7.11 Hazards and Hazardous Materials

This section describes the environmental setting and potential impacts related to hazards and hazardous materials that may result from changes in hydrology or changes in water supply. Activities that may accidentally release hazardous materials, expose people to hazardous materials, create safety hazards, impede an emergency response plan, or expose people or structures to wildfire risks could result in a significant impact.

Most actions or conditions from changes in hydrology and changes in water supply would not have impacts associated with hazards and hazardous materials.

Changes in hydrology would result in reoperation of reservoirs. The potential for effects on wildfire suppression associated with changes in reservoir storage is evaluated in this section.

Changes in water supply could result in response actions involving increased groundwater pumping and implementation of other water management actions. These actions would not involve hazards or hazardous materials, ground disturbance, or increased infrastructure and therefore would have no potential impacts related to hazards and hazardous materials.

Section 7.1, *Introduction, Project Description, and Approach to Environmental Analysis*, describes reasonably foreseeable methods of compliance and response actions, including actions that would require construction. These actions are analyzed for potential environmental effects in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*, and Section 7.22, *New or Modified Facilities*.

7.11.1 Environmental Checklist

VIII. Hazards and Hazardous Materials	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒

VIII. Hazards and Hazardous Materials		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
d.	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 significant hazard to the public or the environment?	☐	☐	☐	☒
e.	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f.	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h.	Expose people or structures to a 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?	☐	☐	☒	☐

7.11.2 Environmental Setting

This section describes the hazards and hazardous materials setting to inform the impact discussion in this section and in Section 7.21, *Habitat Restoration and Other Ecosystem Projects*; Section 7.22, *New or Modified Facilities*; and Chapter 9, *Proposed Voluntary Agreements*.

The study area contains naturally occurring and anthropogenic (human-caused) hazards, including hazardous materials and waste and wildfire hazards. Historical agricultural, industrial, and urban activities have resulted in the presence of hazardous materials in soils, sediments, and groundwater. Current activities introduce hazardous materials (e.g., pesticides, fertilizers, industrial waste) and the potential for vector-borne diseases (e.g., seasonal wetlands, animal waste ponds). In addition, infrastructure for oil and natural gas production as well as urban, residential, and recreational facilities with the potential for hazardous materials releases are present throughout the study area (^DWR and Reclamation 2016). Wildfire risk is high in some regions of the study area based on terrain and weather factors, such as drought and wind. Wildfire risk is greatest along the coast, in the foothills of the Sierra Nevada, and in and around national and state forest lands.

7.11.2.1 Naturally Occurring Hazards

Historical geologic conditions in the study area have led to the formation of peat and other organic soils, particularly in portions of the Delta. The thick organic soils and peat have the potential to generate flammable gases, such as methane. In addition, petroleum deposits that lie under the study area could result in the migration of oil and natural gas from deep reservoirs into shallow strata (^DWR and Reclamation 2016).

Asbestos may be found in its natural state in rock or soil (known as *naturally occurring asbestos*). Section 7.5, *Air Quality*, describes and evaluates the potential of sensitive receptors being exposed to naturally occurring asbestos.

7.11.2.2 Anthropogenic Hazards

Hazardous Materials Sites

Hazardous materials sites in the study area include aboveground and underground storage tanks, Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.) sites, brownfield sites, and hazardous waste and landfill sites. These existing hazardous materials sites are governed by various federal, state, and local laws. These sites occur throughout the study area and would need to be identified as part of any construction or excavation planning process.

The following is a partial list of federal and state laws and programs that address the identification, cleanup, storage, and disposal of hazardous wastes (local and county general plans and other laws may apply as well).

- The Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. § 9601 et seq.).
- The Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.).
- The Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. § 9601 et seq.).
- The Toxic Substances Control Act of 1976 (15 U.S.C. § 2601 et seq.).
- The California equivalent to the Comprehensive Environmental Response, Compensation, and Liability Act, the Carpenter-Presley-Tanner Hazardous Substance Account Act (Health & Saf. Code, §§ 25300–25395.45).
- The California Hazardous Waste Control Law (Health & Saf. Code, §§ 25100–25259).
- The California Underground Storage Tank Program (Cal. Code Regs., tit. 23, §§ 2610–2728, 2730–2802, 2803–2814.8; Health & Saf. Code, §§ 25280–252.99.8, 2599.10–25299.97, 25404–25404.9; the Porter-Cologne Water Quality Control Act (Wat. Code, §§ 13000–16104)).
- Aboveground Petroleum Storage Act of 2007 (40 C.F.R. part 112).

Pipelines

Pipelines are present throughout the study area. The main commodities transported through the pipelines are crude oil, refined petroleum products, and natural gas. Pipeline releases of natural gas, crude oil, and refined petroleum have occurred in the study area (^DWR and Reclamation 2016; ^DSC 2011). Discussion of oil and natural gas and associated impacts can be found in Section 7.14, *Mineral Resources*.

Oil and Gas Wells

Active oil and gas extraction fields are present throughout the study area. Petroleum production throughout the area mainly consists of natural gas extraction, although minor quantities of crude oil and condensate are also produced. Thousands of oil and gas wells have been drilled throughout the study area. Oil and natural gas production emits benzene, toluene, ethylbenzene, and xylenes, as well as n-hexane and other volatile organic compounds (^DWR and Reclamation 2016).

Historical oil and gas well fields may include areas with contaminated soil or groundwater. An active producing well field may have areas used during exploration that may cause soil or groundwater contamination. Drilling fluids often contain petroleum compounds in both raw (crude) form and refined form (drilling enhancement additives). Former mud pits (open tanks), although usually lined, may be a historical source for hydrocarbon contamination (^DWR and Reclamation 2016).

Improperly sealed natural gas wells no longer in operation still have the potential to act as natural gas conduits from deep reservoirs to shallow strata, where flammable gases may pose hazards (^DWR and Reclamation 2016).

All California oil and gas wells located on state and private lands are permitted, drilled, operated, maintained, plugged, and abandoned under requirements and procedures administered by the Department of Conservation’s California Geologic Energy Management Division (see Pub. Resources Code, § 3000 et seq.). Oil and gas wells are addressed in Section 7.14, *Mineral Resources*.

Historical Mining

Mercury has been identified as a chemical of concern in study area sediments, especially in the Delta, resulting from gold and mercury mining in the watersheds upstream of the Delta. Mercury was used extensively in mining to extract gold from ores and placer gravel deposits. Mercury releases into the environment by historical gold mining practices have been flowing into the Delta, primarily via the Sacramento River watershed, since the mid-1800s and are expected to continue (^DWR and Reclamation 2016).

Vectors

A *disease vector* is a carrier of disease organisms. The vector may be purely mechanical, as when houseflies spread enteric organisms, or it may be biological, wherein the disease organism multiplies or undergoes change within the vector, as when viruses develop in mosquitoes.

In California, the West Nile virus, St. Louis encephalitis, and western equine encephalomyelitis are the three most important viral mosquito-borne diseases. The viruses that cause these diseases are maintained in nature through a mosquito-bird-mosquito cycle. Typically, waterbodies with poor circulation, continual slow-changing water levels, higher temperatures, and higher organic content produce greater numbers of mosquitoes. Most adult mosquitoes remain close to their point of origin, and their ability to travel is heavily dependent on physical phenomena such as wind. Some mosquitoes feed on mammals and other animal hosts, and others feed on fruits and plant nectars.

The practice of flooding previously dry land (e.g., seasonal wetlands) during the early fall to attract waterfowl for conservation and recreational purposes creates favorable mosquito breeding habitats. Dense vegetation and the slow speed of flooding can also increase the numbers of mosquitoes produced and delay the success of other mosquito control practices such as the use of larvicides and mosquitofish (^DSC 2011).

The principal mosquito prevention method in tidal marsh management entails constructing ditches to circulate tidal water into sloughs and bays to avoid ponding. Mosquito management recommendations include effective drainage of ditches, properly controlled drainage water control structures, spreader ditches constructed with adequate water control mechanisms and maintained free and clear of debris and vegetation, vegetation selection, plant harvesting and removal, incorporation of plant-free zones, draining ponds at designated times to control mosquito breeding, and using fish and naturally occurring insect predators or applying larvicides (^DSC 2011).

In California, mosquito and vector control services are provided by mosquito and vector control districts, pest abatement districts, and other county departments and local government agencies. These entities, collectively referred to as *vector control agencies,* are overseen and regulated primarily by the California Department of Public Health. Vector control agency staff who are responsible for mosquito abatement undergo training and certification in the proper use of pesticides for mosquito control.

County mosquito abatement districts, such as the Sacramento–Yolo Mosquito and Vector Control District, provide mosquito and other vector control for their jurisdictions using best management practices that often include physical, biological, and chemical methods. They perform ongoing surveillance of mosquitoes and other vectors to determine the threat of disease transmission and to lower annoyance levels. Vector control agencies promote cooperation and communication with property owners, residents, social and political groups, and duck clubs and other recreational groups, as well as other governmental agencies to help in these efforts. They work with landowners and land managers who deal with managed wetlands, stormwater and wastewater systems, irrigated agriculture, rice production, dairies (pastures, animal waste ponds), creeks, sloughs, catch basins, roadside ditches, swimming pools, cemeteries, and tire storage facilities. The main goal of these efforts is to protect public health and welfare from diseases transmitted by mosquitoes, such as West Nile virus, Zika virus, western equine encephalomyelitis, canine heartworm, malaria, and others (^DSC 2011).

Agricultural Hazards

Agriculture has been the primary land use in large parts of the study area, such as the Delta and the Sacramento and San Joaquin Valleys for more than a century. Pesticides, including insecticides, herbicides, and fungicides, have been used throughout the area for decades to control weeds and pests in orchards, row crops, and vineyards and may be present in and near agricultural lands (^DWR and Reclamation 2016). In addition to pesticide and herbicide use, farms generate waste products that may be composted on site or stored prior to disposal elsewhere, as discussed below.

Pesticides

State law requires minimization of drift from pesticides to residential areas; the specific requirements vary depending on the pesticide or herbicide and the method of application. County agriculture departments overseen by the California Department of Pesticide Regulation regulate herbicide and pesticide use through permit processes, which require applicants to use only approved pesticides and herbicides and to avoid sensitive receptors (^DSC 2011).

The wide variety of pesticides that have been applied, the numerous crops grown, and the fact that predominant land use across the Delta, the Sacramento Valley, and the San Joaquin Valley supports agriculture indicate that pesticides and their residues are likely to be found in the soils throughout the study area. While organochlorines, arsenates, and mercury compounds are the most persistent, chemicals that have been widely and historically applied may also persist within the soils. Because of their relatively low water solubility, persistent pesticides and compounds generally accumulate in the environment in sediment and soil, as well as in the fatty tissue of terrestrial and aquatic animals and humans. The effects of exposure to any hazardous substance depend on many variables, including the dose, duration, and route of exposure (^DWR and Reclamation 2016).

Pesticide and fertilizer supply companies, including facilities that sell, store, concentrate, dilute, or distribute agricultural chemicals, are present throughout the study area. These facilities may be large-volume supply businesses or farm-level batch plants. Supply businesses often have extensive spill-containment equipment and specially trained staff, while batching operations have less established spill prevention and containment procedures (^DWR and Reclamation 2016).

Waste Products

Most farming properties have land that is not engaged directly in crop production. These areas may be used for equipment storage and maintenance and often contain both aboveground and underground storage tanks for various materials used in the operations of the farm. In addition to the pesticide and herbicide use discussed in the *Pesticides* section, storage of petrochemical products is prevalent. Farms also have a waste disposal area where waste crop material, including animal waste, may be stored for later off-site disposal, composting, or final disposal. These areas often contain drums of lubricants, agricultural chemicals, and other waste products (^DWR and Reclamation 2016). Additionally, livestock farms may have holding ponds for animal waste; these ponds may provide habitat for mosquitoes.

Most farms also have an area where their product is stored or processed on site prior to off-site shipping for consumptive use or additional processing. These areas may concentrate contaminants from the farm product and also result in a concentration of other hazards from equipment used to move the products. Contaminants of concern include pesticides, herbicides, fertilizers, and chemicals for maintaining farm equipment (e.g., solvents, grease, oil, gasoline). The waste disposal areas may have petroleum products (e.g., waste materials from equipment maintenance) or agricultural chemicals (spillage from containers containing residual volumes of chemicals, such as pesticides) (^DWR and Reclamation 2016).

Urban, Residential, and Recreational Land Use

Urban areas have many facilities with the potential for hazardous materials releases, including gasoline stations, dry cleaners, automotive repair facilities, and—in larger towns, manufacturing facilities. Possible contaminants of concern from urban land uses are extensive, but the most common contaminants in soil and groundwater are petroleum and associated compounds (typically gasoline and diesel releases from underground storage tanks); chlorinated solvents and degreasers (from dry cleaning and vehicle repair facilities); and various heavy metals, such as arsenic and lead. The variety of contaminants that can exist in groundwater beneath urban land uses depends on the sources and the geologic conditions present that might accelerate or limit dispersion of contaminants in soil and groundwater media (^DWR and Reclamation 2016).

In addition, large marinas, service houseboats, pleasure craft, and commercial craft are present throughout the study area. Marinas typically include bulk fuel storage and overwater fueling, various boat repair and maintenance facilities, stores, boat storage, and camping facilities. Typical chemicals associated with marinas include fuels, lubricants, cleaners, antifouling paints, and fiberglass components (^DWR and Reclamation 2016).

Lead is a common hazardous material found in urban areas in soils adjacent to major roadways. The lead deposition is the result of airborne particulates and surface water runoff associated with tailpipe emissions prior to the time lead was phased out of vehicle fuel. Properties located adjacent to roadways may contain elevated concentrations of lead in exposed surface soils, which could pose a health hazard to construction workers and users of the properties. Lead also exists in the paint of many homes built before 1978. When lead paint is disturbed (e.g., scraped, dry sanded, heated), it can lead to human lead poisoning (^DSC 2011).

In addition to lead, some asbestos from brake linings could be found in the soils adjacent to major roadways. Other contaminants from brake linings that may be carried by urban stormwater runoff, such as copper and zinc, are discussed in Section 7.12.1, *Surface Water*.

Airports

Airports, if within 2 miles of construction projects, can pose a safety hazard for people residing or working in the construction project area. There are numerous public and private airports within the study area.

Hazardous Waste and Materials Management

A *hazardous waste* is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. The California Environmental Protection Agency's Department of Toxic Substances Control administers and enforces the hazardous waste disposal rules in California. The land disposal program regulates waste discharge to land for treatment, storage, and disposal in waste management units. If the waste meets the criteria and is classified as a hazardous waste, all the requirements for hazardous waste management must be met to ensure safe and protective handling, including storage, transportation, treatment, and disposal (Cal. Code Regs., tit. 23, §§ 2510–2601 [regulatory requirements for hazardous waste]). If the waste does not meet the definition of a hazardous waste, hazardous waste management is not required. However, management of such waste falls within the purview of nonhazardous waste agencies, such as the local municipal waste agencies (Cal. Code Regs., tit. 27, § 20200 et seq. [regulatory requirements for wastes other than hazardous waste]).

In addition, Clean Air Act section 122(r) requires owners and operators who handle specific quantities of hazardous materials to prepare a risk management plan containing detailed information that may be used by first responders to prevent or mitigate damage to the public health and safety and to the environment from a release or threatened release of a hazardous material (42 U.S.C. § 7412(r)). In California, the California Accidental Release Prevention Program (CalARP) has additional state requirements, including an additional list of regulated substances and thresholds (see Health & Saf. Code, §§ 25531–25543.3; Cal. Code Regs., tit. 19, §§ 2735.1–2785.1). CalARP risk management plans must be updated at least every 5 years and when there are significant changes to the stored chemicals.

CalARP facilities also would be subject to the Hazardous Materials Release Response Plans and Inventory Act (also known as the Business Plan Act), which requires an entity or business using hazardous materials to prepare a business plan describing the facility, inventory, emergency response plans, and training programs (Health & Saf. Code, §§ 25500–25547.8). These plans must be submitted to the local Certified Unified Program Agencies. Water purveyors must also comply with the CalARP and prepare a risk management plan, if required. The risk management plan is a detailed analysis of the potential accident factors and mitigation measures that can be implemented to reduce accident potential. The risk management plan may include items such as safety information, hazard review, operating procedures, emergency response plan, training requirements, and compliance audits.

Additionally, each air district in California enforces its own rules and regulations to address toxic air contaminates, including diesel particulate matter, chlorine, and ammonia, as discussed in Section 7.5, *Air Quality*.

Cleanup Sites

The State Water Board and regional water boards have legal authority to regulate site cleanup under Water Code section 13304 and State Water Board plans and policies. Under the site cleanup program, regional water boards regulate and oversee the investigation and cleanup of "non-federally owned" sites where recent or historical unauthorized releases of pollutants to the environment, including soil, groundwater, surface water, and sediment, have occurred. Sites in the program are varied and include pesticide and fertilizer facilities, rail yards, ports, equipment supply facilities, metals facilities, industrial manufacturing and maintenance sites, dry cleaners, bulk transfer facilities, refineries, and some brownfields. The types of pollutants encountered at the sites are diverse and include solvents, pesticides, heavy metals, and fuel constituents. The program requires responsible parties to clean up and abate the effects of discharges. The Department of Toxic Substances Control also oversees cleanup of hazardous wastes on contaminated properties.
The State Water Board's GeoTracker database is the storehouse of site information for sites that the regional water boards oversee; the database also stores information for cleanup sites that are overseen by cities, counties, and health agencies in the state. The Department of Toxic Substances Control database Envirostor is similar to the GeoTracker database and can also be accessed to view cleanup sites. Known as Cortese sites, lists of hazardous materials sites are compiled by different state agencies under Government Code section 65962 and can be viewed on the California Environmental Protection Agency's Cortese List Data Resources website (CalEPA 2023).

Wildfire Hazard Risk

The counties in the study area vary in their risk classification for wildfire from minimal to extremely high due to the highly varied terrain and weather factors. In general, wildfire is a serious hazard in undeveloped areas, such as open grasslands and in and around national and state forest lands, with extensive areas of nonirrigated vegetation. Fire hazards are also considerable in highly vegetated areas containing wildlife habitats and in foothills and mountainous watershed areas in the Sacramento/Delta. The number of homes and overall footprint of the wildland–urban interface, where homes meet or intermingle with undeveloped forests and grasslands, have expanded from 1990 to 2010, which increases the exposure of people or structures to a significant risk of loss, injury, or death from otherwise natural and sometimes ecologically beneficial fire regimes (USFS 2018). The threat of wildfires is greatest during late summer and early fall. Fires in those seasons burn hot and rapidly and, combined with winds, can become destructive crown fires (i.e., fires that advance through canopy fuels more or less independently of surface fires) (^DSC 2011). Climate change, insect pests, and diseases have contributed to the increases in the number, size, intensity, and duration of wildfires (USFS 2013).

Many of the Delta islands are prone to peat fires. Peat fires are extremely difficult to extinguish once ignited. Peat is a type of soil that forms when partially decomposed plant material accumulates in a watery environment. As the organic matter becomes compacted and decays, it generates oxygen, making a fire more difficult to extinguish once it is ignited. The only way to ensure the fire is extinguished is to flood the affected area (^DSC 2011).

Fire hazard conditions throughout the San Francisco Bay Area and Central California are similar to those conditions described previously. Fire hazard conditions in Southern California are generally more extreme than in the northern portions of the study area due to a number of factors: precipitation, topography, vegetation, and climate. Fire hazard conditions in northern California are generally less extreme than in the south, due to higher precipitation and lower temperatures (^DSC 2011).

Fire protection entities responsible for responding to wildfires depend on the county and whether fires are located in incorporated or unincorporated areas. City fire departments, rural county fire districts, and the California Department of Forestry and Fire Protection are among the entities providing fire protection and suppression services throughout the study area. Under state requirements, areas within very high fire hazard risk zones must comply with specific building and vegetation maintenance requirements intended to reduce property damage and loss of life during a fire (^DSC 2011). Building requirements include guidelines for appropriate materials, construction methods, and design standards for roofs, vents, exterior coverings, decking materials, and accessory structures. Maintenance requirements include clearing flammable vegetation around residences, removing dead and dying wood near buildings, and keeping roofs clear of dead vegetative material.

Pursuant to Public Resources Code section 4291, it is required that communities and residences located in State Responsibility Areas clear defensible space around homes and buildings to avoid loss associated with wildfires and follow the requirements of this defensible space (BOF 2006). The defensible space is not irrigated or watered but rather is a complete clearing of vegetation from around structures to reduce or prevent the risk of damage during a fire. State Responsibility Areas are areas where the State of California has the primary financial responsibility for the prevention and suppression of wildland fires (BOF 2012a). In addition, the State of California has identified Very High Fire Hazard Severity Zones in the study area (CAL FIRE 2007). These designations allow the state to make recommendations to the local jurisdictions, and the government code then provides direction for the local jurisdiction to take appropriate actions to help reduce and control the potential for fire. This includes enforcement of the defensible space requirements. (BOF 2012b)

7.11.3 Impact Analysis

Hazardous materials are generally the raw materials for industrial or commercial products or processes that may be classified as toxic, flammable, corrosive, or reactive. As described in Section 7.11.2, *Environmental Setting*, there are existing hazards in the environment, including cleanup sites that, depending on the activity being analyzed, could interact with and create additional hazards. The majority of actions contemplated or conditions that could result from changes in hydrology and changes in water supply as a result of implementation of the proposed Plan amendments would not have impacts associated with hazardous materials and hazards. See Section 7.12.1, *Surface Water*, for a discussion of potential water quality impacts such as mercury levels and flooding and Section 7.12.2, *Groundwater*, for a discussion of contaminants in groundwater.

Under changes in hydrology, altered timing of flows and changes in reservoir levels would not involve hazardous materials and, therefore, would not create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials; upset and accident conditions involving the release of hazardous materials; or emission of hazardous materials within 0.25 mile of a school. Rivers and reservoir levels would remain within their historical channel and banks and would not newly inundate or reveal hazardous sites. Changes in flow and reservoir levels would not have any effect on public airports or private airstrips as these actions would not increase the capacity or present a safety hazard at existing airports, or change where people or airports are located. These actions also would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. There would be no impact.

Changes in water supply involving changes in crops on agricultural land or fallowing of agricultural land and reduced Sacramento/Delta water supply to municipalities would not involve hazardous materials. Accordingly, these changes would not create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials, nor would these changes directly cause the release of hazardous materials into the environment by upset or accident or emit hazardous materials within 0.25 mile of a school. Any earthwork associated with agricultural operations would be in areas already affected by ground disturbance and other actions would not require ground disturbance; therefore, these changes would not affect existing hazardous materials sites. There would be no impact.

Changes in water supply involving increased groundwater pumping and implementation of other water management actions (i.e., groundwater storage and recovery, water transfers, water recycling, and water conservation) would not result in use of any hazardous materials because these actions would not require the use of new machinery or other sources for hazardous materials and would not involve new ground disturbance. Further, recycled water is not considered a hazardous waste (i.e., material that is corrosive, flammable, reactive). Many regulations control the release, use, and management of recycled water to protect public health and the environment. For example, purple pipe systems are required for new recycled water distribution systems so that the systems are appropriately connected to the end use (e.g., landscaping) and minimize potential cross connection with potable water systems. Therefore, people would not be exposed to hazards or hazardous materials due to water recycling. Because these changes would not involve the use of hazardous materials, impacts from routine transport, use, or disposal of hazardous materials; release of hazardous materials into the environment by upset or accident; or emission of hazardous materials within 0.25 mile of a school would not occur. There would be no impact.

Changes in water supply involving increased groundwater pumping and implementation of other water management actions would not affect existing hazardous sites. Actions involving groundwater use are not expected to occur on existing hazardous materials sites because groundwater contamination would defeat the purpose of these groundwater management efforts. Because other water management actions would not require ground disturbance, they would not affect existing hazardous materials sites. Changes in water supply would not change or increase the locations of people or infrastructure and, therefore, would not affect public airports and private airstrips, and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. There would be no impact.

Accordingly, these topics (Impacts HAZ-a through HAZ-g) are not evaluated further in this section.

The potential for changes in reservoir operations and reduced water storage levels to affect wildfire suppression is evaluated in this section under Impact HAZ-h.

Section 7.21, *Habitat Restoration and Other Ecosystem Projects*, and Section 7.22, *New or Modified Facilities,* describe and analyze potential hazards and hazardous materials impacts from various actions that involve construction.

Impact HAZ-h: Expose people or structures to a 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

Wildland fire suppression practices include the use of water from reservoirs to fill tanker trucks, planes, and dip tanks carried by helicopters, as well as fire retardants and fire suppressants.

Fire retardants and fire suppressants are both water-based products containing various chemical additives. These chemicals can be hazardous to humans and to wildlife, which is why the U.S. Forest Service has specific requirements for fire retardants and suppressants to reduce the potential risk, including prohibiting the inclusion of many chemicals that are known to cause harm (USFS 2007, 2020).

Retardants are applied just ahead of an actively moving fire, and the purpose of the water in them is primarily to serve as a method of delivering the chemicals to the area (USFS 2020). Foams are liquid concentrates that are mixed with water and aerated. They are dropped or distributed on the fire area to slow combustion. Foams increase the ability of water to fight fire, and retardants provide protection to areas that have not yet burned (National Wildfire Coordinating Group 1995; USFS 2007). However, because both foams and retardants must be mixed and loaded into planes at designated sites (sometimes at some distance from the fire), they are not as efficient as water. A helicopter can make only one trip per load of foam or retardant whereas it can make several trips from nearby water sources during the same flight.

Changes in hydrology may result in changes to reservoir operations such that water levels are lower during fire season (roughly summer through early fall). However, it is unlikely that lower water levels would prevent access to water for such use, thus impeding fire suppression and exposing people or structures to increased risk of loss, injury, or death from wildland fire.

Most reservoirs have minimum storage volumes well over 1,000 acre-feet. In the Sacramento/Delta, implementation of the cold water habitat objective requires reservoir operators to develop and implement long-term strategies and annual operations plans to minimize reservoir drawdown. Reservoirs would remain available for fire suppression even at the minimum storage level at which water can be released through dam outlet works. Water would continue to be available in either reservoirs or rivers to fight potential forest fires (Moon 2018).

Helicopter buckets range in size (72 to 2,600 gallons of water or fire retardant), depending on the lifting capacity of the helicopter, and can collect water from large reservoirs, lakes, or even small ponds. Other aircraft can carry as much as 3,000 gallons of water or fire retardant (CAL FIRE 2012). If local water supply is low, such as when water pressure drops due to heavy use or when local ponds are dry, firefighters may need to travel farther to collect the water, but this is a planned-for contingency (Gazzar 2017). This situation arose in the 2012–2016 drought; however, access to water is not the critical factor in addressing wildfire risk and response. Fires are burning hotter and more frequently due to parched vegetation from droughts, higher temperatures from climate changes, and increased urban growth in high-risk areas (Arango and Medina 2018; Moon 2018; Lillis and Carlson 2018). In addition, water is not the only mechanism for combatting wildfires; firefighters use a variety of methods, including flame retardant, firebreaks, and backfires (Ebbs

2018). Healthy forest management before a fire starts is important as well (see discussion in Section 4.2.4, *Upper Watershed Forest and Meadow Habitat*). California's Very High Fire Hazard Severity Zone designation allows the state to make recommendations to the local jurisdictions; and the government code (Gov. Code, §§ 51175–51982) then provides direction for the local jurisdiction to take appropriate actions to help reduce and control the potential for fire, including enforcement of defensible space requirements (BOF 2012b).

Heavily forested or vegetated areas exist in many parts of the study area, and these areas will likely continue experiencing forest fires. Reservoirs would continue to be available for fire suppression water, and any increased use of fire retardants would be due to increased fire intensity from climate change, not as a result of changes in hydrology and reduced water supply under the proposed Plan amendments. Impacts from changes in reservoir levels would be less than significant.

7.11.4 References Cited

7.11.4.1 Common References

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7.11.4.2 Section References

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