condition.

The operation of Alternative A would result in increased water supply reliability to agricultural, municipal, and industrial uses. However, any changes in agricultural acreage are expected to result in little to no change in exposure to nuisance problems, or in mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses within the Extended Study Area, resulting in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Operational modeling indicates that the amount of Level 4 wildlife refuge water supply would be the same every year with or without the Project. Project operations would provide an alternate source of Level 4 wildlife refuge water in some years, but would not increase its reliability substantially. Therefore, the provision of an alternate source of Level 4 wildlife refuge water supply would have **no impact** from exposure to nuisance problems, or from mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses, when compared to the Existing Conditions/No Project/No Action Condition.

Operational modeling for Alternative A, when compared to the Existing Conditions/No Project/No Action Condition, indicates that operation of the Project would cause San Luis Reservoir water levels to continue to fluctuate, and likely to a greater degree but within the general range of fluctuations. Water fluctuations at the reservoir would not be expected to increase exposure to nuisance species. Therefore, the impact resulting from Project operation at this reservoir in the Extended Study Area is considered **less-than-significant** when compared to the Existing Conditions/No Project/No Action Condition.

28.3.4.2 Secondary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Sacramento River, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay), Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, and San Francisco Bay

Impact Pub Health-1: Create a Significant Public or Environmental Hazard from the Routine Transport, Use, or Disposal of Hazardous Materials

The only direct Project-related construction activity that would occur in the Secondary Study Area is the installation of two additional pumps into existing bays at the Red Bluff Pumping Plant. The installation of the pumps and associated operation and maintenance, as well as the maintenance activities at the canal intakes, would require the use of limited quantities of hazardous materials, such as fuels, oils, grease, and lubricants. Maintenance and repair of the equipment would be completed at the facility site as is the case with the other existing facilities, or the equipment would be transported to nearby facilities.

The only direct Project-related maintenance activity that would occur in the Secondary Study Area is the removal of sediment from the existing canal intake. Sediment removal has the potential to accidentally release hazardous materials.

The use, storage, handling, or disposal of hazardous materials could result in hazardous releases from equipment or through other means during the installation of the new pump into the existing facility. Implementation of environmental commitments identified in Chapter 3 Description of the Sites Reservoir Project Alternatives, specifically related to spill prevention and hazardous materials management would

reduce the potential release of hazardous materials during construction, operation, or maintenance activities to a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Project operation could affect the flow regime of streams, or the storage conditions of reservoirs within the Secondary Study Area. As discussed in Section 28.2.2.1, the primary hazardous material issue of concern in this study area is the acid mine runoff from the Iron Mountain Mine Superfund site in the Spring Creek watershed. Historical gold mining and associated mercury contamination in the environment are also hazardous material concerns in this area, as well as in the other watersheds within the Secondary Study Area. Project operational modeling indicates no change in Spring Creek Reservoir water levels or releases, or in Spring Creek dilution flows. Because no Project construction would occur in this area, no Project-related soil or sediment disturbance would occur. As a result, the existing risk of soil and sediment contamination would not change from what currently occurs, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-2: Create a Significant Public or Environmental Hazard from the Release of Hazardous Materials into the Environment

Refer to the **Impact Pub Health-1** discussion. The discussion also applies to the release of hazardous materials into the environment.

Impact Pub Health-3: Effects from Hazardous Emissions or Hazardous Materials, Substances, or Wastes within 0.25 Mile of an Existing or Proposed School

No Project construction, operation, or maintenance activities would occur within 0.25 mile of a school site in the Secondary Study Area, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-4: Create a Significant Hazard to the Public or the Environment from the Project Being Located on a Listed Hazardous Materials Site

No Project construction, operation, or maintenance activities would occur on a site in the Secondary Study Area that is included on any list of hazardous materials sites, including the list compiled pursuant to Government Code Section 65962.5. Therefore, there would be **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-5: Effects on Adopted Emergency Response Plan or Emergency Evacuation Plan Implementation

Operational changes in the flow regime or storage conditions of the waterbodies included in the Secondary Study Area would not significantly impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. There would, therefore, be **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Installation of the pumps at the Red Bluff Pumping Plant would require few vehicles and equipment, and its construction period would be short; therefore, it is not expected to significantly affect emergency response or evacuation procedures in that area. Similarly, its regular and routine maintenance activities are also expected to require few vehicles and take a short time to complete. This would result in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-6: Expose People or Structures to a Significant Risk of Loss, Injury, or Death from Wildland Fires

Operational changes in the flow regime or storage conditions of the waterbodies included in the Secondary Study Area would not be expected to expose people or structures to wildland fires, and would, therefore, have **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Installation and associated operation and maintenance of the pumps at the Red Bluff Pumping Plant would not be expected to expose people or structures to risks associated with wildland fires because the pumps would be installed in an existing developed plant, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-9: Expose People to an Increased Risk of Mosquito-borne or Other Vector-borne Illnesses, or Increased Exposure to Nuisance Problems

Installation, operation, and maintenance of two additional pumps into empty bays within the existing Red Bluff Pumping Plant (a developed site) would not affect exposure of people to nuisance problems or mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses at that location, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Project operation could affect the flow regime of streams and/or the storage conditions of reservoirs that are located in the Secondary Study Area. River flows and reservoir water level fluctuations resulting from Alternative A are expected to be within the historical range of operations, resulting in no change in exposure to nuisance problems, and no change in mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses. This would result in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

28.3.4.3 Primary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

All Primary Study Area Project Facilities

Impact Pub Health-1: Create a Significant Public or Environmental Hazard from the Routine Transport, Use, or Disposal of Hazardous Materials

Project construction activities at all Primary Study Area Project facility sites have the potential to accidentally release hazardous materials during implementation of Alternative A.

In addition, Project maintenance activities would require the use of hazardous materials, such as fuels, oils, grease, and lubricants. Maintenance and repair of the equipment would be completed at the project facility site, or the equipment would be transported to nearby facilities. Implementation of environmental commitments identified in Chapter 3 Description of the Sites Reservoir Project Alternatives specifically related to spill prevention and hazardous materials management, implementation of a Worker Environmental Awareness Program, and performing an environmental site assessment would reduce the potential release of hazardous materials during construction, operation, or maintenance activities to a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-2: Create a Significant Public or Environmental Hazard from the Release of Hazardous Materials into the Environment

Refer to the **Impact Pub Health-1** discussion. The discussion also applies to the release of hazardous materials into the environment.

Impact Pub Health-3: Effects from Hazardous Emissions or Hazardous Materials, Substances, or Wastes within 0.25 Mile of an Existing or Proposed School

No Project construction, operation, or maintenance activities would occur within 0.25 mile of a school site, resulting in **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-4: Create a Significant Hazard to the Public or the Environment from the Project Being Located on a Listed Hazardous Materials Site

The results of the agency database review indicate that no Project construction, operation, or maintenance activities would occur on a site that is included on any list of hazardous materials sites, including the list compiled pursuant to Government Code Section 65962.5.

It is possible that not all septic tanks, water wells, underground storage tanks, or other underground storage devices or conveyance systems have been identified on the published databases. These systems are considered as potential conduits for groundwater contamination. It is also possible that not all hazardous spills within the Primary Study Area were reported.

Although there would be no impact due to Project facilities being located on a listed hazardous materials site, there is the potential for Project facilities to be located near unlisted septic tanks, water wells, other underground storage devices, or unreported hazardous spills. However, as part of the Project, DWR and County standards for the proper abandonment of wells, boreholes, and septic systems would be implemented. Additionally, an environmental site assessment would be conducted as described in Chapter 3 Description of the Sites Reservoir Project Alternatives, and any hazardous waste discovered during Project construction would be handled and disposed of pursuant to CERCLA requirements. Therefore, there would be a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-5: Effects on Adopted Emergency Response Plan or Emergency Evacuation Plan Implementation

Project construction equipment and materials would be transported on local roads to access the Project facilities, with many over-sized Project vehicles traveling on the roads. This may result in a reduction in travel speeds on those roads throughout the Project construction period. In addition, some road closures and detours would be necessary during the Project construction period. However, environmental commitments identified in Chapter 3 Description of the Sites Reservoir Project Alternatives, specifically including construction equipment, truck, and traffic management measures and an Emergency Action Plan, would be implemented as part of the Project, resulting in a **less-than-significant impact** on emergency and/or evacuation response when compared to the Existing Conditions/No Project/No Action Condition.

Project operation is expected to increase traffic on local roads leading to the proposed recreation areas at the Project. The Project is expected to generate approximately 200,000 recreation visitor days ⁷ per year

⁷ A recreation visitor day is defined as a recreation visit by one person for part or all of 1 day.

during the Project operation. Therefore, the expected increased traffic on Maxwell Sites Road and County Roads 68, 69, and D during Project operation (primarily Fridays through Sundays during the recreation season⁸); however, given that the increased traffic would not be substantial enough to result in decreased levels of service on these roadways, this would result in a **less-than-significant impact** on emergency and/or evacuation response when compared to the Existing Conditions/No Project/No Action Condition.

Operation and maintenance of all Project facilities would increase traffic on local roads to the individual Project facilities when regular and routine tasks are scheduled to be performed. However, these activities are expected to be performed by a few trained individuals with few vehicles and equipment, resulting in a **less-than-significant impact** on emergency and evacuation response in the areas near Project facilities, when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-6: Expose People or Structures to a Significant Risk of Loss, Injury, or Death from Wildland Fires

The vegetation within the Primary Study Area creates an existing risk of fire hazard from natural hazards, such as lightning strikes, or from human activities that occur there. Project construction, operation, and maintenance activities within the Primary Study Area would increase the potential exposure of people, structures, infrastructure, and other resources to a potentially significant risk of loss, injury, or death from fire.

Most of the Project facilities would be constructed in rural undeveloped areas that have trees, grasses, and shrubs. Project construction activities would likely occur during the summer and fall months, which are generally considered a time of high fire hazard in Northern California.

Construction workers traveling to the Project facility sites and construction materials being transported to the construction sites would increase the risk of fire hazard along their travel route. Operation of vehicles throughout the area, particularly when vegetation adjacent to roads is dry, can increase the fire potential from accidental combustion (e.g., sparks), hot metal (e.g., tail pipes, motors), or traffic accidents.

Project construction activities at individual Project facility locations would increase the risk of fire hazard at those locations due to the presence of construction and worker vehicles and equipment (i.e., combustion engines), the presence of fuels, lubricants, and other flammable substances at the Project facility sites, and the presence of construction workers at the Project sites, if they smoke when there.

Vegetation clearing that would be required as part of Project construction, both at Project facility sites and within Project disturbance areas, would reduce the overall fuel loading in those areas, thereby reducing the long-term fire hazard. In addition, filling Sites Reservoir, TRR, and Holthouse Reservoir with water would reduce the long-term fire hazard at those locations. However, the presence of the construction vehicles and equipment operating in those areas when the facilities are being constructed would increase the fire hazard risk at the facility sites. Project implementation could also result in additional water supplies being available in the Primary Study Area, which could assist in future firefighting responses.

Operation and maintenance activities at Project facilities would occur on a regular basis, and would require the use of vehicles and equipment (also combustion engines) that would increase the risk of fire hazard at those locations when those activities are being performed.

⁸ The recreation season is typically defined as Memorial Day through Labor Day.

Visitors to the proposed recreation areas at the Project would also increase the risk of fire hazard in those areas. Potential fire sources include campsites, campfires, vehicles, and watercraft. However, as identified in Chapter 3 Description of the Sites Reservoir Project Alternatives, a Project Fire Prevention and Suppression Plan would be developed by the Authority and Reclamation, and the construction contractor would be required to coordinate with the fire protection agencies in the Primary Study Area regarding their requirements for preventing and suppressing fires during Project construction, operations, and maintenance. The Fire Prevention and Suppression Plan would also provide requirements for operation and maintenance activities. With implementation of these commitments, there would be only a minor increase from the existing fire hazard risk, resulting in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-7: Create a Safety Hazard for People Residing or Working in the Project Area (If Located in an Area Designated within an Airport Land Use Plan or within 2 Miles of a Public Airport or Public Use Airport If No Plan Has Been Adopted)

A review of County Zoning Maps (Glenn County, 2006; Colusa County, 2011) indicated that Project facilities would not be located within designated airport zones. The closest airport to a Project facility is the Willow-Glenn County Airport, located approximately 0.9 mile west of the GCID Main Canal Railroad Siphon. No Project construction, operation, or maintenance activities would occur within or near a public airport; therefore, there would be **no impact** when compared to the Existing Conditions/No Project/No Action Condition.

Impact Pub Health-9: Expose People to an Increased Risk of Mosquito-borne or Other Vector-borne Illnesses, or Increased Exposure to Nuisance Problems

Construction sites are generally flat and have the potential to create ponding areas after a rainstorm. Large ponding areas that do not completely dry after 3 to 5 days are conducive to mosquito breeding and can contribute to mosquito population growth. In addition, to satisfy National Pollutant Discharge Elimination System stormwater permit requirements, some construction contractors create drainage ditches and subsequent retention ponds at Project construction sites to prevent stormwater runoff from entering nearby waterbodies. Such ponded features would be limited and temporary, resulting in a **less-than-significant impact** at all Project facility construction sites when compared to the Existing Conditions/No Project/No Action Condition. Additionally, with the implementation of mosquito and vector control measures, as identified in Chapter 3 Description of the Sites Reservoir Project Alternatives, potential impacts would be further reduced.

The construction and filling of the three proposed reservoirs (Sites, Holthouse, and the TRR), and the forebay and afterbay that would be constructed at the Delevan Pipeline Intake/Discharge Facilities, would create an increase in total surface water area and reservoir shoreline. Increased surface water area would create habitat suitable for mosquito egg deposition; however, standard vector control practices, including coordination with Glenn County Mosquito and Vector Control District, the Colusa County Environmental Health Department, and the Colusa County Mosquito Abatement District, would be implemented, as identified in Chapter 3 Description of the Sites Reservoir Project Alternatives. Therefore, impacts from mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses at the new reservoirs would result in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Although surface water fluctuations occur at the existing Funks Reservoir, operation of the proposed expanded reservoir (i.e., Holthouse Reservoir) would result in more varied surface water fluctuations. Given these fluctuations, in addition to established mosquito controls in place, impacts from mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses at Holthouse Reservoir would result in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

Site Reservoir is intended for water storage as well as for recreational use. Recreational use would be facilitated by the establishment of up to five recreation areas with hiking trails, picnic areas, camping areas, a swimming area, and boat ramps. Because these recreation areas would be open to the public, existing mosquito abatement controls would be in place to minimize impacts from mosquito or vector populations, habitat, controls, or the spread of mosquito- or vector-borne illnesses. This would result in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

In addition to impacts from mosquitoes at the Project and the recreation areas, impacts from rodents, flies, bees, yellowjackets, and stinging ants, as well as Giardia and Swimmer's Itch, could occur. The recreation areas are proposed to include picnic areas, camping areas, swimming beaches, boat ramps, wildlife viewing vistas, and hiking trails. Standard vector control practices would be implemented as part of the project to minimize impacts from such vectors and potential illnesses resulting in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

The location of the Project supports small areas of forested woodlands and large areas of grassland, which provide suitable habitat for rattlesnakes, ticks, conenose bugs and poison oak. Such species are common at reservoir recreation areas, and visitors would be informed of such hazards through proposed signage and visitor information. Potential risks would accordingly result in a **less-than-significant impact** when compared to the Existing Conditions/No Project/No Action Condition.

28.3.5 Impacts Associated with Alternative B

28.3.5.1 Extended and Secondary Study Areas – Alternative B

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative B, as they relate to the transport, use, or disposal of hazardous materials (**Impact Pub Health-1**), release of hazardous materials into the environment (**Impact Pub Health-2**), hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**), Projects being located on a listed hazardous materials site (**Impact Pub Health-4**), effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**), wildland fire risk (**Impact Pub Health-6**), and increased risk of exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) would be the same as described for Alternative A for the Extended and Secondary study areas.

28.3.5.2 Primary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

Most Project facilities would be the same for Alternatives A and B (see Chapter 3 Description of the Sites Reservoir Project Alternatives, Table 3-1). These facilities would require the same construction methods and operation and maintenance activities regardless of alternative and would, therefore, result in the same construction, operation, and maintenance impacts on public health and environmental hazards.

Several Alternative B Primary Study Area Project facilities have different designs than Alternative A, including the following: the Alternative B Sites Reservoir would be larger than the Alternative A reservoir and would consequently alter the size and location of the dams; the road relocations associated with Alternative B differ from those for Alternative A, mostly due to changes to the saddle dam access roads; the Alternative B design for the Sites/Delevan Overhead Power Line would be much shorter than the Alternative A design; the Alternative B Delevan Pipeline Discharge Facility would replace the Alternative A Delevan Pipeline Intake/Discharge Facilities; and the area included in the Project Buffer would change because the size of some of the facilities surrounded by the Project Buffer would change. However, these differences in the size of the facility footprint, alignment, or construction disturbance area would not change the type of construction, operation, and maintenance activities that were described for Alternative A. Also, the same environmental commitments identified in Section 28.3.4.3 and described in further detail in Chapter 3 Description of the Sites Reservoir Project Alternatives would be implemented under Alternative B to reduce the potential for impacts to occur. Construction, operation, and maintenance of these facilities would, therefore, have the same impact on the transport, use, or disposal of hazardous materials (**Impact Pub Health-1**), release of hazardous materials into the environment (**Impact Pub Health-2**), hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**), Projects being located on a listed hazardous materials site (**Impact Pub Health-4**), effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**), and wildland fire risk (**Impact Pub Health-6**) as described for Alternative A.

The differences in the size of the footprint or alignment of the construction disturbance area would have the same impact on public health from the potential exposure to mosquito or vector populations, habitat, and the spread of mosquito- or vector-borne illnesses, and exposure to nuisance problems (**Impact Pub Health-9**), within the Primary Study Area as described for Alternative A, with the exception of the potential impacts associated with the Delevan Pipeline Intake/Discharge Facility forebay and afterbay that are included in Alternative A, but not Alternative B. Because Alternative B would not have a forebay and afterbay at that location, potential impacts from mosquito or vector populations, habitat, and the spread of mosquito- or vector-borne illnesses at that location would be less for Alternative B than described for Alternative A.

The boundary of the Project Buffer would be the same for Alternatives A and B, but because the footprints of some of the Project facilities that are surrounded by the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, this difference in the size of the area included within the buffer would not change the type of construction, operation, and maintenance activities that were described for Alternative A. It would, therefore, have the same impact from increased risk of exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) as described for Alternative A.

The differences associated with the larger Alternative B Sites Reservoir and its impacts on public health from mosquitoes, other vectors, and nuisance problems are described below.

Sites Reservoir Inundation Area

Impact Pub Health-9: Expose People to an Increased Risk of Mosquito-borne or Other Vector-borne Illnesses, or Increased Exposure to Nuisance Problems

The establishment of the larger capacity Sites Reservoir associated with Alternative B would create more shoreline and increased water surface area. As with Alternative A, water levels are expected to fluctuate

greatly, and habitat would be limited and standard vector control practices would be implemented. As such, operational and maintenance impacts are considered to be **less-than-significant** (i.e., the same as described for Alternative A) when compared to the Existing Conditions/No Project/No Action Condition.

28.3.6 Impacts Associated with Alternative C

28.3.6.1 Extended and Secondary Study Areas – Alternative C

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative C, as they relate to the transport, use, or disposal of hazardous materials (**Impact Pub Health-1**), release of hazardous materials into the environment (**Impact Pub Health-2**), hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**), Projects being located on a listed hazardous materials site (**Impact Pub Health-4**), effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**), wildland fire risk (**Impact Pub Health-6**), and increased risk of exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) would be the same as described for Alternative A for the Extended and Secondary study areas.

28.3.6.2 Primary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

Most Primary Study Area Project facilities would be the same for Alternatives A, B, and C (see Chapter 3 Description of the Sites Reservoir Project Alternatives, Table 3-1). These facilities would require the same construction methods and operation and maintenance activities regardless of alternative and would, therefore, result in the same construction, operation, and maintenance impacts on public health and environmental hazards. The Alternative C design of the Sites/Delevan Overhead Power Line and Delevan Pipeline Intake/Discharge Facilities is the same as the Alternative A design. These facilities would require the same construction methods and operation and maintenance activities regardless of alternative. Also, the same environmental commitments identified in Section 28.3.4.3 and described in further detail in Chapter 3 Description of the Sites Reservoir Project Alternatives would be implemented under Alternative C to reduce the potential for impacts to occur. Construction, operation, and maintenance of these facilities would, therefore, have the same impacts as those described for Alternative A, as follows: transport, use, or disposal of hazardous materials (**Impact Pub Health-1**); release of hazardous materials into the environment (**Impact Pub Health-2**); hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**); projects being located on a listed hazardous materials site (**Impact Pub Health-4**); effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**); and wildland fire risk (**Impact Pub Health-6**).

The Alternative C design for the Sites Reservoir Inundation Area and Dams and Road Relocations and South Bridge are the same as the Alternative B design. These facilities would require the same construction, operation, and maintenance activities regardless of alternative. Moreover, the same environmental commitments identified in Section 28.3.4.3 and described in further detail in Chapter 3 Description of the Sites Reservoir Project Alternatives would be implemented under Alternative C to reduce the potential for impacts to occur. Construction, operation, and maintenance of these facilities would result in the same impacts on public health and environmental hazards as described for Alternative B.

The boundary of the Project Buffer is the same for Alternatives A, B, and C, but because the footprints of some of the Project facilities that are included in the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, this difference in the size of the area included within the buffer would not change the construction, operation, and maintenance activities that were described for Alternative A. The Project Buffer under Alternative C would, therefore, have the same impact from increased risk of receptor exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) as described for Alternative A. The impacts associated with the larger Alternative C Sites Reservoir on public health from mosquitoes, other vectors, and nuisance problems would be the same as described for Alternative B.

28.3.7 Impacts Associated with Alternative D

28.3.7.1 Extended and Secondary Study Areas – Alternative D

Construction, Operation, and Maintenance Impacts

The impacts associated with Alternative D, as they relate to the transport, use, or disposal of hazardous materials (**Impact Pub Health-1**), release of hazardous materials into the environment (**Impact Pub Health-2**), hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**), Projects being located on a listed hazardous materials site (**Impact Pub Health-4**), effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**), wildland fire risk (**Impact Pub Health-6**), and increased risk of exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) would be the same as described for Alternative A for the Extended and Secondary study areas.

28.3.7.2 Primary Study Area – Alternative D

Construction, Operation, and Maintenance Impacts

Many of the Project facilities would be the same for Alternatives B, C, and D (see Table 3-6 in Chapter 3 Description of the Sites Reservoir Project Alternatives). These facilities would require the same construction methods and operation and maintenance activities regardless of alternative. Also, the same environmental commitments identified in Section 28.3.4.3 and described in further detail in Chapter 3 Description of the Sites Reservoir Project Alternatives would be implemented under Alternative C to reduce the potential for impacts to occur. These Project facilities would, therefore, result in the same construction, operation, and maintenance impacts to the transport, use, or disposal of hazardous materials (**Impact Pub Health-1**); release of hazardous materials into the environment (**Impact Pub Health-2**); hazardous emissions, materials, substances, or wastes in the vicinity of a school (**Impact Pub Health-3**); Projects being located on a listed hazardous materials site (**Impact Pub Health-4**); effects on emergency response or evacuation plan implementation (**Impact Pub Health-5**); wildland fire risk (**Impact Pub Health-6**); and increased risk of exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**). Therefore, unless explicitly discussed below, impacts at all Project facilities are anticipated to be the same as for Alternatives B and C. The following are Project facilities and impacts associated with Alternative D:

- Alternative D would include the development of only two recreation areas (Stone Corral Creek Recreation Area and Peninsula Hills Recreation Area) instead of up to five recreation areas that could be developed for each of the other Project alternatives. Alternative D would include a boat ramp on the western side of the reservoir where the existing Sites Lodoga Road would be inundated. Because

there would be only two recreation areas under Alternative D, the road segments providing access to Lurline Headwaters Recreation Area required for the other alternatives would not be required; however, Alternative D includes an additional 5.2 miles of roadway from Huffmaster Road to Leesville Road. The decreased number of recreation areas and slightly modified roadways would not be expected to result in additional impacts compared to those associated with the other alternatives and would, therefore, result in the same impacts on public health and environmental hazards as described for the other Project alternatives.

- For Alternative D, the Delevan Pipeline alignment would be approximately 50 to 150 feet south of the alignment for Alternatives A, B, and C. This alignment takes advantage of existing easements to reduce impacts on local landowners. The shift in alignment is not expected to change the potential impacts on public health or create additional environmental hazards and would, therefore, result in the same impacts as described for the other Project alternatives.
- Under Alternative D, the TRR would be slightly smaller (approximately 80 acres smaller for Alternative D) when compared to all other Project alternatives; however, this smaller size would not be expected to change the potential impacts on public health as compared to the other Project alternatives.
- Unlike the other alternatives, Alternative D includes a north-south alignment of the Delevan Overhead Power Line, rather than the east-west alignment between the TRR and the Delevan Pipeline Intake/Discharge Facility. Additionally, Alternative D includes a proposed electrical substation west of Colusa in addition to the substation near the Holthouse Reservoir. The total length of the power line would be 1 mile longer than described for Alternatives A, B, and C; however, it would be aligned within an existing transportation and utility corridor. Despite these changes in facility footprint, the Alternative D design would result in the same construction, operation, and maintenance impacts on public health and environmental hazards as described for Alternative A.
- The boundary of the Project Buffer is the same for all alternatives, but because the footprints of some of the Project facilities that are included in the Project Buffer would differ between the alternatives, the acreage of land within the Project Buffer would also differ. However, this difference in the size of the area included within the buffer would not change the construction, operation, and maintenance activities that were described for Alternative A. The Project Buffer under Alternative D would, therefore, have the same impact from increased risk of receptor exposure to mosquito- or vector-borne illnesses or to nuisance problems (**Impact Pub Health-9**) as described for Alternative A. The impacts associated with the larger Alternative D Sites Reservoir on public health from mosquitoes, other vectors, and nuisance problems would be the same as described for Alternative B.

28.4 Mitigation Measures

28.4.1 Hazardous Materials and Wildland Fires

Because no potentially significant impacts were identified, no mitigation is required or recommended. Environmental commitments, including environmental site assessments; construction management procedures; stormwater pollution prevention plans; erosion control, management, and dewatering; and spill prevention and hazardous materials management are included in all Project alternatives and discussed in Chapter 3 Description of the Sites Reservoir Project Alternatives.

28.4.2 Mosquitoes and Other Vectors

Because no potentially significant impacts were identified, no mitigation is required or recommended. Environmental commitments, including mosquito and vector control measures are included in all Project alternatives and are discussed in Chapter 3 Description of the Sites Reservoir Project Alternatives.

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