20 Noise

This chapter presents an overview of the existing noise and vibration conditions in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) and the environmental consequences and mitigation, as they pertain to the implementation of the Project alternatives.

20.1 Environmental Setting/Affected Environment

This section begins with background information to support the noise and vibration analysis and then presents the existing noise and vibration conditions and sensitive receptors in the Project area with the potential to be affected by Project implementation.

20.1.1 Noise and Vibration Terminology

This section presents a framework for understanding noise and vibration levels and their potential impacts.

20.1.1.1 Noise

Noise can be generally defined as unwanted sound. Sound, traveling in the form of waves from a source, is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). The sound pressure level (referred to as sound level) is the most common descriptor used to characterize the loudness of an ambient sound level. It is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

Pressure oscillation rates can be measured in units of hertz, which correspond to the frequency of a sound. Typically, sound does not consist of a single frequency but rather a broad band of frequencies varying in levels of magnitude (sound power). The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the frequency/sound power level spectrum. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum; humans cannot hear low and high-end frequencies well. Therefore, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 and above 5,000 hertz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies and greater sensitivity to mid-range frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted dB (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in Table 20-1.

Table 20-1. Typical Noise Levels Associated with Common Activities

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noise urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quite suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation (Caltrans) 2013
Key: dBA = A-weighted decibels

A key concept in evaluating potential noise impacts is the perceived effect of incremental increase in existing noise levels. Table 20-2 presents the effect of increasing noise levels. For example, the table shows that an increase of three dBA is barely perceptible, an increase of five dBA is noticeable, and a 10-dBA increase would be perceived by someone to be a doubling of noise (Federal Highway Administration [FHWA] 2011).

Table 20-2. Perceived Effect of Incremental Increases in Existing Noise Levels

Sound Level Change (dBA)	Relative Loudness/ Impact	Acoustical Energy Gain (%)
0	Reference	0
+3	Barely Perceptible Change	50
+5	Noticeable Change	67
+10	Twice as Loud	90
+20	Four Times as Loud	99

Source: FHWA 2011
Key: dBA = A-weighted decibels

Noise analyses and regulations use the following terms:

- **L_{eq}: Equivalent energy level** – A-weighted sound level corresponding to a steady-state sound level that contains the same total energy as a varying signal over a given sample period. This is typically computed over 1-, 8-, and 24-hour sample periods. An hourly sample period is denoted as $L_{eq}(h)$.

- **L_{dn}: Day-night average level** – The energy average sound level for a 24-hour day determined after the addition of a 10-dBA penalty to all noise events occurring at night between 10 p.m. and 7 a.m. This is a useful measure for community noise impact because people in their homes are much more sensitive to noise at night when they are relaxing or sleeping than they are in the daytime.
- **L_{max}: Maximum noise level** – Representing the highest sound level measured for a given period.
- **L_{min}: Minimum noise level** – Representing the lowest sound level measured for a given period.
- **L_x: Statistical noise descriptor** – The noise level exceeded X percent of a specified time period. For example, L_{10} indicates the noise level that is exceeded 10 percent of the time during a given period.
- **CNEL: Community Noise Equivalent Level** – A 24-hour average L_{eq} that includes the addition of five dBA to sound levels from 7 p.m. to 10 p.m. and an addition of 10 dBA to sound levels from 10 p.m. to 7 a.m. The CNEL is commonly used in California instead of the L_{dn}.

Noise effects on humans can range from annoyance to physical discomfort and harm. Sleeping patterns, speech communication, mental acuity, and heart and breathing rates can all be disturbed by noise. Perception of the noise is affected by its pitch, loudness, and character.

Sound levels from isolated point sources of noise typically decrease by about six dBA for every doubling of distance from the noise source. When the noise source is a continuous line, such as vehicle traffic on a highway, sound levels decrease by about three dBA for every doubling of distance. Noise levels can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the reduction of noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) and the presence of dense vegetation can also affect the degree to which sound is attenuated over distance (FHWA 2011).

20.1.1.2 Vibration

Vibration refers to groundborne noise and perceptible motion. The most common impacts from groundborne vibration include annoyance, movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, disruption of vibration-sensitive operations or activities, and triggering of landslides. Vibrations caused by construction can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source due to spreading of the energy and frictional losses. Thus, groundborne vibrations from most construction activities rarely reach the levels that can damage structures but can achieve the perceptible ranges in buildings very close to construction sites (Federal Transit Authority [FTA] 2006).

In extreme cases, the vibration can cause damage to buildings or equipment. In most circumstances, common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures, with the occasional exception of blasting and sheet pile-driving during construction. To assess the potential for structural damage associated

with vibration, the vibratory ground motion near the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions, typically in units of inches per second (in/sec). The PPV is defined as the maximum instantaneous peak of the vibration signal. According to FTA guidelines (2006), the construction vibration damage criterion for non-engineered timber and masonry buildings is 0.2 in/sec, and that of structures or buildings constructed of reinforced-concrete, steel, or timber is 0.5 in/sec.

Annoyance from vibration often occurs when the vibration exceeds the threshold of perception. A vibration level that causes annoyance would be well below the damage threshold for normal buildings. Generally, groundborne vibration does not provoke adverse human reaction to those who are outdoors as the effects associated with the shaking of building are absent. The root mean square amplitude is most frequently used to describe the effect of vibration on the human body. The root mean square amplitude is defined as the average of the squared amplitude of the signal and is approximately 70 percent of the PPV for a single frequency vibration. Vibration velocity level (Lv) in dB notation (VdB) is commonly used to measure root mean square. The dB notation acts to compress the range of numbers required to describe vibration and is referenced to one in one million in/sec in the United States. The threshold of perception for vibration is typically around 64 VdB.

Construction activities can either result in continuous or single-impact (transient) vibration impacts. Typical equipment or activities that could result in continuous vibration impacts include excavation equipment, traffic, vibratory pile drivers, and vibratory compaction equipment; examples of transient vibration sources include blasting and drop balls. Some construction activities, like jackhammers or impact pile drivers, can continually generate single transient events at a high frequency. However, for evaluation purposes, this equipment would be regarded as having frequent or continuous vibration impacts. Damage thresholds for continuous sources are approximately half of the thresholds for transient sources.

20.1.2 Existing Noise and Vibration Sources

The Project involves construction activities within the California Department of Fish and Wildlife's Fremont Weir Wildlife Area (FWWA), most of which is in Yolo County. The western end of Fremont Weir and the northern end of the proposed west side gated notch are in Sutter County. The southern tip of the Yolo Bypass is in Solano County, but no construction is proposed in that area. The FWWA allows visitors to fish, hunt, hike, and view wildlife. There are no residences, buildings, or recreational facilities within the FWWA; however, the FWWA would be partially open to the public during construction.

Haul routes may include portions of Interstate (I) 5 and county roads (CRs) providing access from I-5 to the Project area. CRs 117 and 16 would be used for East (Alternative 1) and Center (Alternatives 2 and 5) alternatives, Downstream Channel improvements, Agricultural Road Crossing 1 improvements, and East Supplemental Fish Passage components. CRs 102, 16, and 116A would be used for West (Alternatives 3, 4, and 6) and Center (Alternatives 2 and 5) alternatives and West Supplemental Fish Passage components. CRs 117 and 22 would be used for the Northern and Southern Water Control structures and fish bypass channel components. CRs 102 and 28H would be used for the Southern Water Control Structure and fish bypass channel components and Tule Canal Floodplain improvements.

The area surrounding the Project area and haul routes is mainly agricultural and rural. Figure 20-1 illustrates the area of analysis for noise and vibration.

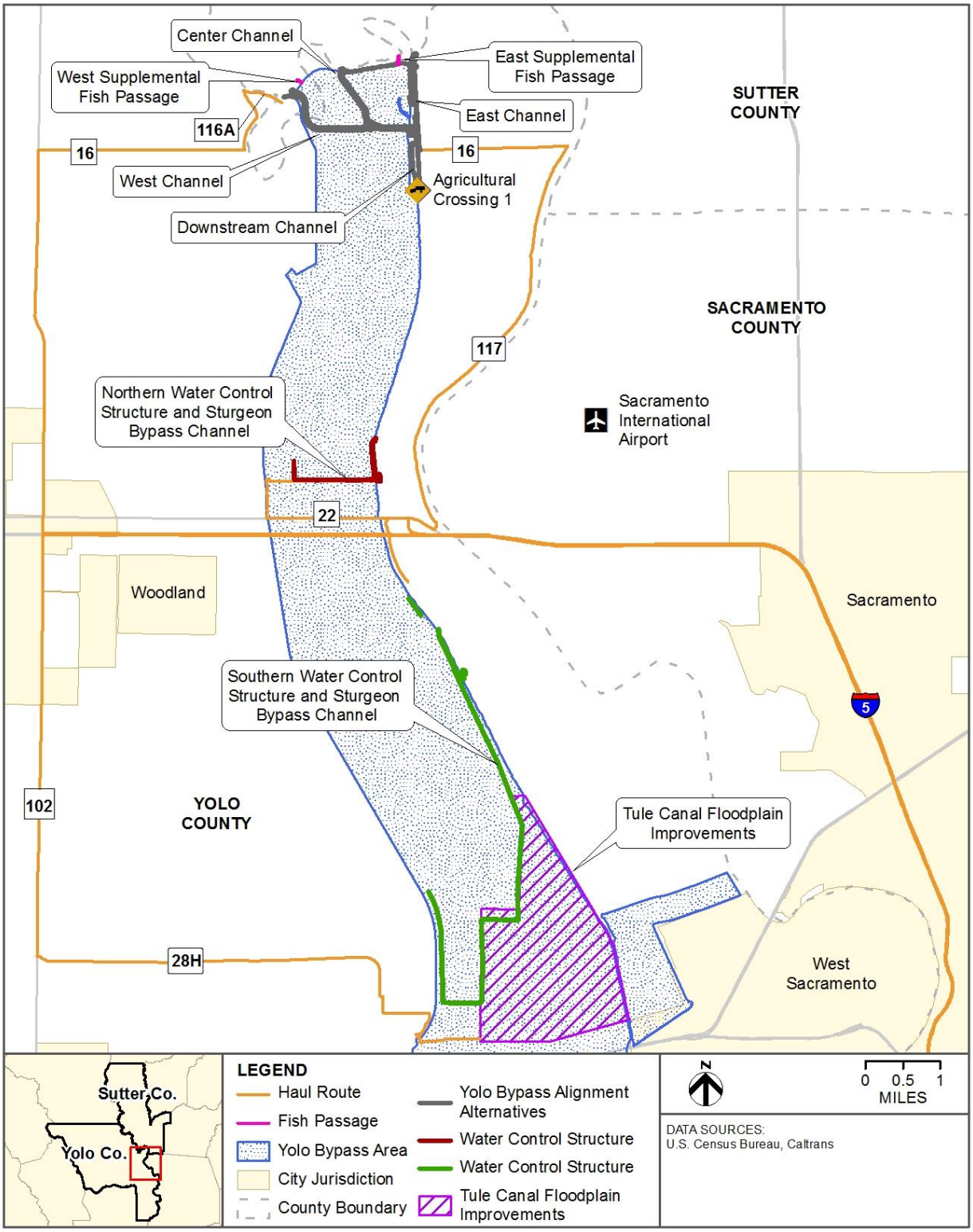

Figure 20-1. Noise and Vibration Area of Analysis

Noise sources in the Project area are of four general types: agricultural, recreational, general stationary, and general mobile.

Agricultural Noise. The predominant land use near the Project area is related to agricultural activities. Farm operations produce noise from a variety of sources. These include heavy equipment for plowing and harvesting, crop-spraying aircraft, onsite processing equipment, and irrigation water pumps. Farm tractors typically produce 78 to 106 dBA L_{max}, with an average of 84 dBA L_{max} at 50 feet (Yolo County 2009). Crop-spraying aircraft typically fly at low altitude and may cause loud temporary noise exceeding those of commercial aircraft from the Sacramento International Airport. Crop-spraying is typically seasonal and short in duration at any given location. In addition to affecting the farmers and farm laborers, agricultural noise also affects those living in or near agricultural areas.

Recreational Noise. Recreational noise can include hunting and boating noise from the FWWA and the Sacramento River, respectively. Firearms typically generate instantaneous noise exceeding 140 dBA (American Speech-Language-Hearing Association 2017). State laws require motorboats to be muffled and to generate less than 75 dBA at the shoreline (California Natural Resources Agency 2017). Vehicle parking for the FWWA is only available on the east side of the FWWA; visitors typically travel on CR 107, which has no residential receptors along the road.

General Stationary Noises. General stationary noises (i.e., those emanating from fixed locations) are associated with a variety of land uses. Stationary sources can include air conditioning units, power tools, motors, generators, appliances, and manufacturing and industrial facilities. As shown in Figure 20-2, there are no residences, industrial facilities, or commercial facilities within the Project area. The nearest residence is 700 feet to the west of the Project area, and the nearest industrial facilities are 2.5 miles to the west of the Project area. Therefore, contribution of general stationary noises to the ambient noise levels in the Project area is minimal.

General Mobile Noise. General mobile noise sources can include vehicles, aircraft, boats, and trains. Mobile noise is usually temporary and variable but can be intense and annoying because of its abruptness and intensity. In urban areas, these mobile sources contribute to the ambient noise.

The closest mobile noise sources to the Project area are agricultural equipment and occasional boat traffic on the Sacramento River. There is minimal stationary noise or ground-based mobile noise; I-5 is over 4.5 miles south of the area, and there are no railroads nearby. The largest source of mobile noise to the Project area is the Sacramento International Airport, located 2.5 miles southeast of the construction area. Planes are typically flying at 1,000 to 3,000 feet above sea level (Sacramento Area Council of Governments [SACOG] 2013). The area falls just outside of the existing 60 dBA CNEL contour (Yolo County 2009) and well outside of the future projected 60 dBA CNEL contour (Yolo County 2009, SACOG 2013) but is located within the Traffic Pattern Area of the *Sacramento International Airport Land Use Compatibility Plan*. It is estimated that the existing noise level in the proposed construction area is approximately 55 dBA CNEL. There are also three private airports (Riego Flight Strip, Lauppes Strip, and Sopwith Farm) within two miles of the Project area.

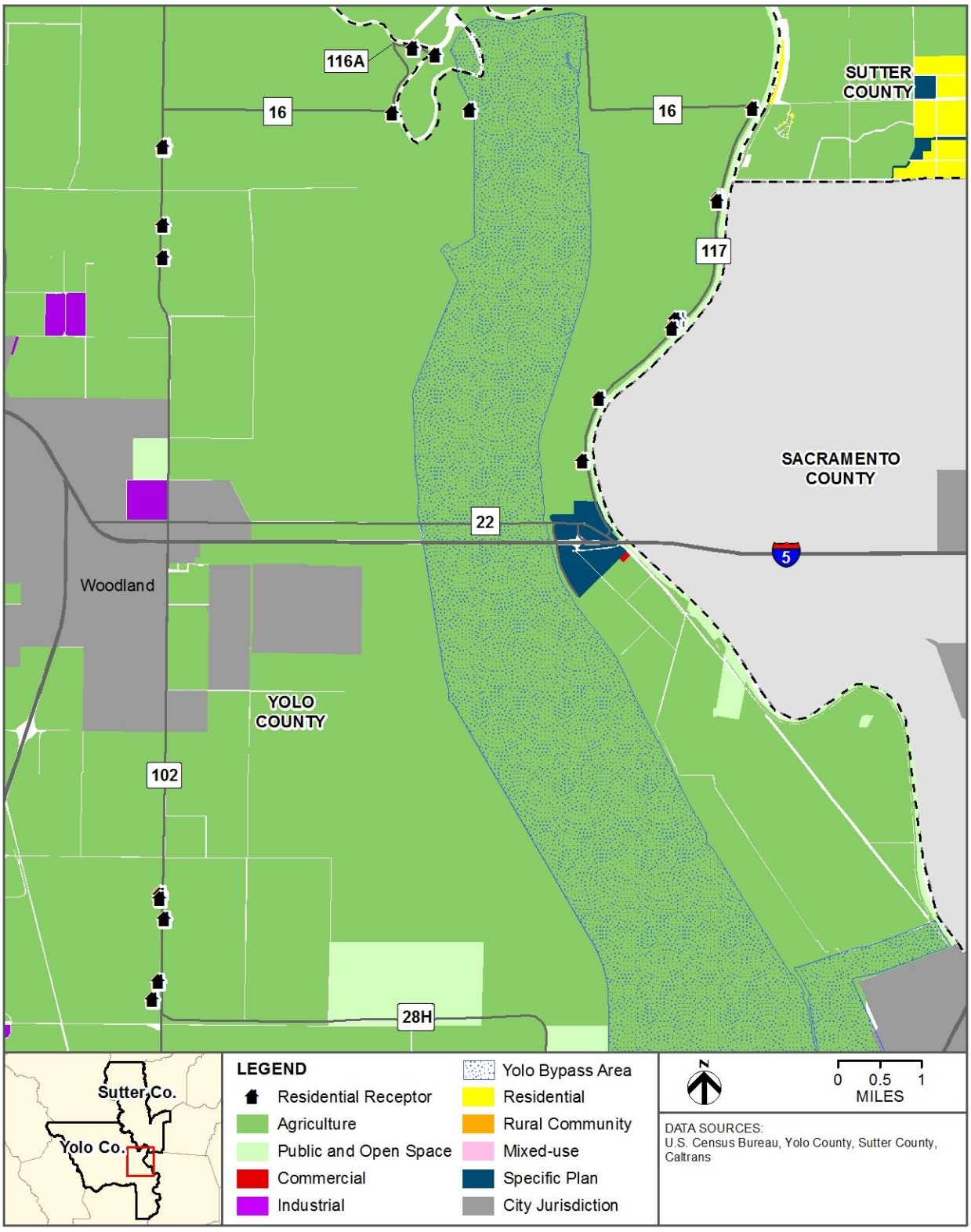

Figure 20-2. Noise-Sensitive Land Uses in the Area of Analysis

20.1.3 Existing Noise and Vibration Sensitive Receptors

Generally, places where quiet is an essential element of a land use's intended purpose qualify as a noise-sensitive receptor, such as historical monuments with significant outdoor use. Places where people normally sleep, like residences, hotels, and hospitals, qualify as noise-sensitive receptors. For these types of receptors, nighttime sensitivity to noise must be considered. Various institutional land uses where excessive noise could interfere with speech, meditation, and concentration also qualify as noise sensitive receptors. These land uses include schools, libraries, theaters, churches, cemeteries, monuments, and museums. Parks may also be considered noise-sensitive receptors, but this classification is dependent on their use. For example, a park intended primarily for active recreation would not be considered a noise-sensitive receptor (FTA 2006). Noise-sensitive receptors may also have stationary noise sources at their locations.

Noise-sensitive receptors located within the Project area include recreational visitors to the FWWA (which would be partially open to the public during construction) and wildlife. Existing wildlife and effects of construction noise on wildlife are discussed in Chapter 9, *Vegetation, Wetlands, and Wildlife Resources*. Noise-sensitive receptors located near the Project area include several residential receptors, approximately 60 to 550 feet from the centerline of CRs 117, 102, 16, and 116A, as shown in Figure 20-2.

20.2 Regulatory Setting

This section describes the applicable noise and vibration laws, rules, regulations, and policies at the Federal, State of California (State), county, and local level.

20.2.1 Federal Plans, Policies, and Regulations

In the past, the United States Environmental Protection Agency (USEPA) coordinated all Federal noise control activities through its Office of Noise Abatement and Control. However, in 1981, Congress concluded that noise issues were best handled at the state or local government level. As a result, the USEPA phased out the office's funding in 1982 as part of a shift in Federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 were not rescinded by Congress and remain in effect today although essentially unfunded. Additionally, Title IV – Noise Pollution of the Clean Air Act provides guidance to state and local entities for establishing appropriate noise control standards.

20.2.2 State Plans, Policies, and Regulations

20.2.2.1 California Buildings Standards Code

The State of California has adopted noise standards in areas of regulation not preempted by the Federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. Title 24 of the California Code of Regulations, also known as the California Buildings Standards Code, establishes building standards applicable to all occupancies throughout the State. The code provides acoustical regulations for both exterior-to-interior sound insulation as well as sound and impact

isolation between adjacent spaces of various occupied units. Title 24 regulations generally state that interior noise levels generated by exterior noise sources shall not exceed 45 dBA L_{dn}/CNEL, with windows closed, in any habitable room for general residential uses.

20.2.2.2 General Plans and Noise Ordinances

The State of California also provides guidance for the preparation of general plans and noise ordinances. In 1976, the State Department of Health Services (now the Department of Public Health) issued *Noise Element Guidelines* (Health and Safety Code Section 46050.1). In 1977, the State Office of Noise Control published a model noise ordinance and mandated that each county develops a noise element as part of its general plan (Section 65302[f] of the California Government Code). The purpose of this element is to identify and appraise noise problems in the community. The Office of Noise Control's model ordinance recommends limits on temporary construction noise levels and operational noise levels in residential, commercial, and industrial areas.

The State's *General Plan Guidelines* recommend that local governments "'analyze and quantify' noise levels and the extent of noise exposure through actual measurement and the use of noise modeling." In addition to other requirements, the guidelines state that "technical data relating to mobile and point sources must be collected and synthesized into a set of noise control policies and programs that 'minimizes the exposure of community residents to excessive noise'" (California Governor's Office of Planning and Research [OPR] 2003).

As part of the county-level planning process, analysis of existing conditions and community tolerance for noise is used to dictate the normally acceptable community noise exposure. Measured in dBA, a normally acceptable community noise exposure is used by the State to signify satisfactory land use in relation to noise exposure. Other terms used by the State to analyze community noise exposure are:

- **Normally Acceptable –** Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
- **Conditionally Acceptable –** New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
- **Normally Unacceptable –** New construction or development generally should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
- **Clearly Unacceptable –** New construction or development generally should not be undertaken.

Table 20-3 displays land use categories and the associated acceptability for community noise exposure levels.

Table 20-3. Noise Compatible Land Use Planning

Land Use	Normally Acceptable L_{dn} or CNEL (dBA) [a]	Conditionally Acceptable L_{dn} or CNEL (dBA) [a]	Normally Unacceptable L_{dn} or CNEL (dBA) [a]	Clearly Unacceptable L_{dn} or CNEL (dBA) [a]
Residential – Low Density Single Family, Duplex, Mobile Homes	50-60	55-70	70-75	75+
Residential – Multi Family	50-65	60-70	70-75	75+
Transient Lodging – Motels, Hotels	50-65	60-70	70-80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	80+
Auditoriums, Concert Halls, Amphitheaters	N/A	50-70	N/A	65+
Sports Arena, Outdoor Spectator Sports	N/A	50-75	N/A	70+
Playgrounds, Neighborhood Parks	50-70	N/A	67-75	72+
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-75	N/A	70-80	80+
Office Buildings, Business Commercial and Professional	50-70	67-77	75+	N/A
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	75+	N/A

Source: OPR 2003

Note:

[a] Ranges in the community noise exposure levels (and any subsequent overlaps in the different categories) reflect the differing noise goals of a community, the community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution (OPR 2003).

Key: CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel scale; L_{dn} = day-night average level; N/A = not applicable

20.2.3 Regional and Local Plans, Policies, and Regulations

Most local jurisdictions have adopted noise standards for both transportation and non-transportation sources in noise ordinances and the Noise Element of their general plans.

The Health and Safety Element of the *2030 Countywide General Plan* includes the Noise Element (Yolo County 2009). The goal of the noise element is to protect people from the harmful effects of excessive noise through proper planning and noise reduction measures where necessary and feasible. The plan incorporates Table 20-3 as a guideline for long-term noise compatible land use planning. The plan recommends adopting a comprehensive noise ordinance that includes standards for acceptable exterior and interior noise levels and construction equipment and noise-emitting construction activities. The plan also recommends requiring a noise analysis for all proposed projects that may impact sensitive receptors, such as residences. Yolo County does not have an adopted noise ordinance.

The Noise Element of the Sutter County *2030 General Plan* (2011) has a policy to limit noise-generating construction activities within 1,000 feet of sensitive receptors, such as residences,

between 7:00 a.m. and 6:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays. Vibration levels are also limited to impact criteria developed by the FTA. For example, frequent vibration levels should not exceed 72 VdB at residences and 75 VdB on institutional land uses. In addition, noise from new stationary sources should not exceed an $L_{eq}(h)$ of 55 dBA or L_{max} of 70 dBA during the day (between 7:00 a.m. and 10:00 p.m.) and $L_{eq}(h)$ of 45 dBA or L_{max} of 65 dBA at the property line of a sensitive noise receptor, such as a residence. Also, for a residence with an existing L_{dn} of 55 dBA, the increase in exterior noise level as a result of the new development should not be more than 3 dB. To implement these policies, the plan recommends requiring a noise analysis for new projects and adopting a noise ordinance with quantitative maximum allowable noise levels. Sutter County does not have an adopted noise ordinance.

20.3 Environmental Consequences

These sections describe the environmental consequences and environmental impacts associated with each alternative. Detailed descriptions of the alternatives evaluated in this section are provided in Chapter 2, *Description of Alternatives*.

20.3.1 Methods for Analysis

The focus of this analysis is on potential temporary noise impacts during construction. Activities with the potential for generating short-term, temporary increases in noise levels include construction activities and construction-related traffic. Long-term noise impacts are not anticipated from operation and maintenance of new facilities. However, short-term and intermittent noise impacts would occur from maintenance activities, such as from sediment removal.

Appendix L, *Noise and Vibration Calculations*, presents details on the methods used and results of noise modeling conducted for this Environmental Impact Statement (EIS)/Environmental Impact Report (EIR). The noise level at nearby sensitive receptors during the construction of each alternative was calculated by 1) attenuating the construction sound level for distance to the receptor and 2) logarithmically adding the attenuated construction noise source level to the ambient noise level. Construction noise was predicted using the equations and guiding principles from the FHWA Roadway Construction Noise Model. The model database provides maximum noise levels for various pieces of construction equipment at a reference distance of 50 feet. The types of construction equipment that could be used during the construction of each alternative, the percentage of time that the equipment would operate at full power (usage factor) during an hour, and each piece's maximum noise level are presented in Table 20-4. The construction equipment is estimated to operate for 10 hours a day between 7:00 a.m. and 6:00 p.m. Monday through Saturday.

Table 20-4. Construction Equipment Types and Noise Levels

Equipment Type	Usage Factor	L_{max} at 50 Feet
All Other Equipment Greater than 5 hp	50%	85
Compactor (ground)	20%	83
Concrete Mixer Truck	40%	79
Concrete Pump Truck	20%	81
Crane	16%	81
Dozer	40%	82
Dump Truck	40%	76
Excavator	40%	81
Flat Bed Truck	40%	74
Front End Loader	40%	79
Generator	50%	81
Grader	40%	85
Impact Pile Driver	20%	101
Pickup Truck	40%	75
Pumps	50%	81
Roller	20%	80
Scraper	40%	84

Source: FHWA 2006

Key: hp = horsepower; L_{max} = maximum noise level measured during a monitoring period

The analysis of transportation noise impacts associated with construction worker commute traffic and trucks hauling waste and construction materials focuses on sensitive land uses along local and regional roadways. It was assumed that construction workers would commute to the sites using the same roads as the haul trucks. Doubling of traffic would only result in a change of approximately 3 dB, which would be barely perceptible to a human ear (FHWA 2011). Traffic would need to be increased at least 3 times for increased noise to be readily perceived (5 dBA) and at least nine times to double the noise levels (10 dBA). Construction-related traffic was compared against the 2015 annual average daily traffic volumes published by Caltrans (2016).

In addition to noise, construction activities have the potential to produce vibration that may be annoying or disturbing to humans and may cause damage to structures. Highest levels of vibration from construction projects are caused by soil compacting, jack hammering, and structure demolition. Table 20-5 presents the PPV (in/sec) and Lv (VdB) for typical construction equipment (FTA 2006). PPV levels were applied to each type of construction equipment as appropriate, and the equivalent PPV at the receptor was calculated. Although PPVs are not additive, total PPV for each action was evaluated for a conservative analysis. Lv levels for all equipment that may be operating simultaneously were added logarithmically. Similar to the noise analysis for alternatives and actions within an alternative that do not have a defined sensitive receptor, such as an existing residence, the distances at which the vibration level would be less than the significance threshold were determined.

Table 20-5. Construction Equipment Types and Vibration Levels

Equipment Type	PPV at 25 feet (in/sec)	Approximate Lv at 25 feet (VdB)
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.17	93
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86

Source: FTA 2006

Key: in/sec = inches per second; Lv = vibration velocity level; PPV = peak particle velocity; VdB = vibration decibels

Noise impacts are determined relative to existing conditions (for the California Environmental Quality Act [CEQA]) and the No Action Alternative (for the National Environmental Policy Act [NEPA]). However, as described below, the No Action Alternative would be the same as existing conditions because noise levels are not anticipated to experience substantive changes in the area of analysis. Therefore, the analysis compares the impacts of the action alternatives only to existing conditions.

20.3.2 Thresholds of Significance – CEQA

The significance criteria described below were developed consistent with the environmental checklist in Appendix G of the State CEQA Guidelines to determine the significance of potential noise impacts that could result from implementation of the project. These thresholds also encompass the factors considered under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. Noise impacts would be considered significant if the project would result in:

- Exposure of persons to, or generation of noise and vibration levels in excess of, standards established in the local general plan or noise ordinance or applicable standards of other agencies
- Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels
- A substantial permanent increase in ambient noise levels in the Project vicinity
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity
- Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

The evaluation of the significance of exposure of persons to, or generation of noise and vibration levels in excess of, established standards was based primarily on compatibility with noise regulations discussed in Section 20.2.

According to FTA guidelines (2006), a vibration criterion of 0.2 in/sec is the significant impact level for non-engineered timber and masonry buildings. Furthermore, structures or buildings constructed of reinforced-concrete, steel, or timber have a vibration damage criterion of 0.5 in/sec. Also, groundborne vibration levels of 72 VdB at residences and 75 VdB on institutional land uses would be considered annoying (Sutter County 2011). These thresholds were used to

evaluate the significance of exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

For the purpose of this analysis, the noise compatibility guidelines by land use category included in Yolo County's *2030 Countywide General Plan* (2009) were used to determine a substantial increase in noise level. Table 20-3 summarizes the normally and conditionally acceptable noise levels for the residential and agricultural land uses expected to be in the Project area. A substantial increase was considered to be noise levels that exceed the conditionally acceptable levels. Temporary noise from maintenance activities was also compared against the conditionally acceptable levels.

The significance criteria described above apply to the noise receptors that could be affected by the project.

20.3.3 Effects and Mitigation Measures

This section provides an evaluation of the direct and indirect noise effects from implementing the Project alternatives. This analysis is organized by Project alternative, with specific impact topics numbered sequentially under each alternative.

20.3.3.1 No Action Alternative

Under the No Action Alternative, the Project would not be implemented and none of the project features would be developed. This analysis assumes that ambient noise levels under the No Action Alternative would be the same as existing conditions. Neither construction-related activities nor increased operational activities would occur.

CEQA Conclusion

Without implementation of the Project under the No Action Alternative, there would be **no impact** to existing noise and vibration levels within the Project area because neither construction-related activities nor increased operational and maintenance activities would occur. Therefore, there would be no adverse effects from:

- Exposure of persons to, or generation of noise and vibration levels in excess of, standards established in the local general plan or noise ordinance or applicable standards of other agencies
- Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels
- A substantial permanent increase in ambient noise levels in the Project vicinity
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity
- Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

20.3.3.2 Alternative 1: East Side Gated Notch

Alternative 1, East Side Gated Notch, would allow increased flow from the Sacramento River to enter the Yolo Bypass through a gated notch on the east side of Fremont Weir. The invert of the new notch would be at an elevation of 14 feet, which is approximately 18 feet below the existing Fremont Weir crest. Alternative 1 would allow up to 6,000 cubic feet per second (cfs) to flow through the notch during periods when the river levels are not high enough to go over the crest of Fremont Weir to provide open channel flow for adult fish passage. See Section 2.4 for more details on the alternative features.

20.3.3.2.1 Impact NOI-1: Exposure of persons to, or generation of noise and vibration levels in excess of, standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of East Channel, Downstream Channel, and Agricultural Road Crossing 1 and ongoing maintenance activities would occur in Yolo County. The West Supplemental Fish Passage would be in Sutter County but would not be within 1,000 feet of residential receptors. Yolo County does not have a quantitative noise threshold in their general plan or regulations that are relevant to this Project (Yolo County 2009). As recommended by the *2030 Countywide General Plan* (2009), a noise analysis was performed for this project. Vibration levels from construction and maintenance activities are not anticipated to exceed the 72 VdB annoyance criteria in Sutter County. Therefore, Alternative 1 would be consistent with the general plans of Yolo and Sutter counties.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 1 would be **less than significant** because Alternative 1 construction, operation, and maintenance noise and vibration levels would be consistent with the general plans of Yolo and Sutter counties.

20.3.3.2.2 Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

Construction equipment associated with Alternative 1, such as pile drivers, drill rigs, dozers, and loaded trucks, would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures and sensitive receptors.

PPV levels during construction of the East Channel, Downstream Channel, West Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 1 are estimated to be less than 0.2 in/sec at 100 feet or more from the vibration source. There are no non-engineered timber and masonry buildings within these distances from the construction activities; therefore, construction activities are not anticipated to damage buildings.

Lv levels during construction associated with Alternative 1 are estimated to be less than 72 VdB at 510 feet or more from the vibration source. Although there are no residences within 510 feet of the construction areas, vibration on peak days would be caused mainly by loaded haul truck traffic. Residential receptors adjacent to the haul routes range from 60 to 550 feet from the centerline of the road and would be impacted significantly by the vibration of the roads. On peak construction days, there would be 668 haul trips and 404 construction worker trips. There would

be up to 112 daily worker trips and 801 daily haul truck trips associated with maintenance activities.

No long-term project operations would occur under Alternative 1 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 1 would be **significant** because vibrations from loaded haul trucks along the haul routes could exceed the annoyance threshold for adjacent residential receptors during construction and maintenance.

Mitigation Measure MM-NOI-1: Implement a Noise and Vibration Control Plan

A Noise and Vibration Control Plan (NVCP) will be developed by the construction and maintenance contractor prior to the start of any construction activities to address increased noise and vibration levels associated with Project implementation.

The NVCP will identify the procedures for predicting construction and maintenance noise levels at sensitive receptors and describe the reduction measures and best management practices required to minimize construction noise. The NVCP noise mitigation measures will include but not be limited to:

- All construction equipment shall be stored in a designated staging area during the construction phase to eliminate daily heavy-duty truck trips on local roadways.
- To achieve an hourly average noise level below 60 dBA, speed limits and limits on the number of passbys per hour shall be established and enforced for construction vehicle traffic on local roads adjacent to sensitive receptors to minimize traffic noise.
- Sound attenuation will be used or constructed to minimize noise levels. Potential sound attenuation measures could include but are not limited to stationary barriers placed between the source(s) of construction noise and noise-sensitive receptors. The feasible measures will be determined by the construction contractor based on an initial evaluation of each construction site.
- Contractor will be responsible for maintaining equipment to comply with noise standards (e.g., exhaust mufflers, acoustically attenuating shields, shrouds, or enclosures).
- The public will be kept informed of the construction hours and days.
- The contractor will provide contact information for filing complaints and respond to noise and vibration complaints. The contact information will be posted on the exterior of any sound barriers.
- A pre-construction meeting will be held with contractors and project managers to confirm that noise mitigation procedures are in place.
- All mitigation requirements will be included in bid documents and construction contracts.

Although implementation of Mitigation Measure MM-NOI-1 would reduce vibration impacts to residents, the high number of haul trucks on peak construction and maintenance days would not

reduce vibration levels to less than significant levels. Vibration impacts under Alternative 1 would remain **significant and unavoidable**.

20.3.3.2.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Construction impacts on ambient noise levels generated by Alternative 1 would be short-term and would not result in permanent increases in ambient noise levels. There would be no impact to the ambient noise levels that would result in a substantial permanent increase.

Operation of Alternative 1 would not require a continuous use of heavy equipment, and noise-generating equipment would be housed in a building, which would provide sufficient noise reduction. Operation of Alterative 1 is not anticipated to have a significant effect on the ambient noise levels. Maintenance activities, including road regrading, debris and vegetation removal, sediment removal, channel repairs, and other basic upkeep, would occur periodically throughout the year. These activities are not anticipated to have a significant effect on the ambient noise levels.

CEQA Conclusion

Permanent noise impacts under Alternative 1 would be **less than significant** because construction and maintenance of Alternative 1 would not cause a permanent increase in noise and operation of Alternative 1 would not cause a significant permanent increase in ambient noise levels.

20.3.3.2.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Noise from construction equipment would occur throughout the construction phase of Alternative 1. Ambient noise levels within the Project area would increase because of additional noise from construction equipment. Noise levels would vary, depending on the construction phasing and specific pieces of equipment in use at any given time. There are residences near the construction area and along the haul routes.

Noise levels during construction of the East Channel, Downstream Channel, West Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 1 are estimated to be less than the residential significance threshold of 70 dBA at 430 feet or more from the noise source. There are no residential receptors within 430 feet of the construction areas. An agricultural significance threshold of 80 dBA would be affected at 140 feet or less. However, there would be no agricultural receptors within 140 feet of the construction areas.

Haul and commute routes for Alternative 1 would include I-5, CR 117, and CR 16 for the East Channel, Downstream Channel, and Agricultural Road Crossing 1 components and I-5, CR 102, CR 16, and CR 116A for the West Supplemental Fish Passage. Currently, heavy equipment for agricultural uses travels on these county roads. On peak construction days, there would be 668 haul trips and 404 construction worker trips. The added trips to I-5 would not double the traffic on I-5 so the increase in traffic noise level would not be perceptible; however, county roads that do not have frequent existing traffic are expected to experience enough of a traffic increase to

double the traffic noise levels. The traffic noise increase would be significant for the residences along those roads.

Operation of the headworks and other facilities would not be expected to generate excessive noise that would exceed the significance criteria. Maintenance activities, such as sediment removal, may also require the use of heavy equipment and haul trucks. Heavy equipment use at the main channel, headworks structure, and buildings is not anticipated to exceed residential or agricultural significance thresholds. However, there may be up to 112 daily worker trips and 801 haul truck trips associated with maintenance activities. Similar to construction traffic impacts, receptors along county roads with infrequent traffic may experience a temporary significant increase in noise level.

CEQA Conclusion

Impacts from operation of the headworks and other facilities would be expected to be **less than significant**. However, temporary noise impacts under Alternative 1 would be **significant** because ambient noise levels for road-side receptors along the haul and commute routes could increase substantially from construction- and maintenance-related traffic.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise impacts, but it would not reduce noise levels to less than significant on peak construction days given the high number of haul trucks estimated for Alternative 1.

Temporary noise impacts under Alternative 1 would remain **significant and unavoidable**.

20.3.3.2.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

The Sacramento International Airport is located 2.5 miles southeast of the channel construction area. Although the Project area is within the airport's Traffic Pattern Area, the Project area lies just outside of the existing 60 dBA CNEL contour (Yolo County 2009) and well outside of the future projected 60 dBA CNEL contour (Yolo County 2009; SACOG 2013). Private airports are used infrequently; therefore, noise from private airports would not be excessive, and workers would not be exposed to excessive noise levels from the public and private airports.

CEQA Conclusion

Airport noise impacts under Alternative 1 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.3 Alternative 2: Central Gated Notch

Alternative 2, Central Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 2 is the location of the notch; Alternative 2 would site the notch near the center of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (14.8 feet) because the river is higher at this upstream location, and the gate would allow up to 6,000 cfs through to

provide open channel flow for adult fish passage. See Section 2.5 for more details on the alternative features.

20.3.3.3.1 Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the Center Channel, Downstream Channel, and Agricultural Road Crossing 1 would occur in Yolo County. The West Supplemental Fish Passage would be in Sutter County but would not be within 1,000 feet of sensitive receptors. The exposure of persons to noise and vibration levels under Alternative 2 from construction, operation, and maintenance would be the same as those discussed for Alternative 1.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 2 would be **less than significant** because Alternative 2 construction, operation, and maintenance noise and vibration levels would be consistent with the general plans of Yolo and Sutter counties.

20.3.3.3.2 Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

The exposure of person to groundborne vibration or noise under Alternative 2 would be the same as those discussed for Alternative 1. On peak construction days, there would be 599 haul trips and 446 construction worker trips. Maintenance activities would involve up to 112 daily worker trips and 802 haul truck trips. The vehicles from these trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

No long-term project operations would occur under Alternative 2 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 2 would be **significant** because vibrations from loaded trucks during construction and maintenance could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibrations to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 2.

Vibration impacts under Alternative 2 would remain **significant and unavoidable**.

20.3.3.3.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent increases in ambient noise levels under Alternative 2 would be the same as those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts under Alternative 2 would be **less than significant** because construction and maintenance of Alternative 2 would not cause permanent noise and operation of Alternative 2 would not cause a significant permanent increase in ambient noise levels.

20.3.3.3.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Temporary increases in ambient noise levels under Alternative 2 would be the same as those discussed for Alternative 1. Haul and commute routes would include I-5, CR 117, and CR 16 for the Center Channel, Downstream Channel, and Agricultural Road Crossing 1 components and I-5, CR 102, CR 16, and CR 116A for the West Supplemental Fish Passage. On peak construction days, there would be 599 haul trips and 446 construction worker trips. Operation of the headworks and other facilities would not be expected to generate excessive noise that would exceed the significance criteria. There would also be up to 112 daily worker trips and 802 haul truck trips associated with maintenance activities. The vehicles from these trips would increase ambient noise levels that may affect residential receptors adjacent to the haul routes.

CEQA Conclusion

Impacts from operation of the headworks and other facilities would be expected to be **less than significant.** Temporary noise impacts under Alternative 2 would be **significant** because ambient noise levels at road-side receptors could increase substantially from construction- and maintenance-related traffic.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise impacts, but it would not reduce noise levels to less than significant on peak construction days given the high number of haul trucks estimated for Alternative 2.

Temporary noise impacts under Alternative 2 would remain **significant and unavoidable**.

20.3.3.3.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure to airport noise levels under Alternative 2 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 2 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.4 Alternative 3: West Side Gated Notch

Alternative 3, West Side Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 3 is the location of the notch; Alternative 3 would site the notch on the western side of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (16.1 feet)

because the river is higher at this upstream location. Alternative 3 would allow up to 6,000 cfs through the gated notch to provide open channel flow for adult fish passage. See Section 2.6 for more details on the alternative features.

20.3.3.4.1 Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the East Supplemental Fish Passage, Downstream Channel, and Agricultural Road Crossing 1 would occur in Yolo County. Yolo County does not have a quantitative noise threshold in their general plan or regulations (Yolo County 2009). As recommended by the *2030 Countywide General Plan* (2009), a noise analysis was performed for this project.

The West Channel construction would partially occur in Sutter County and would be within 1,000 feet of sensitive receptors. Construction is estimated to occur between 7:00 a.m. and 6:00 p.m. Monday through Saturday. Sutter County limits construction activities within 1,000 feet of sensitive receptors to between 7:00 a.m. and 6:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays. Construction activities on Saturdays may occur outside of the Sutter County allowed hours. Vibration levels at the closest sensitive receptors at 700 feet from the construction area would be approximately 81 VdB, approximately nine VdB above the annoyance threshold of 72 VdB. Vibration levels from maintenance activities at the closest sensitive receptors would be approximately 78 VdB, approximately six VdB above the annoyance threshold of 72 VdB. Operation is not anticipated to have a significant effect on the ambient noise or vibration levels and therefore would not be expected to exceed standards adopted by Sutter County.

Alternative 3 would be consistent with Yolo County's General Plan but would not be consistent with the Sutter County General Plan.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 3 would be **significant** because Alternative 3 construction noise would not be consistent with the Sutter County General Plan.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise and vibration levels, but not enough to reduce to less than significant levels.

Noise and vibration impacts associated with Alternative 3 construction would remain **significant and unavoidable**.

20.3.3.4.2 Impact NOI-2: Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Construction equipment associated with Alternative 3, such as pile drivers, drill rigs, dozers, and loaded trucks, would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures and sensitive receptors.

PPV levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 3 are estimated to be less than 0.2 in/sec at 100 feet or more from the vibration source. There are no non-engineered

timber and masonry buildings within these distances from the construction activities; therefore, construction activities are not anticipated to damage buildings.

There is a residential receptor approximately 700 feet from proposed West Channel construction activities. At the receptor, Lv would be approximately 81 VdB, which is above the annoyance threshold of 72 VdB; therefore, construction activities would likely cause human annoyance. Vibration on peak days would be caused mainly by loaded haul truck traffic. Residential receptors adjacent to the haul routes range from 60 to 550 feet from the centerline of the road and would be impacted significantly. On peak construction days, there would be 597 haul trips and 554 construction worker trips. There would also be up to 114 daily worker trips and 840 haul truck trips associated with maintenance activities. The vehicles from these trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

Maintenance activities would result in an Lv of approximately 78 VdB at the receptor closest to the West Channel, which would be above the annoyance threshold and would be significant. No long-term project operations would occur under Alternative 3 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 3 would be **significant** because vibrations from loaded haul trucks traveling along the haul routes and to the West Channel during construction and maintenance activities could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibrations to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 3.

Vibration impacts under Alternative 3 would remain **significant and unavoidable**.

20.3.3.4.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent ambient noise increases under Alternative 3 would be the same as those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts under Alternative 3 would be **less than significant** because construction and maintenance of Alternative 3 would not cause permanent noise and operation of Alternative 3 would not cause a significant permanent increase in ambient noise levels.

20.3.3.4.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Noise from construction equipment would occur throughout the construction phase of this proposed alternative. Ambient noise levels within the Project area would increase because of additional noise from construction equipment. Noise levels would vary, depending on the

construction phasing and specific pieces of equipment in use at any given time. There are residences near the construction area and haul routes.

Noise levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 3 are estimated to be less than the residential significance threshold of 70 dBA at 430 feet or more from the noise source. The closest residential receptor to the West Channel would be 700 feet, and noise level at this receptor would be approximately 70 dBA, which would not exceed the residential significance threshold of 70 dBA. The agricultural significance threshold of 80 dBA would be impacted at 140 feet or less. However, there would be no agricultural receptors within 140 feet of the construction areas.

Haul and commute routes would include I-5, CR 117, and CR 16 for the East Supplemental Fish Passage, Downstream Channel, and Agricultural Road Crossing 1 components and I-5, CR 102, CR 16, and CR 116A for the West Channel. Currently, heavy equipment for agricultural uses travels on these county roads. On peak days, there would be 597 haul trips and 554 construction worker trips. The added trips to I-5 would not double the traffic on I-5, so the increase in traffic noise level would not be perceptible; however, county roads that do not have frequent existing traffic are expected to experience enough of a traffic increase to double the traffic noise levels. Traffic noise increases would be significant for the residences along those roads.

Operation of the headworks and other facilities would not be expected to generate excessive noise that would exceed the significance criteria. Maintenance activities, if dewatering and sediment removal are required, may also require the use of heavy equipment and haul trucks. Heavy equipment use at the main channel, headworks structure, and buildings is not anticipated to exceed residential or agricultural significance thresholds. However, there may be up to 114 daily worker trips and 840 haul truck trips associated with maintenance activities. Similar to construction traffic impacts, receptors along county roads with infrequent traffic may experience temporary significant increases in noise levels.

CEQA Conclusion

Impacts from operation of the headworks and other facilities would be expected to be **less than significant**. Temporary noise impacts under Alternative 3 would be **significant** because ambient noise levels for road-side receptors along the haul and commute routes could increase substantially from construction- and maintenance-related traffic.

With implementation of the NVCP included in Mitigation Measure MM-NOI-1, up to a 10-dBA reduction could be achieved with a physical noise barrier; therefore, implementation of mitigation measure MM-NOI-1 would reduce the noise levels from construction equipment at the residential receptor to a less than significant level. Although Mitigation Measure MM-NOI-1 would also reduce noise levels from construction and maintenance traffic, it would not be enough to reduce noise levels to less than significant levels.

Temporary traffic noise impacts under Alternative 3 would remain **significant and unavoidable**.

20.3.3.4.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure of people to airport noise under Alternative 3 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 3 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.5 Alternative 4: West Side Gated Notch – Managed Flow

Alternative 4, West Side Gated Notch – Managed Flow, would have a smaller amount of flow entering the Yolo Bypass through the gated notch in Fremont Weir than some other alternatives, but it would incorporate water control structures to maintain inundation for longer periods of time within the northern portion of the Yolo Bypass. Alternative 4 would include the same gated notch and associated facilities as described for Alternative 3; however, it would be operated to limit the maximum inflow to 3,000 cfs. See Section 2.7 for more details on the alternative features.

20.3.3.5.1 Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the East Supplemental Fish Passage, Downstream Channel, Agricultural Road Crossing 1, and Northern and Southern Water Control structures and fish bypass channels would occur in Yolo County. Yolo County does not have a quantitative noise threshold in their General Plan or regulations (Yolo County 2009). As recommended by the *2030 Countywide General Plan* (2009), a noise analysis was performed for this project.

The West Channel construction would be partially located in Sutter County and within 1,000 feet of sensitive receptors. Construction is anticipated to occur between 7:00 a.m. and 6:00 p.m. Monday through Saturday. Sutter County limits construction activities within 1,000 feet of sensitive receptors to between 7:00 a.m. and 6:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays. Vibration levels from construction of the West Channel and the Southern Water Control Structure and fish bypass channels would be approximately 81 VdB and 75 VdB, respectively. They would exceed the annoyance threshold of 72 VdB. Vibration levels from maintenance activities at the closest sensitive receptors would be approximately 78 VdB, approximately six VdB above the annoyance threshold of 72 VdB. Operation is not anticipated to have a significant effect on the ambient noise or vibration levels and therefore would not be expected to exceed standards adopted by Sutter County.

Alternative 4 would be consistent with the General Plan of Yolo County but would not be consistent with the General Plan of Sutter County.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 4 construction would be **significant** because Alternative 4 would not be consistent with the General Plan of Sutter County.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce construction noise and vibration levels but not enough to reduce to less than significant levels.

Noise and vibration impacts associated with Alternative 4 construction would remain **significant and unavoidable**.

20.3.3.5.2 Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

Construction equipment associated with Alternative 4, such as pile drivers, drill rigs, dozers, and loaded trucks, would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures and sensitive receptors.

PPV levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, Agricultural Road Crossing 1, and Northern and Southern Water Control structures and fish bypass channel associated with Alternative 4 are estimated to be less than 0.2 in/sec at 100 feet or more from the vibration source. There are no non-engineered timber and masonry buildings within these distances from the construction activities; therefore, construction activities are not anticipated to damage buildings.

There is a residential receptor approximately 700 feet from the proposed West Channel construction activities. At this receptor, Lv would be approximately 81 VdB, which is above the annoyance threshold of 72 VdB; therefore, construction activities would likely cause human annoyance. Lv at the nearest residential receptor to the Southern Water Control Structure and fish bypass channel also would exceed the annoyance threshold at 75 VdB. Vibration on peak activity days would be caused mainly by loaded haul truck traffic. Residential receptors adjacent to the haul routes range from 60 to 550 feet from the centerline of the road and would be impacted significantly. On peak construction days, there would be 1,645 haul trips and 726 construction worker trips. There would also be up to 178 daily worker trips and 1,719 haul truck trips associated with maintenance activities. The vehicles from these trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

No long-term project operations would occur under Alternative 4 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 4 during construction and maintenance would be **significant** because vibration from loaded haul trucks could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibration to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 4.

Vibration impacts under Alternative 4 would remain **significant and unavoidable**.

20.3.3.5.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent increase in ambient noise levels under Alternative 4 would be the same as those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts under Alternative 4 would be **less than significant** because construction and maintenance of Alternative 4 would not cause permanent noise and operation of Alternative 4 would not cause a significant permanent increase in ambient noise levels.

20.3.3.5.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Noise from construction equipment would occur throughout the construction phase of this proposed alternative. Ambient noise levels within the Project area would increase because of additional noise from construction equipment. Noise levels would vary, depending on the construction phasing and specific pieces of equipment in use at any given time. There are residences near the construction area and haul routes.

Noise levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 4 are estimated to be less than the residential significance threshold of 70 dBA at 430 feet or more from the noise source. The closest residential receptor to the West Channel would be 700 feet, and noise level at the receptor would be approximately 70 dBA, which would not exceed the residential significance threshold of 70 dBA. Agricultural significance threshold of 80 dBA would be impacted at 140 feet or less. However, there would be no agricultural receptors within 140 feet of the construction areas.

Haul and commute routes would include I-5, CR 117, and CR 16 for the East Supplemental Fish Passage, Downstream Channel, and Agricultural Road Crossing 1 components; I-5, CR 102, CR 16, and CR 116A for the West Channel; and I-5, CR 117, CR 22, CR 102, and/or CR 28 for the Northern and Southern Water Control structures and fish bypass channels. Currently, heavy equipment for agricultural uses travels on these county roads. On peak days, there would be 1,645 haul trips and 726 construction worker trips. The added trips to I-5 would not double the traffic on I-5, so the increase in traffic noise level would not be perceptible; however, county roads that do not have frequent existing traffic are expected to experience enough of a traffic increase to double the traffic noise levels. Traffic noise increases would be significant for the residences along those roads.

Operation of the headworks and other facilities would not be expected to generate excessive noise that would exceed the significance criteria. Maintenance activities, if dewatering and sediment removal are required, may require the use of heavy equipment and haul trucks. Heavy equipment use, at the main channel, headworks structure, and buildings, is not anticipated to exceed residential or agricultural significance thresholds. However, there may be up to 178 daily worker trips and 1,719 haul truck trips associated with maintenance activities. Similar to construction traffic impacts, receptors along county roads with infrequent traffic may experience temporary significant increases in noise level.

CEQA Conclusion

Impacts from operation of the headworks and other facilities would be expected to be **less than significant.** Temporary noise impacts under Alternative 4 would be **significant** because ambient noise levels for road-side receptors along the haul and commute routes could increase substantially from construction- and maintenance-related traffic.

With implementation of the NVCP included in Mitigation Measure MM-NOI-1, up to a 10-dBA reduction could be achieved with a physical noise barrier; therefore, implementation of mitigation measure MM-NOI-1 would reduce the noise levels from construction equipment at the residential receptor to a less than significant level. Although Mitigation Measure MM-NOI-1 would also reduce noise levels from construction and maintenance traffic, it would not be enough to reduce to less than significant levels.

Temporary noise impacts under Alternative 4 would remain **significant and unavoidable**.

20.3.3.5.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure of people to airport noise under Alternative 4 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 4 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.6 Alternative 5: Central Multiple Gated Notches

Alternative 5, Central Multiple Gated Notches, would improve the entrainment of fish by using multiple gates and intake channels so that the deeper gate could allow more flow to enter the bypass when the river is at lower elevations. Flows would move to other gates when the river is higher to control inflows. Alternative 5 incorporates multiple gated notches in the central location on the existing Fremont Weir that would allow combined flows of up to 3,400 cfs. See Section 2.8 for more details on the alternative features.

20.3.3.6.1 Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the Center Channel and Agricultural Road Crossing 1 would occur in Yolo County. The West Supplemental Fish Passage would be located in Sutter County but would not be within 1,000 feet of sensitive receptors. Exposure of persons to noise and vibration under Alternative 5 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 5 construction, operation, and maintenance would be **less than significant** because Alternative 5 would be consistent with the general plans of Yolo and Sutter counties.

20.3.3.6.2 Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

Exposure of persons to groundborne vibration and noise levels under Alternative 5 would be the same as that discussed for Alternative 1. On peak construction days, there would be 634 haul trips and 598 construction worker trips. There would also be up to 114 daily worker trips and 784 haul truck trips associated with maintenance activities. The vehicles from these trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

No long-term project operations would occur under Alternative 5 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 5 would be **significant** because vibrations from loaded haul trucks during construction and maintenance could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibrations to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 5.

Vibration impacts under Alternative 5 would remain **significant and unavoidable**.

20.3.3.6.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent increases in ambient noise levels under Alternative 5 would be the same as those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts associated with Alternative 5 would be **less than significant** because construction and maintenance of Alternative 5 would not cause permanent noise and operation of Alternative 5 would not cause a significant permanent increase in ambient noise levels.

20.3.3.6.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Temporary increases in ambient noise under Alternative 5 would be the same as those discussed for Alternative 1. Haul and commute routes would include I-5, CR 117, and CR 16 for the Center Channel and Agricultural Road Crossing 1 components and I-5, CR 102, CR 16, and CR 116A for the West Supplemental Fish Passage. On peak construction days, there would be 634 haul

trips and 598 construction worker trips. Operation of the headworks and other facilities would not be expected to generate excessive noise that would exceed the significance criteria. There would also be up to 114 daily worker trips and 784 haul truck trips associated with maintenance activities. The vehicles from these trips would increase ambient noise levels that may affect residential receptors adjacent to the haul routes.

CEQA Conclusion

Impacts from operation of the headworks and other facilities would be expected to be **less than significant**. Temporary noise impacts under Alternative 5 would be **significant** because ambient noise levels at road-side receptors could increase substantially from construction- and maintenance-related traffic.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise impacts, but it would not reduce noise levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 5.

Temporary noise impacts under Alternative 5 would remain **significant and unavoidable**.

20.3.3.6.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure to airport noise under Alternative 5 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 5 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.6.6 Tule Canal Floodplain Improvements (Program Level)

As described in Section 2.8.1.7, Alternative 5 would include floodplain improvements along Tule Canal, just north of I-80. These improvements would not be constructed at the same time as the remaining facilities. They are included at a program level of detail to consider all the potential impacts and benefits of Alternative 5. Subsequent consideration of environmental impacts would be necessary before construction could begin.

Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the Tule Canal Floodplain Improvements would occur in Yolo County. Yolo County does not have a quantitative noise threshold in their General Plan or regulations that are relevant to this Project (Yolo County 2009).

CEQA Conclusion

Noise and vibration impacts under Alternative 5 associated with the Tule Canal Floodplain Improvements would be **less than significant** because the Tule Canal Floodplain Improvements would be consistent with the General Plan of Yolo County.

Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

Exposure of persons to groundborne vibration or noise levels under the Tule Canal Floodplain Improvements would be similar to that discussed under Alternative 1. Vehicles from construction and maintenance trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

No long-term project operations would occur with the Tule Canal Floodplain Improvements that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 5 associated with the Tule Canal Floodplain Improvements would be **significant** because vibrations from loaded haul trucks during construction and maintenance could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibrations to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Tule Canal Floodplain Improvements (truck volumes assumed to be equivalent to Alternative 5).

Vibration impacts from the Tule Canal Floodplain Improvements would remain **significant and unavoidable**.

Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent increases in ambient noise levels under the Tule Canal Floodplain Improvements would be similar to those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts under Alternative 5 associated with the Tule Canal Floodplain Improvements would be **less than significant** because construction and maintenance of the Tule Canal Floodplain Improvements would not cause permanent noise and operation of the Tule Canal Floodplain Improvements would not cause a significant permanent increase in ambient noise levels.

Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Temporary increases in ambient noise levels under the Tule Canal Floodplain Improvements would be similar to those discussed for Alternative 1. Haul and commute routes would include

I-5, CR 102, and CR 28H for the Tule Canal Floodplain Improvements, which are the same routes that would be used for the Southern Water Control Structure associated with Alternative 4. Vehicles from construction and maintenance trips would increase ambient noise levels that may affect residential receptors adjacent to the haul routes. Residential receptors on CR 102 are as close as 130 feet from the centerline of the road.

CEQA Conclusion

Temporary noise impacts under Alternative 5 associated with the Tule Canal Floodplain Improvements would be **significant** because ambient noise levels at road-side receptors could increase substantially from construction- and maintenance-related traffic.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise impacts, but it would not reduce noise levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Tule Canal Floodplain Improvements.

Temporary noise impacts from the Tule Canal Floodplain Improvements would remain **significant and unavoidable**.

Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure to airport noise under the Tule Canal Floodplain Improvements would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 5 associated with the Tule Canal Floodplain Improvements would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.3.7 Alternative 6: West Side Large Gated Notch

Alternative 6, West Side Large Gated Notch, is a large notch in the western location that would allow flows up to 12,000 cfs. It was designed with the goal of entraining more fish while allowing more flow into the bypass when the Sacramento River is at lower elevations. See Section 2.9 for more details on the alternative features.

20.3.3.7.1 Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies

Construction of the East Supplemental Fish Passage, Downstream Channel, and Agricultural Road Crossing 1 would occur in Yolo County. Yolo County does not have a quantitative noise threshold in their General Plan or regulations (Yolo County 2009). As recommended by the *2030 Countywide General Plan* (2009), a noise analysis was performed for this project.

The West Channel construction would be partially located in Sutter County and within 1,000 feet of sensitive receptors. Construction is anticipated to occur between 7:00 a.m. and 6:00 p.m.

Monday through Saturday. Sutter County limits construction activities within 1,000 feet of sensitive receptors to between 7:00 a.m. and 6:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays. Vibration levels at the closest sensitive receptors at 700 feet from the construction area would be approximately 81 VdB, approximately nine VdB above the annoyance threshold of 72 VdB. Vibration levels from maintenance activities at the closest sensitive receptors would be approximately 78 VdB, approximately six VdB above the annoyance threshold of 72 VdB. Operation is not anticipated to have a significant effect on the ambient noise or vibration levels and therefore would not be expected to exceed standards adopted by Sutter County.

Alternative 6 would be consistent with the General Plan of Yolo County but would not be consistent with the General Plan of Sutter County.

CEQA Conclusion

Noise and vibration impacts associated with Alternative 6 would be **significant** because Alternative 6 would not be consistent with the General Plan of Sutter County.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise and vibration levels but not enough to reduce to less than significant levels.

Noise and vibration impacts associated with Alternative 6 would remain **significant and unavoidable**.

20.3.3.7.2 Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels

Construction equipment associated with Alternative 6, such as pile drivers, drill rigs, dozers, and loaded trucks, would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures and sensitive receptors.

PPV levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 6 are estimated to be less than 0.2 in/sec at 100 feet or more from the vibration source. There are no non-engineered timber and masonry buildings within these distances from the construction activities; therefore, construction activities are not anticipated to damage buildings.

There is a residential receptor approximately 700 feet from the West Channel construction activities. At the receptor, Lv would be approximately 89 VdB, which is above the annoyance threshold of 72 VdB; therefore, construction activities would likely cause human annoyance. Vibration on peak days would be caused mainly by loaded haul truck traffic. Residential receptors adjacent to the haul routes range from 60 to 550 feet from the centerline of the road and would be impacted significantly. On peak construction days, there would be 895 haul trips and 828 construction worker trips. There would also be up to 138 daily worker trips and 1,247 haul truck trips associated with maintenance activities. The vehicles from these trips would generate vibrations that could result in groundborne noise or vibration that may affect residential receptors adjacent to the haul routes.

No long-term project operations would occur under Alternative 6 that would generate excessive vibrations or groundborne noise or otherwise expose buildings or persons to such impacts.

CEQA Conclusion

Vibration impacts under Alternative 6 would be **significant** because vibration from loaded haul trucks during construction and maintenance could exceed the annoyance threshold.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce the impacts of vibration to residents, but it would not reduce vibration levels to less than significant on peak construction and maintenance days given the high number of haul trucks estimated for Alternative 6.

Vibration impacts under Alternative 6 would remain **significant and unavoidable**.

20.3.3.7.3 Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity

Permanent increases in ambient noise levels under Alternative 6 would be the same as those discussed for Alternative 1.

CEQA Conclusion

Permanent noise impacts under Alternative 6 would be **less than significant** because construction and maintenance of Alternative 6 would not cause permanent noise and operation of Alternative 6 would not cause a significant permanent increase in ambient noise levels.

20.3.3.7.4 Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity

Noise from construction equipment would occur throughout the construction phase of this proposed alternative. Ambient noise levels within the Project area would increase because of additional noise from construction equipment. Noise levels would vary, depending on the construction phasing and specific pieces of equipment in use at any given time. There are residences near the construction area and haul routes.

Noise levels during construction of the West Channel, Downstream Channel, East Supplemental Fish Passage, and Agricultural Road Crossing 1 associated with Alternative 6 are estimated to be at or less than the residential significance threshold of 70 dBA at 370 feet or more from the noise source. There are no residential receptors within 370 feet of the construction areas. Agricultural significance threshold of 80 dBA would be impacted at 140 feet or less. However, there would be no agricultural receptors within 140 feet of the construction areas.

Haul and commute routes would include I-5, CR 117, and CR 16 for East Supplemental Fish Passage, Downstream Channel, and Agricultural Road Crossing 1 components and I-5, CR 102, CR 16, and CR 116A for the West Channel. Currently, heavy equipment for agricultural uses travels on these county roads. On peak days, there would be 895 haul trips and 828 construction worker trips. The added trips to I-5 would not double the traffic on I-5, so the increase in traffic noise level would not be perceptible; however, county roads that do not have frequent existing traffic are expected to experience enough of a traffic increase to double the traffic noise levels. Traffic noise increases would be significant for the residences along those roads.

If dewatering and sediment removal are required under Alternative 6, then the use of heavy equipment and haul trucks may also be required. Heavy equipment use at the main channel,

headworks structure, and buildings is not anticipated to exceed residential or agricultural significance thresholds. However, there may be up to 138 daily worker trips and 1,247 haul truck trips associated with maintenance activities. Similar to construction traffic impacts, receptors along county roads with infrequent traffic may experience temporary significant increases in noise level.

CEQA Conclusion

Temporary noise impacts under Alternative 6 would be **significant** because ambient noise levels could increase substantially from construction and maintenance noise.

Implementation of the NVCP included in Mitigation Measure MM-NOI-1 would reduce noise levels from construction traffic but not enough to reduce to less than significant levels.

Temporary noise impacts under Alternative 6 would remain **significant and unavoidable**.

20.3.3.7.5 Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports

Exposure to airport noise under Alternative 6 would be the same as that discussed for Alternative 1.

CEQA Conclusion

Airport noise impacts under Alternative 6 would be **less than significant** because people residing or working in the Project area would not be exposed to excessive noise levels from public or private airports.

20.3.4 Summary of Impacts

Table 20-6 provides a summary of the identified noise and vibration impacts for construction, operation, and maintenance of the Project.

Table 20-6. Summary of Impacts and Mitigation Measures – Noise

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Impact NOI-1: Exposure of persons to, or generation of, noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies	No Action	NI	---	NI
	1, 2, 5 (Project), 5 (Program)	LTS	---	LTS
	3, 4, 6	S	MM-NOI-1	SU

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Impact NOI-2: Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels	No Action	NI	---	NI
	All Action Alternatives	S	MM-NOI-1	SU
Impact NOI-3: A substantial permanent increase in ambient noise levels in the Project vicinity	No Action	NI	---	NI
	All Action Alternatives	LTS	---	LTS
Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity	No Action	NI	---	NI
	All Action Alternatives	S	MM-NOI-1	SU
Impact NOI-5: Exposure of people residing or working in the Project area to excessive noise levels from public or private airports	No Action	NI	---	NI
	All Action Alternatives	LTS	---	LTS

Key: LTS = less than significant; NI = no impact; S = significant; SU = significant and unavoidable

20.4 Cumulative Impacts Analysis

This section presents the cumulative impacts analysis for noise and vibration. Section 3.3 presents an overview of the cumulative impacts analysis, including the methodology and the projects, plans, and programs considered in the cumulative impacts analysis.

20.4.1 Methodology

This evaluation of cumulative impacts for noise considers the effects of the Project and how they may combine with the impacts of other past, present, and future projects or actions to create significant impacts on specific resources. The area of analysis for these cumulative effects includes the Project area. For noise and vibration impacts, sources beyond one-half mile are not likely to have cumulative effects. The timeframe for this cumulative analysis includes the past, present, and probable future projects producing related or cumulative impacts that have been identified in the area of analysis.

This cumulative impacts analysis utilizes the project analysis approach described in detail in Section 3.3, *Cumulative Impacts*. The cumulative project included in this analysis is the Lower Elkhorn Basin Levee Setback (LEBLS) Project. The project would provide improved public safety and system resiliency as part of the *2012 Central Valley Flood Protection Plan* by implementing levee setbacks in the Lower Elkhorn Basin.

20.4.2 Cumulative Impacts

Related and reasonably foreseeable projects and actions may result in noise impacts in the Project area. Although significant and unavoidable impacts would occur for all action alternatives, noise impacts are only cumulative if they are in the same vicinity because noise levels decrease with distance. Therefore, only proposed project elements located near the LEBLS Project were evaluated for cumulative impacts.

In particular, levee removal and relocation that could occur during construction of the LEBLS Project may result in additional construction activities along Tule Canal. Improvements to the Southern Water Control Structure and fish bypass channel and the Tule Canal Floodplain that would occur in the same vicinity under the action alternatives would result in significant cumulative noise impacts when combined with the LEBLS Project. The other construction activities would not be located close enough to the Lower Elkhorn Basin to contribute to the significant cumulative impact.

Because construction activities under Alternative 4 and Alternative 5 that would occur in the Lower Elkhorn Basin would be significant and unavoidable, the action alternatives' incremental contributions to the significant cumulative impacts associated with noise **would be cumulatively considerable.**

20.5 References

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21 Population and Housing

This chapter assesses the potential effects on population and housing that would occur from the implementation of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) alternatives. The discussion of existing conditions and the potential impacts of the alternatives on population and housing encompasses the Project area and the cities of Davis, Sacramento, West Sacramento, and Woodland.

21.1 Environmental Setting/Affected Environment

The following section presents the available data on population and housing characteristics. The indicators of overall economic health of the housing market in an area of analysis help assess the capacity for communities to accommodate population growth that could result from the alternatives. This section presents demographic and housing information from the American Community Survey (ACS) at the State of California (State), county, and city level. Communities in Yolo and Sacramento counties were analyzed for their potential to temporarily house workers during the construction period.

21.1.1 Yolo County

Project alternatives would be constructed within Yolo County for 28 weeks. It is assumed that some portion of the workers could reside temporarily within the vicinity of the Project area, which could include areas within Yolo County, particularly the cities of Davis, West Sacramento, and Woodland.

21.1.1.1 Demographic Data

Yolo County age demographics have a similar trend to the demographics of the State. In Yolo County, 78.1 percent of the population was over 18 years of age and 11 percent over the age of 65, according to the 2015 ACS Estimate. Similarly, in the State of California, 76.1 percent of the population was over 18 years of age and 12.5 percent over the age of 65 (United States Census Bureau 2015a).

Table 21-1. Age Demographics for Yolo County, 2015

	City of Davis		City of West Sacramento		City of Woodland		Yolo County	
	Estimate	Percent	Estimate	Percent	Estimate	Percent	Estimate	Percent
Total Population	66,510	-	50,747	-	56,997	-	207,320	-
18 years and older	55,624	83.6%	37,561	74%	41,962	73.6%	161,954	78.1%
65 years and older	6,249	9.4%	5,658	11.1%	6,913	12.1%	22,757	11%
Median Age	25.6 years	-	33.5 years	-	35.1 years	-	30.9 years	-

Source: United States Census Bureau 2015a

21.1.1.2 Housing Data

Table 21-2 presents housing information for Yolo County and the cities of Davis, West Sacramento, and Woodland. According to the United States Census Bureau in 2015, Yolo County had 76,090 housing units, of which 94.6 percent were occupied. Renters occupied 34,493 units while owners occupied 37,504 units (United States Census Bureau 2015b). The ACS estimated that median monthly rent in Yolo County was $1,102.

Table 21-2. Housing Estimates for Yolo County, City of Davis, City of West Sacramento, and City of Woodland, 2015

	Yolo County		City of Davis		City of West Sacramento		City of Woodland	
	Estimate	Percent	Estimate	Percent	Estimate	Percent	Estimate	Percent
Occupied Housing Units	71,997	94.6%	24,428	96.2%	17,930	95.1%	19,547	93.8%
Vacant Housing Units	4,093	5.4%	953	3.8%	924	4.9%	1,292	6.2%
Owner-Occupied	37,504	52.1%	10,615	43.5%	9,632	53.7%	10,963	56.1%
Renter-Occupied	34,493	47.9%	13,813	56.5%	8,298	46.3%	8,584	43.9%
Median Monthly Rent	$1,102	-	$1,249	-	$895	-	$965	-

Source: United States Census Bureau 2015b

Table 21-3 provides the typical travel distance to Fremont Weir.

Table 21-3. Typical Commute Distances from Davis, West Sacramento, and Woodland to Fremont Weir [1] (miles)

	Davis	West Sacramento	Woodland
Fremont Weir	25.8	21.2	18.8

[1]Distances were approximated using Google Maps and are only accurate to within five miles.

21.1.2 Sacramento County

Project alternatives would be constructed within two miles of Sacramento County for 28 weeks. If needed, it is assumed that some portion of the workers could also be housed temporarily near the Project area in Sacramento County, particularly within the City of Sacramento.

21.1.2.1 Demographic Data

Sacramento County age demographics have a trend similar to the demographics of the State (see Table 21-4). In Sacramento County, 75.4 percent of the population was over 18 years of age and 12.4 percent over the age of 65, according to the 2015 ACS Estimate. Similarly, in the State, 76.1 percent of the population was over 18 years of age and 12.5 percent over the age of 65 (United States Census Bureau 2015a).

Table 21-4. 2015 Age Demographics for Sacramento County

	City of Sacramento		Sacramento County		State of California	
	Estimate	Percent	Estimate	Percent	Estimate	Percent
Total Population	480,566	-	1,465,832	-	38,421,464	-
18 years and older	365,945	76.1%	1,105,088	75.4%	29,247,121	76.1%
65 years and older	56,513	11.8%	181,287	12.4%	4,797,320	12.5%
Median Age	34 years	-	35.5 years	-	35.8 years	-

Source: United States Census Bureau 2015a

21.1.2.2 Housing Data

Table 21-5 presents the housing information for Sacramento County and the City of Sacramento. According to the United States Census Bureau, in 2015, Sacramento County had 560,271 housing units, of which approximately 93.3 percent were occupied. Renters occupied 232,990 units while owners occupied 289,606 units (United States Census Bureau 2015b). The median monthly rent in Sacramento County was $1,036.

Table 21-5. Housing Estimates for Sacramento County, City of Sacramento, 2015

	Sacramento County		City of Sacramento	
	Estimate	Percent	Estimate	Percent
Occupied Housing Units	522,596	93.3%	178,185	92.2%
Vacant Housing Units	37,675	6.7%	15,113	7.8%
Owner-Occupied	289,606	55.4%	84,129	47.2%
Renter-Occupied	232,990	44.6%	94,056	52.8%
Median Monthly Rent	$1,036	-	$1,022	-

Source: United States Census Bureau 2015b

Table 21-6 provides the typical travel distance from the City of Sacramento to Fremont Weir.

Table 21-6. Typical Commute Distances from City of Sacramento to the Fremont Weir Area[1] (miles)

	City of Sacramento
Fremont Weir Area	22.5

[1]Distances were approximated using Google Maps and are only accurate to within five miles.

21.2 Regulatory Setting

Regulations at the Federal, State, and local levels regarding housing are generally concerned with the proper construction, provision, and siting of housing for a variety of incomes. The project alternatives do not call for the construction of new homes or the demolition of existing homes; therefore, the regulations pertaining to housing do not apply.

21.3 Environmental Consequences

This section provides information about the environmental consequences of the project alternatives on population and housing. This section describes the methodology, criteria for determining significance of effects, and environmental consequences and mitigation measures associated with effects of each alternative. Detailed descriptions of the alternatives evaluated in this section are provided in Chapter 2, *Description of Alternatives*.

21.3.1 Methods for Analysis

This analysis uses both qualitative and quantitative methods to determine the effects on population and housing. Effects considered are related to availability of temporary housing for non-local construction workers and whether the use of housing by construction workers would impact the local housing market. Implementation of the alternatives would not require any land acquisition that would necessitate the relocation of housing units. The project description includes preliminary estimates of the numbers of workers required for construction actions. This analysis compares the housing needs associated with these workers with the existing demographics and housing statistics described in Section 21.2, *Environmental Setting*.

Impacts to population and housing are determined relative to existing conditions (for California Environmental Quality Act [CEQA]) and the No Action Alternative (for the National Environmental Policy Act). However, as described below, the No Action Alternative would be the same as existing conditions because population and housing would follow current trends and are not anticipated to experience substantive changes in the area of analysis. Therefore, the analysis compares the impacts of the action alternatives only to existing conditions.

21.3.2 Thresholds of Significance – CEQA

The thresholds of significance for impacts are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. The project would be considered to have significant impacts if it would result in any of the conditions listed below.

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

These thresholds also encompass the factors taken into account under the National Environmental Policy Act to determine the significance of an action in terms of its context and the intensity of its impacts. It is assumed that the temporary workers would mostly come from outside of the region. The Project area is rural with few residences in the vicinity; therefore, the Project would result in no impact related to the displacement of people or displacement of existing housing. These impacts are not evaluated further.

The threshold for significance that was further evaluated was the potential for the implementation of the project alternatives to induce substantial growth in the area, either directly by proposing new homes for the temporary workers.

Significant impacts on population and housing would result if the project resulted in substantial population growth in the area of analysis. This analysis considers whether population and household growth would occur with implementation of the Project, specifically, whether this growth would be within the forecasts for the communities in Yolo and Sacramento counties and/or can be considered substantial with respect to the remaining growth potential in those communities.

21.3.3 Effects and Mitigation Measures

This section provides an evaluation of the direct and indirect effects on population and housing from implementing the Project alternatives. This analysis is organized by Project alternative, with specific impact topics numbered sequentially under each alternative.

21.3.3.1 No Action Alternative

Under the No Action Alternative, the Project would not be implemented, and none of the Project features would be developed in the Project area. The No Action Alternative would not require any construction and would not affect population and housing in the area.

21.3.3.1.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

The No Action Alternative would not result in construction activities taking place in the Project area. There would be no influx of temporary workers near the Project area and no impacts on population and housing. Population and housing would follow current trends.

CEQA Conclusion

There would be **no impact** to population and housing associated with the No Action Alternative because population and housing would follow current trends.

21.3.3.2 Alternative 1: East Side Gated Notch

Alternative 1, East Side Gated Notch, would allow increased flow from the Sacramento River to enter the Yolo Bypass through a gated notch on the east side of Fremont Weir. The invert of the new notch would be at an elevation of 14 feet, which is approximately 18 feet below the existing Fremont Weir crest. Alternative 1 would allow up to 6,000 cubic feet per second (cfs) to flow through the notch during periods when the river levels are not high enough to go over the crest of

Fremont Weir to provide open channel flow for adult fish passage. See Section 2.4 for more details on the alternative features.

21.3.3.2.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Construction likely would begin in late 2020 or early 2021 and is estimated to last 28 weeks, with peak construction periods requiring up to 202 workers for one week in mid-July. The project element that would take the longest to construct would be the headworks structure. The number of workers per week would range from 9 to 202, depending on the construction activities involved. The number of personnel required was identified based on key project components and assumed a standard 10-hour shift work day and 6-day work week.

To be conservative, it was assumed that all workers would come from outside the region and would require housing. However, it is expected that most workers would come from within the region because there is a limited need for specialty services, construction periods are short, and there is a high likelihood of adequate numbers of skilled workers in the region. Although not all vacant houses reported in Tables 21-2 and 21-5 would be available for rent, it is likely that adequate housing would be available for these temporary workers. The additional demand for temporary housing would not be great enough in comparison to the number of houses available to result in increased rental prices.

In addition to vacant properties, construction workers could be temporarily housed in local hotels due to the short, seven-month construction period. There are more than 20 hotels in Sacramento, 13 hotels in West Sacramento, 7 hotels in Davis, and 9 hotels in Woodland that could provide short-term housing. In addition, some workers may bring their own campers or trailers.

Taking into consideration the population estimates shown in Tables 21-1 and 21-4 and projected population increases of 9,869 in 2020 and 11,671 in 2021 for Yolo County and 97,541 in 2020 and 116,078 in 2021 for Sacramento County (California Department of Transportation [Caltrans] 2015), workers who may originate from outside the region during the construction period for construction of Alternative 1 would contribute to a negligible population increase.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with Alternative 1 would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.3.3 Alternative 2: Central Gated Notch

Alternative 2, Central Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 2 is the location of the notch; Alternative 2 would site the notch near the center of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (14.8 feet) because the river is higher at this upstream location, and the gate would allow up to 6,000 cfs through to

provide open channel flow for adult fish passage. See Section 2.5 for more details on the alternative features.

21.3.3.3.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Under Alternative 2, the 28-week construction period would have a peak construction employment of 223 workers for one week in the beginning of August. The weekly number of workers would range from 10 to 223, depending on the construction activities involved. The impacts to population and housing would be the same as described for Alternative 1.

CEQA Conclusion

This impact would be **less than significant** because construction workers would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure associated with Alternative 2 would be needed, and there would be a negligible impact on population.

21.3.3.4 Alternative 3: West Side Gated Notch

Alternative 3, West Side Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 3 is the location of the notch; Alternative 3 would site the notch on the western side of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (16.1 feet) because the river is higher at this upstream location. Alternative 3 would allow up to 6,000 cfs through the gated notch to provide open channel flow for adult fish passage. See Section 2.6 for more details on the alternative features.

21.3.3.4.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Under Alternative 3, peak construction periods would require 277 workers for one week in the middle of July. The weekly number of workers would range from 10 to 277, depending on the construction activities involved. The impacts to population and housing would be the same as described for Alternative 1.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with Alternative 3 would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.3.5 Alternative 4: West Side Gated Notch – Managed Flow

Alternative 4, West Side Gated Notch – Managed Flow, would have a smaller amount of flow entering the Yolo Bypass through the gated notch in Fremont Weir than some other alternatives, but it would incorporate water control structures to maintain inundation for longer periods of time within the northern portion of the Yolo Bypass. Alternative 4 would include the same gated notch and associated facilities as described for Alternative 3; however, it would be operated to limit the maximum inflow to 3,000 cfs. See Section 2.7 for more details on the alternative features.

21.3.3.5.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Under Alternative 4, peak construction periods would require 363 workers for one week in the middle of July. The weekly number of workers would range from 10 to 363, depending on the construction activities involved. The impacts to population and housing would be the same as described for Alternative 1.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with Alternative 4 would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.3.6 Alternative 5: Central Multiple Gated Notches

Alternative 5, Central Multiple Gated Notches, would improve the entrainment of fish by using multiple gates and intake channels so that the deeper gate could allow more flow to enter the bypass when the river is at lower elevations. Flows would move to other gates when the river is higher to control inflows. Alternative 5 incorporates multiple gated notches in the central location on the existing Fremont Weir that would allow combined flows of up to 3,400 cfs. See Section 2.8 for more details on the alternative features.

21.3.3.6.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Under Alternative 5, construction likely would begin in late 2020 or early 2021 and continue for two construction seasons. Construction the first year is estimated to last 28 weeks and would continue for 12 weeks the following year. Peak construction periods would require 358 workers for one week in August during the first year. Although this alternative would require approximately twice the number of workers during the week of peak construction, the temporary workers could easily be housed within the region for one week. The weekly number of workers would range from 5 to 358 workers, depending on the construction activities involved. The impacts to population and housing would be the same as described for Alternative 1.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with Alternative 5 would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.3.6.2 Tule Canal Floodplain Improvements (Program Level)

As described in Section 2.8.1.7, Alternative 5 would include floodplain improvements along Tule Canal, just north of Interstate 80. These improvements would not be constructed at the same time as the remaining facilities. They are included at a program level of detail to consider all of the potential impacts and benefits of Alternative 5. Subsequent consideration of environmental impacts would be necessary before construction could begin.

Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Peak construction periods would require fewer works than under the project-level components of Alternative 5 due to the small project size. The impacts to population and housing would be the same or less as described for the project-level components of Alternative 5.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with the Tule Canal Floodplain Improvements would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. In addition, the number of workers needed for the floodplain improvements would be substantially less than the number of workers needed for the Project-level components. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.3.7 Alternative 6: West Side Large Gated Notch

Alternative 6, Large Gated Notch, is a large notch in the western location that would allow flows up to 12,000 cfs. It was designed with the goal of entraining more fish while allowing more flow into the bypass when the Sacramento River is at lower elevations. See Section 2.9 for more details on the alternative features.

21.3.3.7.1 Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs.

Under Alternative 6, peak construction periods would require 414 workers for one week in the middle of August. The weekly number of workers would range from 35 to 414, depending on the construction activities involved. The impacts to population and housing would be the same as described for Alternative 1.

CEQA Conclusion

This impact would be **less than significant** because construction workers associated with Alternative 6 would not be expected to relocate permanently if they come from outside of the region, and adequate housing vacancies would be available to accommodate workers during the temporary construction period. Therefore, no new housing or infrastructure would be needed, and there would be a negligible impact on population.

21.3.4 Summary of Impacts

Table 21-7 below provides a summary of the identified impacts to population and housing within the Project area and nearby cities.

Table 21-7. Summary of Impacts and Mitigation Measures – Population and Housing

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Impact POP-1: Construction-Related Increase in Population and Corresponding Housing Needs	No Action	NI	-	NI
	All Action Alternatives	LTS	-	LTS

Key: LTS = less than significant; NI = no impact

21.4 Cumulative Impacts Analysis

This section describes the cumulative impacts analysis for population and housing. Section 3.3, *Cumulative Impacts*, presents an overview of the cumulative impacts analysis, including the methodology and the projects, plans, and programs considered in the cumulative impacts analysis.

21.4.1 Methodology

This evaluation of cumulative impacts for population and housing considers the effects of the Project and how they may combine with the impacts of other past, present, and future projects or actions to create significant impacts on specific resources. The area of analysis for these cumulative impacts is the same as the alternatives analysis. The timeframe for this cumulative analysis includes the past, present, and probable future projects producing related or cumulative impacts that have been identified in the area of analysis.

21.4.2 Cumulative Impacts

It is expected that over the near term, the principal areas of growth in California will be more in the inlands area, including Sacramento County (Caltrans 2015). Sacramento County historically has a larger population than Yolo County. Sacramento County's population is expected to grow

rapidly over the next five years, with annual growth projected at 1.2 percent per year, which would provide average stressors on the local housing market as the number of new residential units and housing permits would also increase. This would lessen the impacts to the local housing market presented by any population increases.

In the mid-2000s, Yolo County's population grew at an annual average rate of 0.7 percent. Population growth in Yolo County is expected to increase to 0.8 percent per year between 2015 and 2020 (Caltrans 2015). This would result in moderate stress on the local housing market as new home permits are also projected to increase in the future. This would lessen the impacts to the local housing market presented by any population increases.

Implementing the action alternatives would present little to no impact on the local housing market because the construction season would be short. The duration of stay for the number of non-local workers is expected to be temporary, and workers would be expected to either commute or reside in hotels or campers in lieu of obtaining more permanent housing. Additional projects or construction work would not be out of character with the area in the future. The projected population increase presented in the county's economic forecast is expected to include any increases to population due to upcoming construction and developments. Therefore, the action alternatives' small contributions to an increase in population and housing would **not be cumulatively considerable.**

21.5 References

Caltrans. 2015. *California County-Level Economic Forecast 2015-2040.* Accessed on April 10, 2017. Available at: http://www.dot.ca.gov/hq/tpp/offices/eab/docs/Full%20Report%202015.pdf

United States Census Bureau. 2015a. *Profile of General Population and Housing Characteristics:* 2015 Demographic Profile Page. Accessed on April 10, 2017. Available: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

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22 Environmental Justice

The chapter describes the environmental and regulatory settings of environmental justice in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) area, as well as environmental consequences as they pertain to implementation of the Project alternatives.

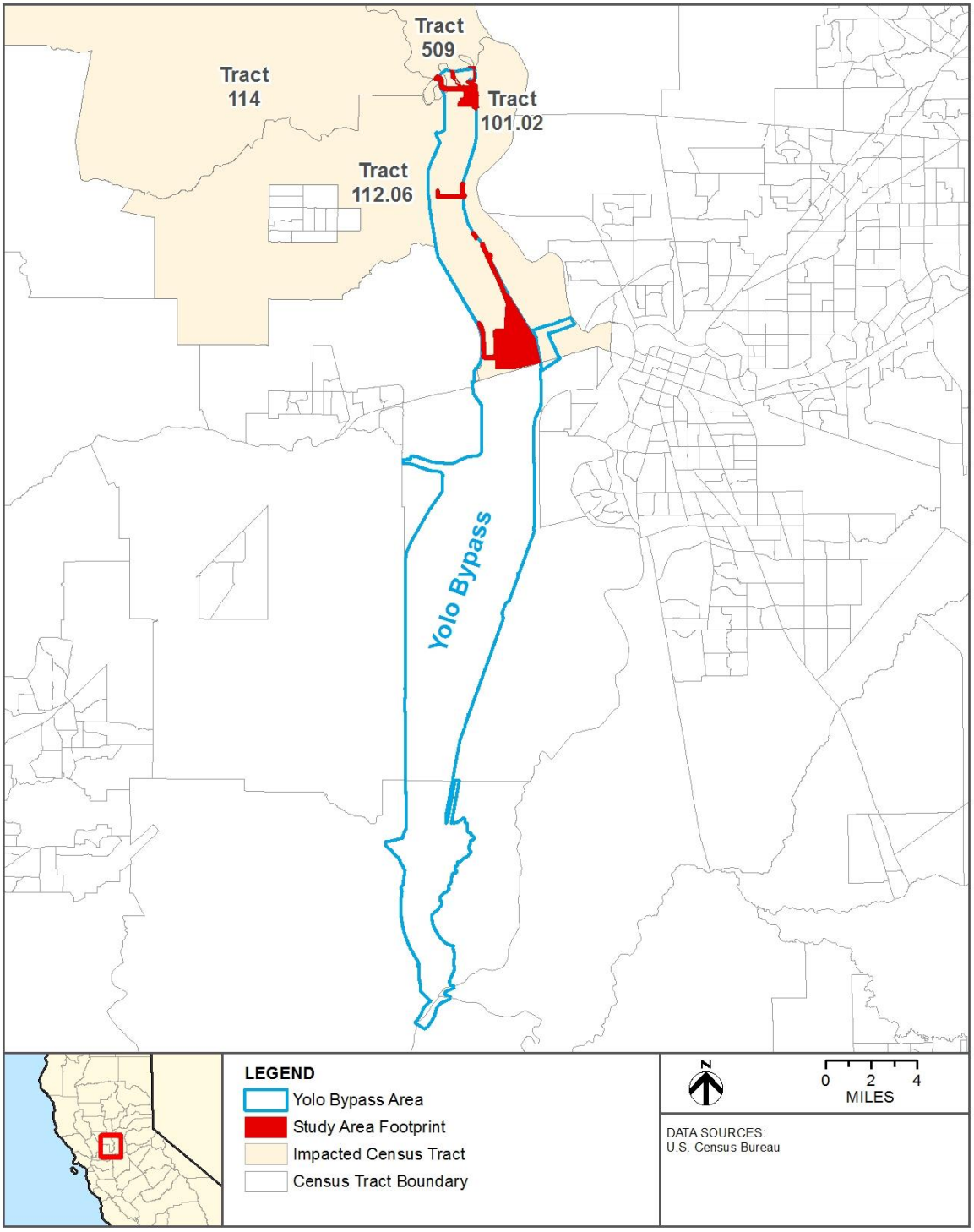
As described in Executive Order (EO) 12898 (59 Federal Register 7629), Federal agencies "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 also aimed to "ensure greater public participation" for people in communities potentially affected by program actions. The concept of environmental justice as applied here is that minority and low-income people should not be disproportionately or adversely affected by economic and quality of life impacts associated with the implementation of the Project. Construction-related activities associated with the Project alternatives could disproportionately or adversely affect areas of minority and low-income populations by increasing air pollution, noise, and traffic in the study area. See Chapters 17, *Transportation*; 18, *Air Quality*; and 20, *Noise* for additional information on these resource effects. Construction and operations under the Project could also place agriculturally productive land out of production, reducing the need for farm labor, which is typically classified as minority and low-income.

22.1 Environmental Setting/Affected Environment

This section describes the affected environment related to environmental justice, as defined by EO 12898 and Council on Environmental Quality (CEQ) Guidance (1997).

The environmental justice analysis is divided into regional (county) and local (census tract) level analysis. Regional and local areas included in this analysis are those where associated project construction would occur, or construction traffic would increase, potentially causing an adverse and disproportionately high effect on neighboring minority and low-income populations, or where agriculturally productive land would be taken out of production. The regional level analysis includes Yolo and Sutter counties. A small portion of the Yolo Bypass (the southern point) is in Solano County. Almost all this area is water (Prospect Slough) and would therefore have no environmental justice effects and is not discussed further. The local level analysis includes Census Tracts 101.02, 112.06, 114, and 509. Construction would not occur in census tracts in the remainder of the Yolo Bypass; therefore, the remaining census tracts are not included in this analysis. Other land use changes in those areas are discussed in Chapter 11, *Land Use and Agricultural Resources*.

Figure 22-1 shows the environmental justice study area.



Source: United State Census Bureau 2010.

Figure 22-1. Environmental Justice Study Area

This section presents the existing regional and local-level demographic and economic characteristic census data, including race, ethnicity, income, and poverty for the Project environmental justice study area. See Section 22.3.1 for assessment methodology on the identified thresholds to determine whether an affected area is considered minority or low-income.

22.1.1 Regional

This section describes demographic and economic characteristic data from the 2015 American Community Survey 1-Year Estimates by the United States Census Bureau for Yolo County. Information for the State of California (State) is presented for comparison purposes.

Table 22-1 presents the racial and ethnic composition of Yolo, Sutter, Solano, and Sacramento counties. These data show that both Sutter and Yolo counties exhibit a total minority proportion exceeding 50 percent, at 52.5 and 52.9 percent, respectively. Solano and Sacramento counties also exhibit a total minority proportion of 50 percent. While the proportion of residents in Yolo and Sutter counties that responded identify as "two or more races" (5.3 and 7.2 percent, respectively) exceeds that of the State (4.5 percent), the total minority population in the two counties is lower than that of the State (62.2 percent). The American Indian population in Sutter County (one percent) exceeds that of the State and Yolo County (0.7 and 0.4 percent, respectively).

Table 22-2 presents the median household income, mean household income, proportion of unemployed individuals, and proportion of individuals living below the poverty threshold for Yolo, Sutter, Solano, and Sacramento counties. The data show that Yolo and Solano counties have a smaller proportion of low-income residents than that for the State (8.8 and 9.6 percent compared to 11.3 percent), whereas the low-income residents in Sutter and Sacramento counties exceed that of the State at 16.9 and 12.6 percent, respectively. Yolo County has a slightly higher unemployment rate than that of the State. Sutter County's unemployment rate (12.5 percent) is higher than the state average (7.3 percent). Sutter and Yolo counties have a median household income and mean household income lower than the State average; however, neither county falls below the United States Census Bureau's defined poverty thresholds for a four-person family unit (two adults and two children) or an individual ($24,339 and $12,486, respectively [United States Census Bureau 2016]). Similarly, Solano and Sacramento counties do not fall below the defined poverty thresholds for a four-person family unit or an individual.

Table 22-1. 2015 Regional Demographic Characteristics

	Yolo County	Sutter County	Solano County	Sacramento County	California
Population	213,016 (100%)	96,463 (100%)	436,092 (100%)	1,501,335 (100%)	39,144,818 (100%)
Ethnicity[1]					
Hispanic or Latino	67,163 (31.5%)	29,194 (30.3%)	113,485 (26%)	341,449 (27%)	15,184,545 (38.8%)
White alone, Not Hispanic	101,266 (47.5%)	45,478 (47.1%)	169,310 (38.8%)	688,269 (45.8%)	14,815,122 (37.8%)

	Yolo County	Sutter County	Solano County	Sacramento County	California
Race[2]					
White	140,351 (65.9%)	67,966 (70.5%)	233,286 (53.5%)	897,925 (59.8%)	23,824,254 (60.9%)
African American	5,669 (2.7%)	1,053 (1.1%)	61,550 (14.1%)	147,797 (9.8%)	2,277,229 (5.8%)
American Indian	809 (0.4%)	939 (1.0%)	2,367 (0.5%)	8,889 (0.6%)	282,777 (0.7%)
Asian	29,518 (13.9%)	15,125 (15.7%)	67,196 (15.4%)	233,519 (15.6%)	5,548,936 (14.2%)
Pacific Islander	606 (0.3%)	362 (0.4%)	3,673 (0.8%)	16,679 (1.1%)	157,554 (0.4%)
Some Other Race	24,790 (11.6%)	4,039 (4.2%)	37,689 (8.6%)	94,383 (6.3%)	5,300,297 (13.5%)
Two or More Races	11,273 (5.3%)	6,979 (7.2%)	30,331 (7.0%)	102,143 (6.8%)	1,753,771 (4.5%)
Total Minority[3]	111,750 (52.5%)	50,985 (52.9%)	266,782 (61.2%)	813,066 (54.2%)	24,329,696 (62.2%)

Source: United States Census Bureau 2015a.

[1] The term "Hispanic" is an ethnic category and can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic residents for each geographic region are tabulated separately from the racial distribution by the United States Census Bureau.

[2] A minority is defined as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic.

[3] "Total Minority" is the aggregation of all non-white racial groups with the addition of all Hispanics, regardless of race, with the total for "While Alone, Not Hispanic" subtracted from the total population.

Table 22-2. 2015 Income, Unemployment, and Poverty Characteristics

Geographic Area	Median Household Income[1,2]	Mean Household Income	Unemployment Rate	Percent Population below Poverty Threshold[3]
Yolo County	$58,966	$81,995	7.9%	8.8%
Sutter County	$52,277	$67,427	12.5%	16.9%
Solano County	$67,443	$84,403	8.7%	9.6%
Sacramento County	$58,942	$76,613	8.3%	12.6%
California	$64,500	$91,757	7.3%	11.3%

Source: United States Census Bureau 2015b.

[1] Household income is defined by the United States Census Bureau as “the sum of money income received in the calendar year by all household members 15 years old and over” (United States Census Bureau Undated).

[2] In 2015 inflation-adjusted dollars.

[3] Percentage of families and people whose income in the past 12 months was below the poverty level. The census classifies families and persons as below poverty “if their total family income or unrelated individual income was less than the poverty threshold” as defined for all parts of the country by the Federal government (United States Census Bureau Undated). For 2015, the preliminary Federal weighted average poverty level threshold for an individual was $12,486 and $24,339 for a four-person family unit (two adults and two children) (United States Census Bureau 2016).

22.1.2 Local

This section describes demographic and economic characteristic data from the 2015 American Community Survey 5-Year Estimates by the United States Census Bureau at the census tract level. Information for Sutter County, Yolo County, and the State of California as a whole are also presented for comparison purposes.

Census tracts are defined as "small, relatively permanent statistical subdivisions of a county delineated by local participants as part of the United States Census Bureau's Participant Statistical Areas Program" (United States Census Bureau Undated). These areas generally consist of between 1,500 and 8,000 people and are designed to be homogeneous with respect to population characteristics, economic status, and living conditions. The size of census tracts can vary widely, depending on the density of a settlement (United States Census Bureau Undated). The Project area could have environmental justice impacts in four census tracts: Census Tracts 101.02, 112.06, 114, and 509.

Table 22-3 presents the racial and ethnic composition of the census tracts. These data show that most of the census tracts have total minority proportions greater than 50 percent. Census Tract 114 has the highest minority population at 58.8 percent, whereas Census Tract 509 has the lowest at 43.6 percent. Census Tracts 101.02, 114, and 509 have Hispanic or Latino percentages higher than their county averages, but only Census Tract 114 has a percentage (50.1 percent) higher than the State average of 38.4 percent. Census Tract 101.02 exhibits a higher proportion of Black/African American residents (5.8 percent) than its county (2.6 percent). All census tracts exhibit lower proportions of Black/African American residents than that of the State (5.9 percent).

Table 22-4 presents the median household income, mean household income, proportion of unemployed individuals, and proportion of individuals living below the poverty threshold for the environmental justice study area census tracts. The data show that Census Tracts 101.02, 114, and 509 have a higher proportion of residents living below the poverty threshold than the State and county in which it is located. Census Tracts 101.02 and 114 have unemployment rates greater than both the county and State, whereas Census Tract 509 has an unemployment rate greater than the State but not the county. All but one of the census tracts (Census Tract 112.06) have median and mean household incomes lower than the State and county average; however, these census tracts do not fall below the United States Census Bureau's defined poverty thresholds for a four-person family unit (two adults and two children) or an individual.

Table 22-3. 2011-2015 Local Demographic Characteristics

Geographic Area	Total Population	Hispanic Origin[1]		Race[2]							
		Hispanic or Latino	White Alone, Not Hispanic	White	Black/ African American	American Indian and Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Total Minority[3]
CT 101.02	7,274 (100%)	2,552 (35.1%)	3,219 (44.3%)	4,215 (57.9%)	420 (5.8%)	10 (0.1%)	666 (9.2%)	136 (1.9%)	1,223 (16.8%)	604 (8.3%)	4,055 (55.7%)
CT 112.06	7,841 (100%)	2,380 (30.4%)	3,823 (48.8%)	5,444 (69.4%)	93 (1.2%)	309 (3.9%)	1,077 (13.7%)	27 (0.3%)	487 (6.2%)	404 (5.2%)	4,018 (51.2%)
CT 114	4,245 (100%)	2,126 (50.1%)	1,748 (41.2%)	3,073 (72.4%)	79 (1.9%)	111 (2.6%)	221 (5.2%)	0 (0.0%)	635 (15.0%)	126 (3.0%)	2,497 (58.8%)
CT 509	1,696 (100%)	605 (35.7%)	956 (56.4%)	1,363 (80.4%)	32 (1.9%)	24 (1.4%)	0 (0.0%)	20 (1.2%)	195 (11.5%)	62 (3.7%)	740 (43.6%)
Sutter County	95,247 (100%)	28,261 (29.7%)	46,108 (48.4%)	66,258 (69.6%)	2,049 (2.2%)	1,033 (1.1%)	14,044 (14.7%)	288 (0.3%)	5,847 (6.1%)	5,728 (6.0%)	49,139 (51.6%)
Yolo County	207,320 (100%)	64,526 (31.1%)	100,100 (48.3%)	137,009 (66.1%)	5,409 (2.6%)	1,955 (0.9%)	28,324 (13.7%)	1,021 (0.5%)	22,353 (10.8%)	11,249 (5.4%)	107,220 (51.7%)
California	38,421,464 (100%)	14,750,686 (38.4%)	14,879,258 (38.7%)	23,747,013 (61.8%)	2,265,387 (5.9%)	287,028 (0.7%)	5,261,978 (13.7%)	150,370 (0.4%)	4,974,791 (12.9%)	1,734,897 (4.5%)	23,542,206 (61.3%)

Source: United States Census Bureau 2011-2015a.

Notes:

[1] The term "Hispanic" is an ethnic category and can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic residents for each geographic region are tabulated separately from the racial distribution by the United States Census Bureau.

[2] A minority is defined as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic.

[3] "Total Minority" is the aggregation of all non-white racial groups with the addition of all Hispanics, regardless of race, with the total for "While Alone, Not Hispanic" subtracted from the total population.

Key:

CT = census tract

Table 22-4. 2011-2015 Local Economic Characteristics

Geographic Area	Median Household Income[1,2]	Mean Household Income	Unemployment Rate	Percent Population Below Poverty Threshold[3]
CT 101.02	$39,972	$47,323	17.6%	12.7%
CT 112.06	$81,447	$105,024	8.5%	1.1%
CT 114	$47,456	$65,492	13.9%	14.1%
CT 509	$41,991	$62,650	11.0%	18.2%
Sutter County	$52,017	$69,238	13.2%	14.7%
Yolo County	$54,989	$78,450	9.0%	10.2%
California	$61,818	$87,877	9.9%	12.2%

Source: United States Census Bureau 2011-2015b.

Notes:

[1] Household income is defined by the United States Census Bureau as "the sum of money income received in the calendar year by all household members 15 years old and over" (United States Census Bureau Undated).

[2] In 2015 inflation-adjusted dollars.

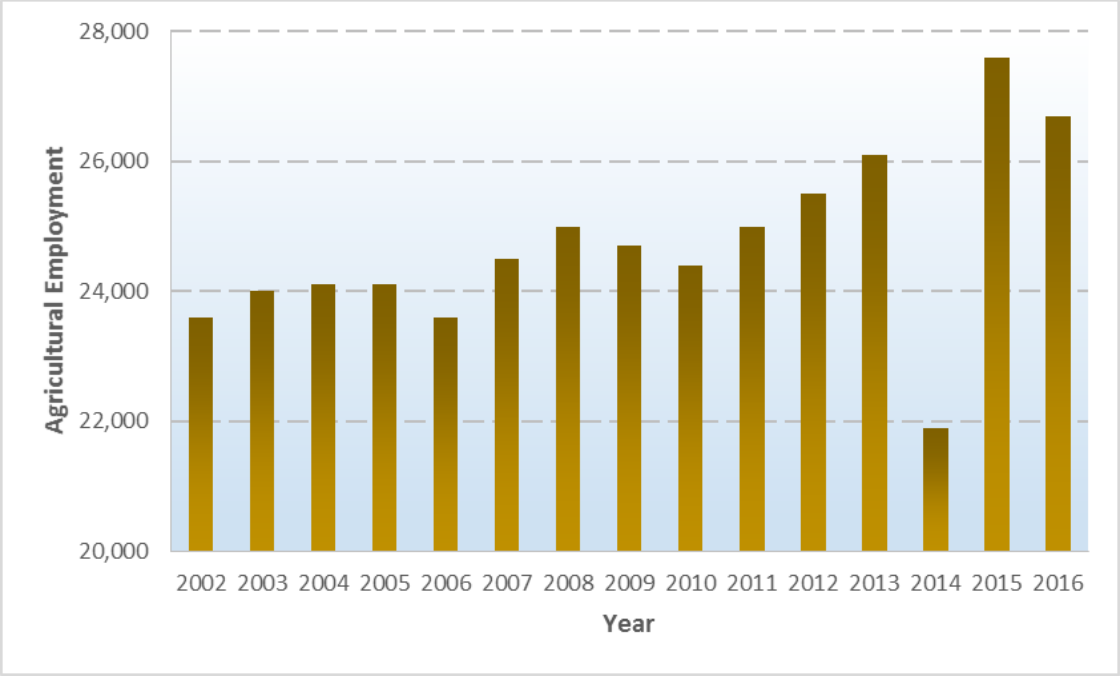
[3] Percentage of families and people whose income in the past 12 months was below the poverty level. The census classifies families and persons as *below poverty* "if their total family income or unrelated individual income was less than the poverty threshold" as defined for all parts of the country by the Federal government (United States Census Bureau Undated).

Key:

CT = census tract

22.1.3 Agricultural Employment

Parts of the study area are in Sutter and Yolo counties, which fall within the Sacramento Valley Agricultural Employment Region as defined by the California Employment Development Department (EDD). Other counties within this region include Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Solano, Tehama, and Yuba. Figure 22-2 shows the historical agricultural employment for the Sacramento Valley region. In 2015, Yolo County employed between 5,001 and 10,000 people in the agricultural industry, while Sutter County employed 1,501 to 5,000 people (EDD 2016a). The Sacramento Valley region comprised approximately 6.4 percent of the State's agricultural employment in 2016 (EDD 2016b).



Source: EDD 2016b.

Figure 22-2. Sacramento Valley Historical Agricultural Employment

Tables 22-5 through 22-7 describe demographic and economic characteristic data from the United States Department of Agriculture (USDA) 2012 Census of Agriculture, United States Census Bureau's American Community Survey 5-Year Estimates for 2006-2010, and EDD's 2016 Occupational Employment Statistics and Wages Data Tables. Information for the State of California as a whole is presented for comparison purposes.

Table 22-5 presents the racial and ethnic composition of farm operators, as defined in the 2012 Census of Agriculture (USDA 2014), in Sutter and Yolo counties. The data show that the vast majority of farm operators in Sutter County are White. In Yolo County, the majority of operators are White. There is a slightly higher proportion of Hispanic farm operators in Yolo County (12.6 percent) when compared to the State average of 12.0 percent. Farm operators in Yolo and Sutter counties are not considered to be an environmental justice population because, based on the data, the total minority population within farm operators in Yolo and Sutter counties does not exceed 50 percent.

Table 22-5. 2012 Farm Operators' Demographic Characteristics[1]

Geographic Area	Total Farm Operators[2]	White[3]	Black/ African American[3]	American Indian and Alaska Native[3]	Asian[3]	Native Hawaiian/ Pacific Islander[3]	Two or More Races[3]	All Races, Hispanic[3]
Sutter County	2,297 (100%)	1,641 (71.4%)	3 (0.1%)	41 (1.8%)	479 (20.9%)	13 (0.6%)	29 (1.3%)	179 (7.8%)
Yolo County	1,759 (100%)	1,486 (84.5%)	15 (0.9%)	20 (1.1%)	113 (6.4%)	7 (0.4%)	12 (0.7%)	222 (12.6%)
California	126,099 (100%)	111,141 (88.1%)	526 (0.4%)	1,761 (1.4%)	7,474 (5.9%)	455 (0.4%)	1,030 (0.8%)	15,123 (12.0%)

Source: USDA 2014.

[1] "Total Minority" cannot be computed from the data provided by the USDA Census of Agriculture as a tabulation of "White Alone, Not Hispanic" farm operators is not provided.

[2] The USDA Census of Agriculture provided a tabulation of "Total Farm Operators" for the county and State; therefore, the sum of the farm operators will not equal the value provided for "Total Farm Operators."

[3] Demographic data were collected for a maximum of three operators per farm.

Table 22-6 presents the racial and ethnic composition of laborers and helpers in Sutter and Yolo counties. Information for the State of California as a whole is presented for comparison purposes. The category "laborers and helpers" excludes construction personnel as they are captured under a different category by the United States Census Bureau. However, the category is not necessarily exclusive to farm laborers, and the data may include other manual labor sectors as part of the total. Regardless, the race and ethnic composition of this sector suggests that laborers and helpers, as an employment sector, are generally of minority status, with Hispanics comprising the largest proportion of laborers and helpers in both Sutter and Yolo counties (68.3 and 75.5 percent, respectively). However, the population of Hispanic laborers and helpers does not exceed that of the State (78.8 percent). The population of White laborers and helpers in Sutter and Yolo counties (20.0 and 29.1 percent, respectively) exceeds that of the State (19.2 percent). In Sutter County, the percentage of Asian laborers and helpers are over three times the State average. According to the CEQ guidance (1997), agencies may consider environmental justice communities either as a group of individuals living in geographic proximity to one other or "a geographically dispersed/transient set of individuals (such as migrant workers or Native American[s]) where either type of group experiences common conditions of environmental exposure or effect."

Table 22-7 presents mean annual wage information for farming occupations in Sutter and Yolo counties. While the data do not demonstrate as clearly as the United States Census data the proportion of residents living below the poverty threshold, the information presented in this table does suggest that mean incomes in the farming industry are generally lower than the mean income for all industries, with less skilled workers (agricultural equipment operators and farmworkers) generally earning less than 50 percent of the mean wage for all industries. Farming, fishing, and forestry occupations in Sutter County earn slightly more than 50 percent of the mean wage for all industries in the county, but less than 50 percent of the State mean wage for all industries. Except for first-line supervisors, agricultural workers in Sutter County had mean annual wages lower than the State and Yolo County, in the first quarter of 2016. In Yolo County, the overall farming, fishing, and forestry occupations earn less than 50 percent of the mean wage for all industries in both the county and the State but earn more than the state average

Table 22-6. 2006-2010 Laborers' and Helpers' Demographic Characteristics

Geographic Area	Total Laborers and Helpers	Race[1]						Hispanic Origin[2]		Total Minority[3]
		White	Black/ African American	American Indian and Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Two or More Races or Some Other Race	White Alone, Not Hispanic	All Races, Hispanic[1]	
Sutter County	4,360 (100%)	870 (20.0%)	25 (0.6%)	45 (1.0%)	620 (14.2%)	0 (0%)	0 (0%)	870 (24.5%)	2,680 (75.5%)	3,490 (80.0%)
Yolo County	5,210 (100%)	1,515 (29.1%)	30 (0.6%)	20 (0.4%)	170 (3.3%)	0 (0%)	210 (4.0%)	1,515 (31.7%)	3,260 (68.3%)	3,695 (70.9%)
California	870,025 (100%)	167,320 (19.2%)	29,900 (3.4%)	3,085 (0.4%)	34,505 (4.0%)	3,205 (0.4%)	11,750 (1.4%)	167,320 (21.2%)	620,260 (78.8%)	702,705 (80.8%)

Source: United States Census Bureau 2006-2010

[1] A minority is defined as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic.

[2] The term "Hispanic" is an ethnic category and can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic residents for each geographic region are tabulated separately from the racial distribution by the United States Census Bureau.

[3] "Total Minority" is the aggregation of all non-white racial groups with the addition of all Hispanics, regardless of race, with the total for "While Alone, Not Hispanic" subtracted from the total population.

Table 22-7. 2016 (First Quarter) Agricultural Workers' Mean Annual Wages

Geographic Area	Farming, Fishing, and Forestry Occupations - Overall	First-Line Supervisors	Agricultural Inspectors	Graders and Sorters	Agricultural Equipment Operators	Farmworkers (Crop, Nursery, and Greenhouse)	Farmworkers (Farm and Ranch Animals)	Agricultural Workers, All Other	All Industries
Sutter County[1]	$22,899	$47,425	--	$20,806	$23,925	$20,521	--	$26,721	$45,755
Yolo County[2]	$25,054	$55,556	$37,830	$29,923	$24,676	$22,015	$22,920	--	$54,295
California	$23,225	$43,929	$43,959	$21,578	$27,544	$21,903	$30,665	$34,557	$56,249

Source: EDD 2016c.

Key:

-- = estimate could not be provided

[1] The Sutter County geographic area is part of the Yuba City Metropolitan Statistical Area.

[2] The Yolo County geographic area is part of the Sacramento-Roseville-Arden Arcade Metropolitan Statistical Area.

for the overall farming, fishing, and forestry occupations. In the first quarter of 2016, the mean annual wages for several agricultural workers and workers in all industries in Yolo County were lower than those of the State.

22.2 Regulatory Setting

The following section describes the applicable laws and rules relating to environmental justice.

22.2.1 Federal Plans, Policies, and Regulations

The concept of environmental justice is rooted in the Civil Rights Act of 1964, which prohibits discrimination in Federally assisted programs, and EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, issued February 11, 1994. EO 12898 requires all Federal agencies to conduct "programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin." Section 1-101 of the order requires Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of programs on minority and low-income populations (EO 1994).

The CEQ (1997) states that environmental justice concerns may arise from effects on the natural or physical environment, such as human health or ecological effects on minority or low-income populations, or from related social or economic effects.

22.2.2 State Plans, Policies, and Regulations

California law defines environmental justice as the "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies," in Government Code Section 65040.12(e). Section 65040.12(a) designates the Governor's Office of Planning and Research as the coordinating agency in State government for environmental justice programs and requires the Governor's Office of Planning and Research to develop guidelines for incorporating environmental justice into general plans (7 California Government Code 65040.12).

22.2.3 Regional and Local Plans, Policies, and Regulations

There are no known regional or local plans, policies, or regulations related to environmental justice.

22.3 Environmental Consequences

The purpose of this section is to provide information about the environmental consequences of the alternatives as they relate to environmental justice in the Project area. This section presents assessment methods performed to analyze the environmental justice effects and the potential environmental justice effects of the Project alternatives. Detailed descriptions of the alternatives

evaluated in this chapter are provided in Chapter 2, *Description of Alternatives*. Chapter 16, *Socioeconomics*, presents the socioeconomic effects of the alternatives.

22.3.1 Methods for Analysis

This section describes the assessment methods used to analyze potential environmental justice effects under the National Environmental Policy Act (NEPA) of the Project alternatives, including the No Action Alternative. Under EO 12898, demographic information is used to determine whether minority populations or low-income populations are present in the areas potentially affected by the range of Project alternatives. If so, a determination must be made whether implementation of the alternatives may cause disproportionately high and adverse human health or environmental impacts on those populations.

The CEQ (1997) recommends that the following three factors be considered by the environmental justice analysis to determine whether disproportionately high and adverse impacts may accrue to minority or low-income populations:

- Whether there is or would be an impact on the natural or physical environment that substantially and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment.
- Whether the environmental effects are substantial and are, or may be, having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.
- Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

The methodologies and thresholds used in this analysis are taken from the United States Environmental Protection Agency's (USEPA) final guidance on incorporating environmental justice concerns into NEPA analysis (USEPA 1998) and help define minority and low-income populations. The guidance states that a minority and/or low-income population may be present in an area if the proportion of the populations in the area of interest are "meaningfully greater" than that of the general population or where the proportion exceeds 50 percent of the total population.

The analysis also examines the effects on farmworker employment from cropland conversions in the Yolo Bypass. In this analysis, an effect on farmworkers is determined to be disproportionately high if the ratio of the number of farmworker jobs lost to the total jobs lost in the county is greater than 50 percent. This assumes that the other jobs lost due to project-related actions (agricultural and support industries) are not predominately held by minority or low-income groups. Chapter 16, *Socioeconomics*, uses the Impact Planning and Analysis model to estimate the impacts project actions would have on the regional economy, including employment. Those estimates are used here to project the number of jobs predominately held by minorities that would be lost under each alternative, which helps determine whether a minority population is potentially disproportionately affected by the alternative.

22.1.1.1 Minority

As discussed above, the CEQ (1997) defines the term "minority" as persons from any of the following United States Census categories for race: Black/African American, Asian, Native Hawaiian or Other Pacific Islander, and American Indian or Alaska Native. Additionally, for the purposes of this analysis, "minority" also includes all other nonwhite racial categories such as "some other race" and "two or more races." The CEQ also mandates that persons identified through the United States Census as ethnically Hispanic, regardless of race, should be included in minority counts (CEQ 1997). Hispanic origin is considered to be an ethnic category separate from race, according to the United States Census.

For this analysis, minority populations of Yolo and Sutter counties and the individual census tracts were compared against the California population to determine whether the minority population was “meaningfully greater” than the California population or exceeded 50 percent of the total population. Based on the data in Tables 22-1, 22-2, 22-3 and 22-4, at the regional level, Yolo and Sutter counties were considered minority-affected areas because the minority population was greater than 50 percent. At the local-level, Census Tracts 101.02, 112.06, and 114 were considered minority-affected areas because the minority population was greater than 50 percent, even though, all census tracks had a total minority population lower than the State, and Census tracks 112.06 and 509 had minority populations lower than their respective county’s (Yolo and Sutter, respectively).

22.1.1.2 Low-Income

Persons living with an income below the poverty level are identified as "low-income," according to the annual statistical poverty thresholds established by the United States Census Bureau. The United States Census Bureau poverty threshold indicates that the poverty level for a family of four (two adults and two children) in 2016 was $24,339 and $12,486 for an individual (United States Census Bureau 2016). The guidance states that a census tract exhibiting a proportion of people living in poverty two times higher than the State average of 12.2 percent (a total of 24.4 percent was considered to be meaningfully greater for this analysis) are considered environmental justice populations. No census tracts or counties were considered low-income as none had populations greater than 24.4 percent living below the poverty threshold

This analysis also considered whether an area's median household and per capita incomes were substantially lower than that of the county and/or State average. No census tracts had incomes that were 50 percent or less of the county or State average.

22.1.1.3 Farmworkers

The methodologies and thresholds used in this analysis to analyze potential effects on farmworkers were similar to those used to analyze minority and low-income populations. Based on the data presented in Tables 22-5 through 22-7, Yolo County's farm operators are predominately White, their laborers and helpers are predominately Hispanic, and several agricultural worker groups receive annual wages below the United States Census Bureau's poverty level threshold for a family of four (two adults and two children).

Disproportionately high or adverse effects would occur to Yolo County's farmworker community if construction-related Project actions occurred on agricultural lands or if agricultural productive lands were placed out of production, reducing the need for farm labor.

22.3.2 Determination of Impacts

NEPA requires an analysis of social, economic, and environmental justice effects; however, there is no standard set of criteria for evaluating environmental justice impacts. For the purposes of this Environmental Impact Statement (EIS)/Environmental Impact Report (EIR), the No Action Alternative is the basis of comparison, as required by NEPA. However, the No Action Alternative would be very similar to existing conditions because existing conditions for demographics and regional economics are not anticipated to experience substantive changes in the area of analysis. Therefore, existing conditions is used as a proxy for No Action Alternative in the chapter.

Social, economic, and environmental justice effects are not required to be analyzed under CEQA, and therefore a CEQA analysis is not provided in this chapter.

22.3.3 Effects

This section provides a project-level evaluation of the direct and indirect effects of implementing the alternatives on environmental justice in the Project area. Proposed actions under the alternatives could affect environmental justice areas by conducting construction-related activities in the Project area, increasing construction-related traffic through those areas, and converting croplands to nonagricultural uses. This analysis is organized by project alternative.

22.1.1.4 No Action Alternative

Under the No Action Alternative, the Project would not be implemented, and none of the Project features would be developed in the Project area. The No Action Alternative would not require any construction and would not affect agricultural production in the area; therefore, no minority or low-income populations would be exposed to adverse effects or hazards from project-related construction, and employment would not be disproportionately affected. Therefore, the No Action Alternative would not have an adverse and disproportionately high effect on minority and low-income populations related to:

- Exposure to effects or hazards from project construction
- Changes in employment due to the conversion of cropland to nonagricultural use
- Changes in employment as result of Project construction activities
- Changes to educational opportunities offered in the Yolo Bypass Wildlife Area (YBWA)

22.1.1.5 Alternative 1: East Side Gated Notch

Alternative 1, East Side Gated Notch, would allow increased flow from the Sacramento River to enter the Yolo Bypass through a gated notch on the east side of Fremont Weir. The invert of the new notch would be at an elevation of 14 feet, which is approximately 18 feet below the existing Fremont Weir crest. Alternative 1 would allow up to 6,000 cubic feet per second (cfs) to flow through the notch during periods when the river levels are not high enough to go over the crest of Fremont Weir to provide open channel flow for adult fish passage. See Section 2.4 for more details on the alternative features.

22.1.1.5.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Development of Alternative 1 would require a substantial amount of construction taking place in Yolo and Sutter counties. Construction activities would result in air quality, noise, and transportation impacts. These impacts would be temporary and would be reduced by the mitigation measures described in Chapters 17, *Transportation*; 18, *Air Quality*; and 20, *Noise*. The temporary construction activities could still cause significant impacts to air quality and noise after mitigation measures are implemented. These effects could be experienced by minority or low-income populations.

Minority populations were identified in Yolo and Sutter counties and in Census Tracts 101.02, 112.06, and 114, and were considered minority-affected areas. No census tracts or counties were determined to be low-income affected areas as none had populations greater than 24.4 percent living below the poverty threshold.

The air quality impact thresholds identified in Chapter 18 would be regional, across the entire Sacramento Valley, and not specific to Yolo and Sutter counties. Therefore, adverse and disproportionately high air quality impacts **would not occur** to the minority populations surrounding the Project area due to construction. As described in Chapter 20, there would be very small and localized noise impacts. The sensitive receptors are not known to be in a minority area. Therefore, adverse and disproportionately high noise impacts **would not occur** to the minority populations surrounding the Project area due to construction.

22.1.1.5.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

As described in Chapter 11, *Land Use and Agricultural Resources*, Alternative 1 is expected to increase the period of inundation in the Yolo Bypass, which would delay crop preparation and planning. Delays in field preparation and planning could result in the reduction of total hours a farmworker could work or a reduction in farmworker jobs. Table 22-8 summarizes the effects on farmworker jobs that would be caused by the proposed cropland conversion associated with Alternative 1, based on the estimated employment values from Chapter 16, *Socioeconomics*. See Chapter 16 for a full analysis of the effects on employment, income, and output in the regional economy.

Table 22-8. Employment Effects of Converting Croplands under Alternative 1

	Total County Farmworkers[1]	Farmworker Jobs Affected[2]	Total Jobs Affected[2]	Percent of Jobs Affected that are Farmworkers	Percent of Total County Farmworkers that are Affected
Yolo County	5,210	-0.3	-0.6	50%	<1%

Source: United States Census Bureau 2006-2010. Direct effect of converting croplands (Chapter 16, Table 16-15)
Notes:

[1] Represents the total number of laborers and helpers in Yolo County.

[2] Negative values represent lost jobs, while positive values represent additional jobs.

As shown in Table 22-8, 0.6 jobs would be lost in Yolo County due to the conversion of croplands to nonagricultural use, half of which would be farmworkers. Even though 50 percent of the total jobs lost due to cropland conversion would be farmworker jobs, the total number of jobs lost is less than one job (less than one percent of farmworker employment in Yolo County). Although the area's farmworker community is considered to include both minority and low-income populations, cropland conversions to nonagricultural use in the Project area would not result in a disproportionately high effect on minority and/or low-income employment because the alternative would result in a minimal loss of farmworker jobs. Fluctuations in farmworker employment occur under existing conditions. This slight shift in employment could be experienced under existing market conditions and is therefore not considered to be a disproportionately high effect on minority and/or low-income populations.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of croplands to a non-production state would result in a marginal reduction in farmworker jobs, which are held largely by minority and low-income groups.

22.1.1.5.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

The construction period for Alternative 1 would be one season (April to November), about seven months. As described in Chapter 16, *Socioeconomics*, the construction of Alternative 1 would create 365 jobs. Of the 365 jobs created, 221 jobs (61 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 1 would create a total of six jobs, three of which are considered a direct effect and would include jobs in the maintenance and repair construction of non-residential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified in either county or census tracts. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.5.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

The YBWA is the site of the Discover the Flyway program, a program that allows schools to visit the area to learn about the importance and significance of the local wetlands, agriculture, and wildlife and develop land stewardship ethics. As discussed in Chapter 13, *Recreation*, Alternative 1 would result in increased periods of inundation of up to two weeks, which could reduce access to roads and YBWA facilities, reducing the amount of field trips for the Discover the Flyway program. Since the 2011-2012 program year, the program has hosted an average of 37 field trips, with an average of 52 classes, a year. Of the 52 classes, 38 classes (73 percent) come from Title 1 schools, schools that low-income families typically enroll their children in.

Classes are assumed to come from areas around the Bypass, such as the larger cities of Sacramento and Davis, but could come from areas further away. For comparative purposes, the analysis uses Davis Joint Unified School District (DJUSD) and Sacramento City Unified School District (SCUSD) to determine whether educational opportunities are affected disproportionately. There are approximately 106 schools that could participate in the Discover the Flyway Program in the DJUSD and SCUS, 17 and 86 schools respectively. Approximately 41 percent of schools in DJUSD are considered Title 1 schools and 79 percent are considered Title 1 schools in SCUSD. The reduction in the number of field trips available at the YBWA could affect up to 30 percent of Title 1 schools in DJUSD and up to 57 percent of Title 1 schools in SCUSD. This would suggest that there could be a disproportionate effect on the educational opportunities of low-income students in SCUSD but not on those in DJUSD. Therefore, disproportionately high or adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.1.1.6 Alternative 2: Central Gated Notch

Alternative 2, Central Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 2 is the location of the notch; Alternative 2 would site the notch near the center of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (14.8 feet) because the river is higher at this upstream location, and the gate would allow up to 6,000 cfs through to provide open channel flow for adult fish passage. See Section 2.5 for more details on the alternative features.

22.1.1.6.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Impacts under Alternative 2 relating to construction effects and hazards exposed to minority and/or low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority populations **would not occur** due to the introduction of construction activities in Yolo and Sutter counties and Census Tracts 101.02, 112.06, and 114.

22.1.1.6.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

Impacts under Alternative 2 relating to minority and/or low-income employment within the Project area would be identical to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of croplands to a non-production state would reduce farmworker jobs, which are held largely by minority and low-income groups, by less than one job.

22.1.1.6.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

The construction period for Alternative 2 would be one season (April to November), about seven months. As described in Chapter 16, *Socioeconomics*, the construction of Alternative 2 would create 524 jobs. Of the 524 jobs created, 321 jobs (61 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 2 would create a total of six jobs, three of which are considered a direct effect and would include jobs in the maintenance and repair construction of non-residential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified on the local or regional level. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.6.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

Impacts under Alternative 2 relating to the educational opportunities offered in the YBWA on low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.1.1.7 Alternative 3: West Side Gated Notch

Alternative 3, West Side Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 3 is the location of the notch; Alternative 3 would site the notch on the western side of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (16.1 feet) because the river is higher at this upstream location. Alternative 3 would allow up to 6,000 cfs through the gated notch to provide open channel flow for adult fish passage. See Section 2.6 for more details on the alternative features.

22.1.1.7.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Impacts under Alternative 3 relating to construction effects and hazards exposed to minority and/or low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority populations **would not occur** due to the introduction of construction activities in Yolo and Sutter counties and Census Tracts 101.02, 112.06, and 114.

22.1.1.7.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

Impacts under Alternative 3 relating to minority and/or low-income employment within the Project area would be identical to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of croplands to a non-production state would reduce farmworker jobs, which are held largely by minority and low-income groups, by less than one job.

22.1.1.7.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

The construction period for Alternative 3 would be one season (April to November), about seven months. As described in Chapter 16, *Socioeconomics*, the construction of Alternative 3 would create 619 jobs. Of the 619 jobs created, 385 jobs (62 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 3 would create a total of six jobs, three of which are considered a direct effect and would include jobs in the maintenance and repair construction of nonresidential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified in the area of analysis. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.7.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

Impacts under Alternative 3 relating to the educational opportunities offered in the YBWA on low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.1.1.8 Alternative 4: West Side Gated Notch – Managed Flow

Alternative 4, West Side Gated Notch – Managed Flow, would have a smaller amount of flow entering the Yolo Bypass through the gated notch in Fremont Weir than some other alternatives,

but it would incorporate water control structures to maintain inundation for longer periods of time within the northern portion of the Yolo Bypass. Alternative 4 would include the same gated notch and associated facilities as described for Alternative 3; however, it would be operated to limit the maximum inflow to 3,000 cfs. See Section 2.7 for more details on the alternative features.

22.1.1.8.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Impacts under Alternative 4 relating to construction effects and hazards exposed to minority and/or low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority populations **would not occur** due to the introduction of construction activities in Yolo and Sutter counties and Census Tracts 101.02, 112.06, and 114.

22.1.1.8.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

Table 22-9 summarizes the effects on farmworker jobs that would be caused by the proposed cropland conversion associated with Alternative 4, based on the estimated employment values from Chapter 16, *Socioeconomics*. See Chapter 16 for a full analysis of the effects on employment, income, and output in the regional economy.

Table 22-9. Employment Effects of Converting Croplands under Alternative 4

Gate Closure Date	Total County Farmworkers[1]	Farmworker Jobs Affected	Total Jobs Affected	Percent of Jobs Affected that are Farmworkers	Percent of Total County Farmworkers that are Affected
March 15	41,595	-0.5	-1.5	33%	<1%
March 7	41,595	-0.4	-1.3	31%	<1%

Source: United States Census Bureau 2006-2010. Direct effect of converting croplands (Chapter 16, Tables 16-24 and 16-25)

Notes:

[1] Represents the total number of laborers and helpers in Yolo County.

[2] Negative values represent lost jobs, while positive values represent additional jobs

As shown in Table 22-9, the two gate closure date options would result in 1.3 to 1.5 jobs lost in Yolo County due to the conversion of croplands to nonagricultural use; 0.4 to 0.5 of which would be farmworker jobs. Even though up to 33 percent of the total jobs lost due to cropland conversion would be farmworker jobs, the total number of jobs lost would be no more than 1.5 jobs (less than one percent of farmworker employment in Yolo County). Although the area's farmworker community is considered to include both minority and low-income populations, cropland conversions to nonagricultural use in the Project area would not result in a disproportionately high effect on minority and/or low-income employment because the alternative would result in a minimal loss of county farmworker jobs. Fluctuations in farmworker employment occur under existing conditions. This slight shift in employment could be

experienced under existing market conditions and is therefore not considered to be a disproportionately high effect on minority and/or low-income populations.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of farmlands to a non-production state would result in a marginal reduction in farmworker jobs in Yolo County, which are held largely by minority and low-income groups.

22.1.1.8.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

The construction period for Alternative 4 would be one season (April to November), about seven months. As described in Chapter 16, *Socioeconomics*, the construction of Alternative 4 would create 873 jobs. Of the 873 jobs created, 532 jobs (61 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 4 would create a total of eight jobs, four of which are considered a direct effect and would include jobs in the maintenance and repair construction of nonresidential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified in the area of analysis. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.8.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

Alternative 4 would result in increased periods of inundation from one to three weeks, dependent on the location within the YBWA, which could reduce access to roads and YBWA facilities, reducing the amount of field trips for the Discover the Flyway program. The reduction in the number of field trips available at the YBWA could affect up to 30 percent of Title 1 schools in DJUSD and up to 57 percent of Title 1 schools in SCUSD. This would suggest that there could be a disproportionate effect on the educational opportunities of low-income students in SCUSD but not on those in DJUSD. Therefore, disproportionately high or adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.1.1.9 Alternative 5: Central Multiple Gated Notches

Alternative 5, Central Multiple Gated Notches, would improve the entrainment of fish by using multiple gates and intake channels so that the deeper gate could allow more flow to enter the bypass when the river is at lower elevations. Flows would move to other gates when the river is higher to control inflows. Alternative 5 incorporates multiple gated notches in the central

location on the existing Fremont Weir that would allow combined flows of up to 3,400 cfs. See Section 2.8 for more details on the alternative features.

22.1.1.9.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Impacts under Alternative 5 relating to construction effects and hazards exposed to minority and/or low-income populations within the Project area would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority populations would not occur due to the introduction of construction activities in Yolo and Sutter counties and Census Tracts 101.02, 112.06, and 114.

22.1.1.9.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

Impacts under Alternative 5 relating to minority and/or low-income employment within the Project area would be similar to those discussed for Alternative 1. Table 22-10 summarizes the effects on farmworker jobs caused by the proposed cropland conversion associated with Alternative 5, based on the estimated employment values from Chapter 16, *Socioeconomics*. See Chapter 16 for a full analysis of the effects on employment, income, and output in the regional economy.

Table 22-10. Employment Effects of Converting Croplands under Alternative 5

	Total County Farmworkers[1]	Farmworker Jobs Affected	Total Jobs Affected	Percent of Jobs Affected that are Farmworkers	Percent of Total County Farmworkers that are Affected
Yolo County	41,595	-0.3	-0.7	43%	<1%

Source: United States Census Bureau 2006-2010. Direct effect of converting croplands (Chapter 16, Table 16-29)
Notes:
[1] Represents the total number of laborers and helpers in Yolo County.
[2] Negative values represent lost jobs, while positive values represent additional jobs

As shown in Table 22-10, 0.7 jobs would be lost in Yolo County due to the conversion of croplands to nonagricultural use, 43 percent of which would be farmworkers. Even though 43 percent of the total jobs lost due to cropland conversion would be farmworker jobs, the total number of jobs lost would be less than one percent of farmworker employment in Yolo County (less than one job). Although the area's farmworker community is considered to include both minority and low-income populations, cropland conversions to nonagricultural use in the Project area would not result in a disproportionately high effect on minority and/or low-income employment because the alternative would result in a minimal loss of farmworker jobs. Fluctuations in farmworker employment occur under existing conditions. This slight shift in employment could be experienced under existing market conditions and is therefore not considered to be a disproportionately high effect on minority and/or low-income populations.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of farmlands to a non-production state would result in a marginal reduction in farmworker jobs, which are held largely by minority and low-income groups.

22.1.1.9.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

As described in Chapter 16, *Socioeconomics*, the construction of Alternative 5 would create 1,068 jobs. Of the 1,068 jobs created, 697 jobs (65 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 5 would create a total of 10 jobs, five of which are considered a direct effect and would include jobs in the maintenance and repair construction of nonresidential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified in the area of analysis. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.9.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

Alternative 5 would result in increased periods of inundation in most areas of the YBWA of one to two weeks, while other areas would be inundated for an additional two to three weeks, which could reduce access to roads and YBWA facilities, reducing the amount of field trips for the Discover the Flyway program. The reduction in the number of field trips available at the YBWA could affect up to 30 percent of Title 1 schools in DJUSD and up to 57 percent of Title 1 schools in SCUSD. This would suggest that there could be a disproportionate effect on the educational opportunities of low-income students in SCUSD but not on those in DJUSD. Therefore, disproportionately high or adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.1.1.9.5 Tule Canal Floodplain Improvements (Program Level)

As described in Section 2.8.1.7, Alternative 5 would include floodplain improvements along Tule Canal, just north of Interstate 80. These improvements would not be constructed at the same time as the remaining facilities. They are included at a program level of detail to consider all of the potential impacts and benefits of Alternative 5. Subsequent consideration of environmental impacts would be necessary before construction could begin.

Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

Construction of the Tule Canal Floodplain Improvements would be completed within one year over a 28-week period between April and October. As described in Chapter 16, *Socioeconomics*, the construction of these improvements would create 266 jobs. Of the 266 jobs created, 135 jobs (51 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for the Tule Canal Floodplain Improvements would create a total of 10 jobs, five of which are considered a direct effect and would include jobs in the maintenance and repair construction of nonresidential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified in the area of analysis. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.10 Alternative 6: West Side Large Gated Notch

Alternative 6, Large Gated Notch, is a large notch in the western location that would allow flows up to 12,000 cfs. It was designed with the goal of entraining more fish while allowing more flow into the bypass when the Sacramento River is at lower elevations. See Section 2.9 for more details on the alternative features.

22.1.1.10.1 Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction

Impacts under Alternative 6, relating to construction effects and hazards exposed to minority and/or low-income populations within the Project area, would be similar to those discussed for Alternative 1.

Disproportionately high and adverse effects on minority populations **would not occur** due to the introduction of construction activities in Yolo and Sutter counties and Census Tracts 101.02, 112.06, and 114.

22.1.1.10.2 Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment

Impacts under Alternative 6 relating to minority and/or low-income employment within the Project area would be similar to those discussed for Alternative 1. Table 22-11 summarizes the effects on farmworker jobs that would be caused by the proposed cropland conversion associated with Alternative 6, based on the estimated employment values from Chapter 16, *Socioeconomics*. See Chapter 16 for a full analysis of the effects on employment, income, and output in the regional economy.

Table 22-11. Employment Effects of Converting Croplands under Alternative 6

	Total County Farmworkers[1]	Farmworker Jobs Affected	Total Jobs Affected	Percent of Jobs Affected that are Farmworkers	Percent of Total County Farmworkers that are Affected
Yolo County	41,595	-0.5	-0.9	56%	<1%

Source: United States Census Bureau 2006-2010. Direct effect of converting croplands (Chapter 16, Table 16-35)
Notes:
[1] Represents the total number of laborers and helpers in Yolo County.
[2] Negative values represent lost jobs, while positive values represent additional jobs

As shown in Table 22-11, 0.9 jobs would be lost in Yolo County due to the conversion of croplands to nonagricultural use, 56 percent of which would be farmworkers. Even though 56 percent of the total jobs lost due to cropland conversion would be farmworker jobs, the total number of jobs lost would be less than one job (less than one percent of farmworker employment in Yolo County). Although the area's farmworker community is considered to include both minority and low-income populations, cropland conversions to nonagricultural use in the Project area would not result in a disproportionately high effect on minority and/or low-income employment because the alternative would result in a minimal loss of farmworker jobs. Fluctuations in farmworker employment occur under existing conditions. This slight shift in employment could be experienced under existing market conditions and is therefore not considered to be a disproportionately high effect on minority and/or low-income populations.

Disproportionately high and adverse effects on minority and low-income employment **would not occur** because the conversion of farmlands to a non-production state would result in a marginal reduction in farmworker jobs, which are held largely by minority and low-income groups.

22.1.1.10.3 Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment

The construction period for Alternative 6 would be one season (April to November), about seven months. As described in Chapter 16, *Socioeconomics*, the construction of Alternative 6 would create 1,044 jobs. Of the 1,044 jobs created, 627 jobs (60 percent) are considered a direct effect of construction and would include planning, design, construction, and administrative jobs. In addition, the annual maintenance for Alternative 6 would create a total of 11 jobs, 6 of which are considered a direct effect and would include jobs in the maintenance and repair construction of nonresidential structures sector. This analysis assumes that laborers would be supplied by Yolo, Sutter, Solano, and Sacramento counties.

Minority populations are present in Yolo, Sutter, Solano, and Sacramento counties and in Census Tracts 101.02, 112.06, and 114. Low-income populations were not identified on the local or regional level. Therefore, construction activities in the Project area would result in a temporary increase in minority employment.

This impact would be temporarily **beneficial** because construction activities would create temporary jobs that would be supplied by workers in Yolo, Sutter, Solano, and Sacramento counties, which could include those in Census Tracts 101.02, 112.06, and 114, all of which have minority populations over 50 percent.

22.1.1.10.4 Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students

Alternative 6 would increase typical periods of inundation in most areas within the YBWA by two to three weeks, while other areas would be inundated for an additional three to four weeks, which could reduce access to roads and YBWA facilities, reducing the amount of field trips for the Discover the Flyway program. The reduction in the number of field trips available at the YBWA could affect up to 30 percent of Title 1 schools in DJUSD and up to 57 percent of Title 1 schools in SCUSD. This would suggest that there could be a disproportionate effect on the educational opportunities of low-income students in SCUSD but not on those in DJUSD. Therefore, disproportionately high or adverse effects to the educational opportunities offered in the YBWA on low-income students **could occur** due to increases in inundation in the YBWA.

22.3.4 Summary of Impacts

Table 22-12 provides a summary of the identified effects the Project may have on environmental justice populations within the area.

Table 22-12. Summary of Impacts – Environmental Justice

Impact	Alternative	Effects Determination
Impact EJ-1: Exposure of a minority and/or low-income population to adverse and disproportionately high effects or hazards from Project construction	No Action	No Impact
	All Action Alternatives	Adverse and Disproportionate Effect Would Not Occur
Impact EJ-2: Conversion of cropland to nonagricultural use could result in a disproportionately high effect on minority and/or low-income employment	No Action	No Impact
	All Action Alternatives	Adverse and Disproportionate Effect Would Not Occur
Impact EJ-3: Project construction activities and annual maintenance could increase minority and/or low-income employment	No Action	No Impact
	All Action Alternatives	Beneficial
Impact EJ-4: Project actions could reduce educational opportunities offered in the YBWA on low-income students	No Action	No Impact
	All Action Alternatives	Adverse and Disproportionate Effect Could Occur

22.4 Cumulative Impacts Analysis

This section describes the cumulative impacts analysis for Environmental Justice. Section 3.3 presents an overview of the cumulative impacts analysis, including the methodology, and the projects, plans, and programs considered in the cumulative impacts analysis.

22.4.1 Methodology

This evaluation of cumulative impacts for environmental justice considers the effects of the Project and how they may combine with the effects of other past, present, and future projects or actions to create significant impacts on specific resources. The area of analysis for these cumulative effects includes Yolo, Sutter, Solano, and Sacramento counties. The timeframe for this cumulative analysis includes the past, present, and probable future projects producing related or cumulative impacts that have been identified in the area of analysis. This cumulative effect analysis utilizes the project analysis approach described in detail in Section 3.3, *Cumulative Impacts*.

The projects that would require or result in construction activities within the Project area have the potential to impact environmental justice populations in combination with the Project alternatives. These projects are listed below:

- The American River Common Features General Reevaluation Report would involve extensive excavation activities in the Sacramento Bypass near the east side of the Yolo Bypass.
- The Sacramento River Basin-Wide Feasibility Study would include options to improve the bypass system that could consist of a combination of levee setbacks, weir expansions, and new bypass channels.
- The Lower Elkhorn Basin Levee Setback Project would remove portions of existing levees and improve or relocate associated infrastructure.
- The Sacramento River General Reevaluation Report considers widening bypasses and constructing setback levees.
- The Lower Cache Creek Flood Risk Management Feasibility Study would include levee construction near Yolo Bypass.

22.4.2 Cumulative Impacts

The Project alternatives would not result in disproportionately high and adverse effects to minority and/or low-income populations from construction activities. Cumulative impacts relating to transportation, air quality, and noise are discussed in Chapters 17, 18, and 20, respectively.

This analysis assumed that workers from Yolo, Sutter, Solano, and Sacramento counties would be used for construction-related work created by Project actions. The same assumption was made for the cumulative projects in the area. Minority populations were identified in Yolo, Sutter, Solano, and Sacramento counties. No low-income populations were identified. As discussed above, Project actions would not result in disproportionately high and adverse effects on minority employment due to construction. Therefore, the Project alternatives' contribution to the cumulative effects associated with environmental justice would not exacerbate the potential occurrence of disproportionately high impacts to minority populations in Yolo, Sutter, Solano, and Sacramento counties.

22.5 References

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23 Other NEPA/CEQA Required Disclosures

In addition to the factors described in the preceding chapters, California Environmental Quality Act (CEQA) requires consideration of significant and unavoidable impacts, National Environmental Policy Act (NEPA) requires consideration of Indian Sacred Sites and the relationship of short-term uses and long-term productivity, and both NEPA and CEQA require consideration of irreversible and irretrievable commitments of resources and growth-inducing impacts. These considerations are described below.

23.1 Irreversible and Irretrievable Commitment of Resources

NEPA requires that an Environmental Impact Statement (EIS) include a discussion of the irreversible and irretrievable commitments of resources that may be involved should an action be implemented. Similarly, the State of California (State) CEQA Guidelines (Section 15126, subdivision (c)) require that an Environmental Impact Report (EIR) include a discussion of the significant irreversible environmental changes that would be caused by a proposed project should it be implemented.

An irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled or those that are consumed or reduced to unrecoverable forms. The proposed action would result in the irreversible and irretrievable commitment of the following:

- Construction materials
- Nonrenewable energy
- Land area and associated loss of agricultural and recreational resources

Implementing Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) actions would require the permanent commitment of material resources. Under all alternatives, construction materials, including riprap material and rock slope protection bedding, would be committed to a variety of actions that would construct or modify existing facilities. The irreversible commitment of these material resources would result in a permanent loss of this resource for the future or alternative purposes.

Implementing Project actions would also commit nonrenewable energy in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for the construction, operation, and maintenance of actions. The electrical service required for operation of the headworks under all the alternatives would be three-phase at approximately 100 amperes and 48-volts alternating current (80 kilovolt ampere) during periods of gate operation for fish passage. The irreversible commitment of this nonrenewable energy would result in a permanent loss of this resource for the future or alternative purposes.

Constructing the Project components would permanently affect grazing land, Farmland of Local Potential, and some Prime Farmland and Unique Farmland and result in a reduction in crop

yields where agricultural production would no longer be feasible due to the construction of project structures, as discussed in Chapter 11, *Land Use and Agricultural Resources*. Total loss of agricultural land due to project structures would be about 31 acres under Alternative 1; about 61 acres under Alternative 2; about 52 acres under Alternative 3; 101 acres under Alternative 4; 77 acres under Alternative 5; and 70 acres under Alternative 6. The majority of these construction-related permanently converted lands are designated as grazing lands within the Fremont Weir Wildlife Area (FWWA) and are not typically used for grazing purposes. Alternative 4 is the only alternative that includes construction actions that would convert Prime Farmland and Unique Farmland (1 acres and 30 acres, respectively). The commitment of this agricultural land would result in an irretrievable loss of this resource. In addition, longer inundation of agricultural parcels could delay planting dates and may cause landowners to temporarily remove land from production in some years, as discussed in Chapter 16, *Socioeconomics*. Under Alternatives 1, 2, and 3, there would be an average of 22 acres temporarily removed from production due to the increased period of inundation. Under Alternatives 4, 5, and 6, an average of 101, 44, and 26 acres, respectively, would be temporarily removed from production.

Implementing project actions would reduce the amount of area available for recreation use due to Project components, as discussed in Chapter 13, *Recreation*. Permanent components (e.g. headworks, control building, outlet transition, transport channel, and the supplemental fish passage) would convert existing lands at FWWA to non-recreational use. Total loss of land would be 26.7 acres under Alternative 1, 65.4 acres under Alternative 2, 48.4 acres under Alternative 3, 48.4 acres under Alternative 4, 78.9 acres under Alternative 5, and 65.8 acres under Alternative 6. The commitment of this recreational land would result in an irretrievable loss of this resource.

23.2 Relationship between Short-term Uses and Long-term Productivity

NEPA requires that an EIS consider "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 Code of Federal Regulations Section 1502.16). Such consideration involves using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare; create and maintain conditions under which humans and nature can exist in productive harmony; and fulfill the social, economic, and other requirements of present and future generations of Americans.

Construction activities would include short-term uses of capital, labor, fuels, and construction materials as well as habitats, agricultural areas, and recreation areas. General commitments of construction materials are largely irreversible because most of the construction materials are unsalvageable. Construction would also result in short-term construction-related effects such as interference with local traffic and circulation and increased air emissions, ambient noise levels, dust generation, and disturbance of wildlife. These effects would be temporary, occurring only during construction, and are not expected to alter the long-term productivity of the natural environment.

In the short term, implementing the Project would directly increase demand for construction and technical services. The additional economic activity in these sectors could create jobs for construction contractors and workers; consulting engineers and designers; environmental consultants, such as biologists, botanists, and ecologists; and other personnel. It also would indirectly increase economic activity in industries that provide construction materials and industries providing goods and services to construction workers. In turn, the demand for these services could result in new jobs.

Conversely, temporary fallowing of agricultural land or crop shifting, as discussed in Section 23.1, would result in fewer jobs in the agricultural sector. The effects of Project implementation on employment and economic activity are discussed in Chapter 16, *Socioeconomics*.

Long-term productivity resulting from implementing the Project would increase in some cases and would decrease or remain unchanged in others. The short-term increase in construction-related economic activity would not be sustained over the long term. Construction of project structures would also permanently convert some grazing lands and Farmlands of Local Potential to nonagricultural uses. Construction of Project structures for Alternative 4 could also permanently remove some Prime Farmland and Unique Farmland from agricultural production.

Within the Project area, implementation would result in other long-term effects such as increased aquatic habitat. No identified adverse effects would pose a long-term risk to human health and safety.

In summary, construction activities would generate regional economic activity in the short term, but these activities would not be sustained over the long term. The benefits of aquatic habitat restoration and self-sustaining salmon populations are substantial and would continue into the long term.

Implementing the Project, including implementation of mitigation measures as described in this EIS/EIR, would foster and promote the general welfare; create and maintain conditions under which people and nature can exist in productive harmony; and fulfill social, economic, and other requirements of present and future generations.

23.3 Indian Sacred Sites and Indian Trust Assets

As defined by Executive Order 13007: Indian Sacred Sites, a sacred site means “any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.” Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States government for Indian tribes or individuals, or property protected under United States law for federally recognized Indian tribes or individuals (e.g., land and minerals). ITAs can include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in stream flows associated with a reservation or Rancheria. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States government.

The results of the literature and records search indicate that a few ITAs are located within the Sacramento Valley, but none occur within the Project area of potential effect. Figure 23-1 includes a map of ITAs within the southern Sacramento Valley.

The Project area does not include Federal land, and the nearest ITA is approximately 20 miles northeast of the Project area; therefore, there is no potential for Indian Sacred Sites to be affected by the action alternatives.

23.4 Growth-Inducing Impacts

NEPA requires that an EIS consider indirect effects of a project, which are often the result of growth inducement. The State CEQA Guidelines require that an EIR discuss how a project may induce growth (California Code of Regulations, Title 14, Section 15126.2, subdivision (d)). A project will have a growth-inducing impact if it directly or indirectly:

- Removes obstacles to population or economic growth
- Requires the construction of additional community service facilities that could cause significant environmental effects
- Encourages and facilitates other activities that would significantly affect the environment, either individually or cumulatively

In *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal. App. 4th 342, 367–371 (110 Cal. Rptr. 2d 579), the California Court of Appeals, Fourth District, provided clear direction on the standards for disclosing growth-inducing effects. The EIR must describe the directness or indirectness of the effect. It must also describe the ability of the lead agency to forecast actual effects. Based on these factors, the lead agency may consider mitigation measures for the anticipated effects. Growth- inducing effects are evaluated for the alternatives in accordance with the California Court of Appeals' finding in *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001):

> Neither CEQA itself, nor the cases that have interpreted it, require an EIR to anticipate and mitigate the effects of a particular project on growth on other areas. In circumstances such as these, it is sufficient that the Final Environmental Impact Report warns interested persons and governing bodies of the probability that additional housing will be needed so that they can take steps to prepare for or address that probability. The Final Environmental Impact Report need not forecast the impact that the housing will have on as yet unidentified areas and propose measures to mitigate that impact. That process is best reserved until such time as a particular housing project is proposed.

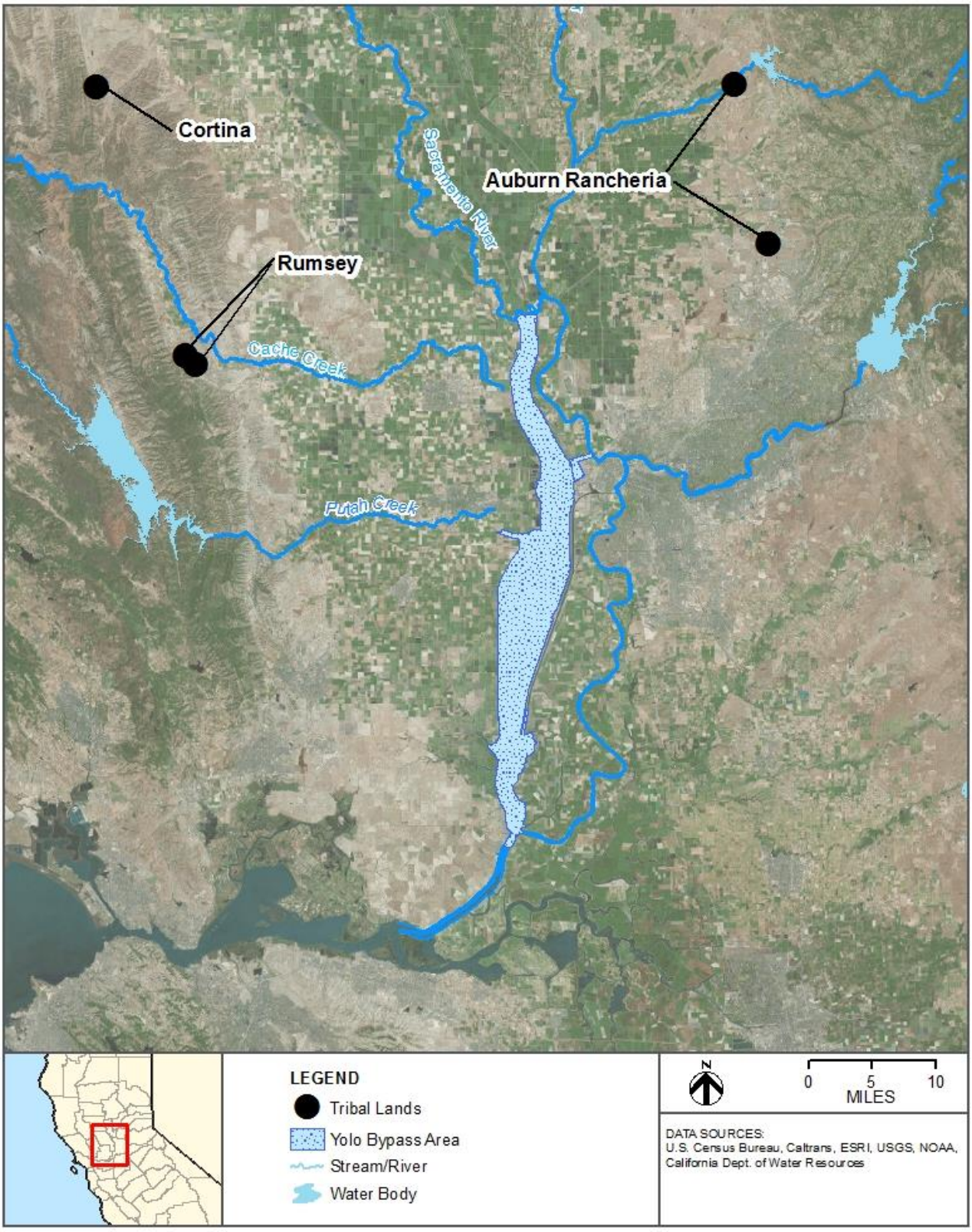

Figure 23-1. Yolo Bypass Proximity to ITAs in the Sacramento Valley (The name Rumsey was the old name used to describe the Yocha Dehe tribe).

None of the Project alternatives removes an obstacle to population or economic growth. No utility (i.e., domestic water, wastewater treatment, sewer, or stormwater treatment) expansion is proposed under any of the alternatives. No new, additional transportation facilities are proposed, nor is there any proposal to increase the capacity of existing facilities. In summary, implementing the Project would not induce growth because the construction workforce would partially come from other areas and is expected to increase demand only for temporary housing, such as hotels, motels, and apartments, and increased economic activity from added recreation opportunities would not be of a magnitude that would drive demand for new housing. Because service systems would not be constructed or expanded, none of the alternatives would remove an impediment to growth.

Project actions would not remove obstacles to growth or require construction of additional community service facilities that could cause significant environmental effects. There would be insufficient economic activity to increase demand for development above that anticipated by local land-use planning agencies.

23.5 Potentially Significant and Unavoidable Impacts

Section 21100, subdivision (b)(2)(A) of CEQA provides that an EIR shall include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapters 4 through 22 provide a detailed analysis of all potentially significant environmental impacts of implementing the Project alternatives, list feasible mitigation measures that could reduce or avoid the significant impacts of the alternatives, and specify whether these mitigation measures would reduce these impacts to a less than significant level. If a specific impact cannot be reduced to a less than significant level, it is considered a significant and unavoidable impact. As shown in Table 23-1, Project implementation would result in several significant and unavoidable environmental impacts.

Table 23-1. Summary of Significant and Unavoidable Impacts

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Water Quality				
Impact WQ-2: Operation-related degradation of surface water quality such that it would exceed regulatory standards or would substantially impair beneficial uses of surface water	1, 2, 3, 4, 5 (Project), 6	S	MM-WQ-4	SU
Aquatic Resources and Fisheries				
Impact FISH-15: Impacts to fish species of focused evaluation due to changes in adult fish passage conditions through the Yolo Bypass	6	S	—	SU

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Impact FISH-16: Impacts to fish species due to changes in potential for stranding and entrainment	4	S	—	SU
Impact FISH-17: Impacts to fish species due to changes in potential for predation	4	S	—	SU
Impact FISH-21: Impacts to fish species of focused evaluation and fisheries habitat conditions	5 (Program)	S	MM-WQ-1-3; MM-TERR-7; MM-FISH-1-5	SU
Cultural Resources				
Impact CULT-3: Impacts on archaeological sites that may not be identified through inventory efforts	All Action Alternatives	S	MM-CULT-3, 4	SU
Impact CULT-4: Damage to Buried Human Remains	5 (Program)	S	MM-CULT-5	SU
Land Use and Agricultural Resources				
Impact AGR-2: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, which may also be protected under the Williamson Act or other conservation programs, to nonagricultural or incompatible uses.	4	S	MM-AGR-1	SU
Air Quality				
Impact AQ-1: Violate air quality standards or contribute substantially to an existing or projected air quality violation	1, 2, 5	S	MM-AQ-1, MM-AQ-2, MM-AQ-3, MM-AQ-4	SU
	3, 4, 6	S	MM-AQ-1, MM-AQ-2, MM-AQ-3, MM-AQ-4, MM-AQ-5	SU
Impact AQ-2: Conflict with or obstruct implementation of the applicable air quality plan	1, 2, 5	S	MM-AQ-1, MM-AQ-2, MM-AQ-3, MM-AQ-4	SU
	3, 4, 6	S	MM-AQ-1, MM-AQ-2, MM-AQ-3, MM-AQ-4, MM-AQ-5	SU
Impact AQ-5: Generate criteria pollutants greater than general conformity *de minimis* thresholds	4, 5, 6	S	MM-AQ-1, MM-AQ-2, MM-AQ-3, MM-AQ-4	SU

Impact	Alternative	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
Noise				
Impact NOI-1: Exposure of persons to or generation of noise and vibration levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies	3, 4, 6	S	MM-NOI-1	SU
Impact NOI-2: Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels	All Action Alternatives	S	MM-NOI-1	SU
Impact NOI-4: A substantial temporary or periodic increase in ambient noise levels in the Project vicinity	All Action Alternatives	S	MM-NOI-1	SU

Key: S = significant; SU = significant and unavoidable

Where feasible mitigation exists, it has been included to reduce these impacts; however, the mitigation would not be sufficient to reduce these impacts to a less than significant level. Section 3.3, *Cumulative Impacts*, describes the contribution of the Project to effects caused, or that would be caused, by past, present, and reasonably foreseeable future actions.

23.5.1 Water Quality

All the action alternatives could result in significant and unavoidable impacts to water quality due to with additional inundation of the bypass. Additional inundation is expected to increase pesticides, salts, methylmercury production, bioaccumulation, and export in the outflow to the Sacramento River. Implementation of Mitigation Measure MM-WQ-4 would not be sufficient to reduce increases in water quality constituents to less than significant levels.

23.5.2 Aquatic Resources and Fisheries

Alternative 4 has the potential to affect aquatic resources because of issues associated with the water control structures in Tule Canal and the associated berms and fish bypass channels. These areas would have a significant impact on juvenile fish passage stranding because of the presence of substantially different hydraulic conditions associated with the water control structures and berms. These structures would also have significant impacts on predation of juvenile fish caused by predator fish congregating near artificial structures. Mitigation measures would not be able to reduce these impacts.

Alternative 5 would have significant effects on fish passage through the construction of the Tule Canal Floodplain Improvements. These features are analyzed at a program level. The improvements include a water control structure in Tule Canal to move water into a series of secondary channels. The water control structure would be a barrier to fish passage and could

have direct and indirect construction-related impacts on fish within the canal. Multiple mitigation measures (both in the *Aquatics* and *Terrestrial* sections) could reduce effects, but they would remain significant and unavoidable.

Alternative 6 could have significant effects on fish passage because it would have greater attraction flows entering the notch, which could attract more upstream-migrating fish into the Yolo Bypass instead of the Sacramento River. When these fish reach the Fremont Weir, fish passage may not be available back into the Sacramento River because Alternative 6 has a narrow window for fish passage. Mitigation measures would not be able to reduce these effects.

23.5.3 Cultural Resources

All the action alternatives have the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Although Mitigation Measures MM-CULT-3 and MM-CULT-4 would reduce impacts to cultural resources to the extent practicable, archaeological resources may not be identified prior to disturbance through these measures; therefore, the cumulative impact would remain significant and unavoidable.

Ground disturbing construction from the Tule Canal Floodplain Improvements could materially alter the physical characteristics that convey the significance of previously unidentified resources or disturb human remains. Implementation of Mitigation Measure MM-CULT-5 would minimize adverse effects to human remains; however, due to the uncertainty of the magnitude of the disturbance to human burials remains, the cumulative impact would remain significant and unavoidable.

23.5.4 Land Use and Agricultural Resources

Alternative 4 has the potential to convert agricultural land, including Prime Farmland and Unique Farmland, to nonagricultural or incompatible uses due to the construction of the water control structures in Tule Canal and their associated berms and fish bypass channels. Implementation of Mitigation Measure MM-AGR-1 would not be sufficient to reduce the impacts on agricultural resources to less than significant because it would not prevent the change to Prime Farmland and Unique Farmland.

23.5.5 Air Quality

All the action alternatives could result in significant and unavoidable impacts due to short-term and temporary construction activities. Emissions of inhalable particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) would exceed Yolo-Solano Air Quality Management District's (AQMD's) and Feather River AQMD's daily construction significance thresholds under all action alternatives; emissions of nitrogen oxides (NO_x) would exceed Yolo-Solano AQMD's annual construction significance threshold for all action alternatives; NO_x emissions would exceed Feather River AQMD's annual construction significance threshold for Alternatives 3, 4, and 6; and reactive organic gas (ROG) emissions would exceed Feather River AQMD's annual construction significance threshold for Alternative 6. Additionally, Alternatives 4, 5, and 6 would generate NO_x emissions that would exceed the general conformity *de minimis* thresholds. Mitigation measures, including applying gravel to

roads, using Tier 4 construction equipment, using on-road vehicles that meet 2010 emission standards, and implementing best available mitigation measures would reduce impacts, but impacts would remain significant.

NO_x emissions would exceed the Yolo-Solano AQMD's daily operational significance threshold for all action alternatives and daily ROG emissions would exceed Yolo-Solano AQMD's daily operational significance threshold for Alternative 4. Although mitigation would reduce impacts from several alternatives and pollutants to less than significant, operational NO_x emissions would remain significant and unavoidable for Alternatives 3, 4, and 6.

23.5.6 Noise

All the action alternatives could result in a significant and unavoidable noise and vibration impact at residences along haul routes. Residential receptors adjacent to the haul routes are located as close as 60 feet from the centerline of the road, and implementation of Mitigation Measure NOI-1 would not reduce noise and vibration levels to less than significant levels. Vibration levels from construction of the West Channel during implementation of Alternatives 3, 4, and 6 could also result in a significant and unavoidable vibration impact to the nearest residence to the West Channel. Vibration levels from construction of the Southern Water Control Structure and Fish bypass channel during implementation of Alternative 4 could result in a significant and unavoidable vibration impact to the nearest residence to the structure. Implementation of Mitigation Measure MM-NOI-1 would not reduce construction vibration to less than significant levels.

23.6 CEQA Preferred Alternative

For the purpose of CEQA and in light of the November 15, 2017 decision from the First Appellate District Court of Appeal of the State of California, Washoe Meadows Community v. Department of Parks and Recreation, DWR has identified Alternative 1 as the preferred alternative. DWR's identification of a preferred alternative does not foreclose any alternatives or mitigation measures, consistent with the California Supreme Court's decision in Save Tara v. City of West Hollywood. All of the alternatives have been analyzed at a comparable level in this Draft EIS/EIR. Reclamation has not identified a preferred alternative in this Draft EIS/EIR for NEPA purposes. Consistent with CEQ Regulations 40 CFR Part 46.425, the Final EIS/EIR will identify a NEPA preferred alternative for implementation (or alternatives if more than one exists).

DWR and Reclamation are seeking input on the alternatives and their environmental effects during the public review of this Draft EIS/EIR. DWR and Reclamation will consider feedback received during the public review on the Draft EIS/EIR and the environmental impacts associated with each alternative when developing the Final EIS/EIR and selecting an alternative for implementation. Any alternative could be selected by the lead agencies following the conclusion of environmental review.

DWR has identified Alternative 1 as the preferred alternative for CEQA because it balances the ability to achieve the project objectives with environmental effects. As discussed in *Chapter 8, Aquatic Resources*, Alternative 6 would provide the most benefit to juvenile salmonids by increasing availability of floodplain rearing habitat. However, Alternative 6 would provide less

benefit for adult fish passage (and would have significant unavoidable impacts related to fish passage under some conditions). Alternatives 1, 2, and 3 provide the best fish passage for adults, and provide moderate benefit for increased floodplain rearing habitat for juveniles.

Alternative 1 would have the smallest construction footprint, and would therefore minimize potential impacts that are driven by construction or facility size (such as air quality, vegetation and wildlife, wetlands, recreation access, and noise). It would have greater environmental effects than Alternatives 4 and 5 related to agricultural land use and waterfowl hunting; however, the differences between alternatives for these resources are of relatively small magnitude. Overall, Alternative 1 would minimize the environmental effects compared to the other alternatives considered for analysis.

23.7 Least Environmentally Damaging Practicable Alternative

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and California Department of Water Resources (DWR) are working closely with Federal, State, and regional agencies to meet regulatory requirements and avoid and minimize impacts and, where necessary, reach agreement on mitigation measures for impacts that cannot be avoided. One important process that integrates many of the applicable regulatory requirements is the Section 404(b)(1) process, as managed by the United States Army Corps of Engineers (USACE) with oversight from the United States Environmental Protection Agency. The 404(b)(1) process considers if the range of potential alternatives evaluated in the EIS/EIR is an appropriate range of "reasonable" and "practicable" alternatives using the best available information. USACE then determines the Least Environmentally Damaging Practicable Alternative (LEDPA) to meet requirements of NEPA, Sections 401 and 404 of the Clean Water Act, and Section 14 of the Rivers and Harbor Act, with consideration of compliance with the Federal Endangered Species Act and the National Historic Preservation Act. USACE's 404(b)(1) LEDPA determination is expected to be attached to the Final EIS/EIR.

23.8 Environmentally Superior Alternative

The Federal NEPA Council on Environmental Quality (CEQ) regulations require identification of an environmentally preferable alternative, and the State CEQA Guidelines (Section 15126.6[e]) require identification of an environmentally superior alternative. However, the CEQ Guidelines and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. The selection of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative although the identification of both will be based on the information presented in this EIS/EIR.

Section 1505.2(b) of the CEQ Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision. The CEQ Regulations define the environmentally preferable alternative as "…the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources."

Similar to the environmentally preferable alternative under NEPA, the CEQA Guidelines, Sections 15120 and 15126.6(e)(2), require identification of an environmentally superior alternative.

This EIS/EIR provides a substantive portion of the environmental information necessary for Reclamation and DWR to determine the environmentally preferable alternative. However, the public and other agencies reviewing a Draft EIS/EIR can assist the lead agencies to develop and determine environmentally preferable alternatives by providing their views in comments on the Draft EIS/EIR. At this phase in the process, DWR has identified Alternative 1 as the environmentally superior alternative because it balances the ability to achieve the project objectives with environmental effects (as described in more detail in Section 23.6). Reclamation has not yet identified an environmentally preferable alternative. Reclamation and DWR will consider feedback during the public review phase of the Draft EIS/EIR on the environmental benefits and impacts of each alternative when developing the Final EIS/EIR and Record of Decision.

23.9 Controversies and Issues Raised by Agencies and Public

CEQA requires the disclosure of controversial project issues raised by agencies and the public. Table 23-2 presents a summary of the Project issues identified during the scoping period. The scoping report (Reclamation and DWR 2013) provides further information on issues identified by agencies and the public during the scoping process.

Table 23-2. Summary of Controversies and Issues Raised by Agencies and the Public

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Flood Control Impacts	The Project must be flood neutral, and any potential impacts should be fully mitigated. The EIS/EIR must evaluate the projected annual frequency of flooding and the expected mean floodplain depth of the Yolo Bypass.	Chapter 4, *Flood Control*
Impacts to Fish	The EIS/EIR must establish a target of how many additional fish to include in the bypass and then analyze how well each alternative meets the target of additional fish to include in the bypass.	Chapter 8, *Aquatics Resources and Fisheries*
Impacts to Water Quality	Analysis must include water quality effects related to temperature, salinity, methylmercury, and agricultural drainage.	Chapter 6, *Water Quality*
Impacts to Waterfowl	The Project should avoid a net loss in habitat for waterfowl.	Chapter 9, *Vegetation, Wetlands, and Wildlife Resources*

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Impacts to Water Rights and Supply	The EIS/EIR should analyze potential changes to supplies of downstream users, including agricultural users and Sacramento-San Joaquin Delta diverters.	Chapter 5, *Surface Water Supply*
Impacts to Groundwater	The EIS/EIR should evaluate the impact of increased inundation on groundwater levels and seepage conditions and the impact of decreased flows on groundwater percolation.	Chapter 7, *Groundwater*
Impacts to Agriculture	The EIS/EIR should evaluate the potential effects of the seasonal timing of inundation on continued cultivation of crops, particularly rice.	Chapter 11, *Land Use and Agricultural Resources*, Chapter 16 *Socioeconomics*
Impacts to Endangered and Special Status Species	The EIS/EIR should survey the occurrence of and fully analyze potential impacts to all endangered special status species and their habitats within the Project area.	Chapter 9, *Vegetation, Wetlands, and Wildlife Resources*
Nonnative Species Impacts	The potential to encourage the establishment or proliferation of aquatic invasive species.	Chapter 8, *Aquatics Resources and Fisheries*
Mosquito Vector Control Impacts	The potential for unintended and secondary effects from late spring flooding that could result in increased mosquito populations.	Chapter 19, *Hazardous Materials and Health and Safety*
Impacts to Recreation	Impacts to recreation should be avoided, and if feasible, the Project should increase recreation opportunities.	Chapter 13, *Recreation*
Climate Change Impacts	The EIS/EIR should conform to the California Global Warming Solutions Act (Assembly Bill 32) and CEQA Guidelines to incorporate a climate change analysis.	Chapter 18, *Air Quality and Greenhouse Gases*
Transportation and Existing Infrastructure Impacts	The EIS/EIR should evaluate the potential effects from transportation routes, including emergency service routes. Transportation to and from Ryer Island should not be hindered during periods of inundation.	Chapter 17, *Transportation*

23.10 Mitigation Monitoring and Reporting Program

The Mitigation Monitoring and Reporting Program will be incorporated in the Final EIS/EIR.

23.11 References

Reclamation (Bureau of Reclamation) and DWR (California Department of Water Resources). 2013. *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Public Scoping Report.* Available at: https://www.usbr.gov/mp/BayDeltaOffice/docs/public-scoping-report.pdf. July 2013.

24 Consultation and Coordination

This chapter documents the consultation and coordination efforts that have occurred during development of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

24.1 Public Involvement

Both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) encourage public involvement during preparation of EISs and EIRs, respectively. The following sections describe the public involvement opportunities that have occurred during the EIS/EIR process.

24.1.1 Public Notices

On March 4, 2013, the United States Department of the Interior, Bureau of Reclamation (Reclamation) initiated the NEPA process by publishing in the Federal Register a Notice of Intent to prepare an EIS and hold public scoping meetings. On the same day, the California Department of Water Resources (DWR) initiated the CEQA process by publishing a Notice of Preparation with the State Clearinghouse (SCH) (SCH# 2013032004) to prepare an EIR and hold public scoping meetings.

24.1.2 Scoping Process

Multiple meeting notifications were used to announce the intent to start the EIS/EIR process and the public scoping meetings. Display advertisements were run in the Sacramento Bee, Daily Democrat, and West Sacramento Press. Reclamation sent a news release via email to approximately 437 stakeholders, agencies, and individuals that were on the Reclamation and DWR mailing lists. Reclamation and DWR also posted the meeting dates, times, and locations on their project websites at: http://www.usbr.gov/mp/BayDeltaOffice/Documents/yolo.html and http://www.water.ca.gov/environmentalservices/yolo_bypass_salmonid.cfm. On April 11, 2013, postcard notifications were mailed to approximately 150 landowners within the Yolo Bypass.

Public scoping meetings were held on March 14, 2013 in the cities of West Sacramento and Woodland, California. Fifty-four people attended the two meetings, including members of the public and representatives from public agencies. In addition to these scoping meetings, Reclamation and DWR presented information to, and received feedback from, members of the Yolo Bypass Fisheries Enhancement Planning Team (a working group for the Bay Delta Conservation Plan planning process). This team has been working on habitat restoration within the Yolo Bypass.

Both public meetings were held in an open house forum. Six information displays at four stations were set up to walk the public through known potential issues, impacts, agency roles, and opportunities for public involvement. Agency staff were assigned to each display to answer

questions and document issues identified by attendees on a flipchart that accompanied each display. The displays included the following information:

- Project area
- Purpose and need/project objectives and potential elements for alternatives
- Relationships to other projects and initiatives
- Environmental review process
- Key resource areas that have the potential to be affected
- Public participation

Verbal and written comments were received by Reclamation and DWR during both scoping meetings. Additionally, the agencies accepted written comments through mail, e-mail, and fax during the scoping period of March 4, 2013 through May 6, 2013. Table 24-1 provides a list of all commenter and, if available, the affiliation of the author. A hard copy of all scoping comments can be found in Appendix E of the *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Public Scoping Report* (Reclamation and DWR 2013).

Table 24-1. Commenters on the Public Scoping Report

Comment Author	Affiliation
Brown, David	Sacramento – Yolo Mosquito & Vector Control District
Cleak, Trevor	Central Valley Regional Water Quality Control Board
Daly, Barbara	North Delta CARES
Damion, Barbara	
Des Jardin, Deirdre	California Water Research
Katz, David	Knaggs Ranch, LLC and Cal Marsh & Farm Vineyards
Kulakow, Robin	Yolo Basin Foundation
Machado, Michael	Delta Protection Commission
Meserve, Osha	(on behalf of) Local Agencies of the North Delta
Messer, Cindy	Delta Stewardship Council
Oggins, Cy	California State Lands Commission
Orloff, Leah	Contra Costa Water District
Pogledich, Phillip	Yolo County
Pollock, Herbert and Lynnel	Pollock Farms
Pruner, Mark	Clarksburg Fire Protection District
Punia, Jay	Central Valley Flood Protection Board
Ross Merz, Lucas	Sacramento River Preservation Trust
Skophammer, Stephanie	U.S. Environmental Protection Agency, Region IX
Stone, Peter	
Suard, Nicole	Snug Harbor Resorts, LLC
Terry, Melinda	North Delta Water Agency
Wallace, Jim	Colusa Drain Mutual Water Company
Wilson, Mark	Wilson Farms & Vineyards

Based on comments received at the scoping meetings, Reclamation filed a notice on March 29, 2013 (posted April 23, 2013) with the Federal Register to reopen the public comment period for the scoping process. The comment period was originally announced to end on April 4, 2013 but was extended through May 6, 2013. Reclamation and DWR also circulated an additional press release notifying stakeholders of the extension.

Reclamation and DWR prepared the *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Public Scoping Report* (Reclamation and DWR 2013), which summarized the comments and concerns raised during the meetings as well as public comments obtained during the public comment period.

24.2 Agency Coordination

Coordination with Cooperating Agencies

In accordance with requirements of NEPA, Reclamation invited eligible governmental agencies to participate as a cooperating agency. The federal cooperating agencies include National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), United States Environmental Protection Agency, United States Army Corps of Engineers (USACE), and Natural Resources Conservation Service.

Reclamation also provided non-Federal agencies with the opportunity to participate as a cooperating agency in the NEPA process if they qualified under Council on Environmental Quality guidance. Reclamation has invited State of California (State) agencies, counties, cities, special districts, and Federally-recognized tribes to be cooperating agencies.

Non-Federal entities that met the specified criteria for cooperating agencies were required to enter into a Memorandum of Understanding (MOU) with Reclamation to memorialize their participation.

Reclamation signed cooperating agency MOUs with the following entities:

- California Central Valley Flood Control Association
- California Department of Fish and Wildlife
- California Regional Water Quality Control Board
- Central Valley Flood Protection Board
- Clarksburg Fire Protection District
- Metropolitan Water District of Southern California
- North Delta Water Agency
- Reclamation District 108
- Reclamation District 2068
- Sacramento-Yolo Mosquito and Vector Control District
- State and Federal Contractors Water Agency

- State Water Resources Control Board
- Yolo County Board of Supervisors

The development of the EIS/EIR required coordination with a variety of local, Federal, and State agencies. The following sections describe these agencies and their roles in the process.

24.2.1 Public Agencies

Multiple Federal, State, and local agencies may need to issue permits or approve the potential project. The Lead Agencies have worked to coordinate closely with these agencies through multiple means, including regular meetings and technical team participation (see Section 24.2.2).

24.2.1.1 NMFS

NMFS developed the *Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project*, which created the need for the Project. Reclamation and DWR need to consult with NMFS under Section 7 of the Endangered Species Act to obtain a biological opinion to implement the Project. NMFS participates in the monthly Core Team meetings with Reclamation and DWR, technical teams, and the landowner and stakeholder meetings (see Section 24.3). In September 2012, NMFS sent a letter to Reclamation concurring with the *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan*.

24.2.1.2 USFWS

Reclamation and DWR coordinated with USFWS on alternative development and analysis of potential impacts to terrestrial resources and associated mitigation. Reclamation and DWR need to consult with USFWS under Section 7 of the Endangered Species Act to obtain a biological opinion and under the Fish and Wildlife Coordination Act to implement the Project. USFWS participates in the monthly Core Team meetings with Reclamation and DWR, technical teams, and the landowner and stakeholder meetings.

24.2.1.3 USACE

The Project has the potential to affect wetlands and flood facilities. Therefore, Reclamation and DWR are coordinating with the USACE Regulatory Division regarding any development of a Clean Water Act Section 404 permit. Additionally, Reclamation and DWR are coordinating on a permit under Section 14 of the Rivers and Harbors Act (also called "Section 408" permit). The USACE participates in the monthly Core Team meetings with Reclamation and DWR, technical teams, and the landowner and stakeholder meetings.

24.2.1.4 California Department of Fish and Wildlife

Reclamation and DWR will need to obtain a consistency determination or incidental take permit under the California Endangered Species Act with the California Department of Fish and Wildlife (CDFW). CDFW has also been involved in alternatives development and analysis. CDFW participates in monthly Core Team meetings with Reclamation and DWR, technical teams, and the landowner and stakeholder meetings.

24.2.1.5 State Historic Preservation Officer

The Project requires compliance with 54 United States Code Section 306108, commonly known as Section 106 of the National Historic Preservation Act. To complete the Section 106 process, as outlined at 36 Code of Federal Regulations Part 800, Reclamation and DWR are required to consult with the State Historic Preservation Officer and afford the Advisory Council on Historic Preservation an opportunity to comment regarding the effects of the proposed undertaking on historic properties. Historic properties are cultural resources that are listed, or eligible for listing, on the National Register of Historic Places. Reclamation and DWR are preparing for this compliance process.

24.2.1.6 Central Valley Regional Water Quality Control Board

The Project could require permits from the Central Valley Regional Water Quality Control Board (RWQCB), including a dewatering permit and coverage under a National Pollution Discharge Elimination System permit for General Construction. Reclamation and DWR have been meeting regularly with the Central Valley RWQCB to determine the correct permits and their requirements, and will continue to coordinate.

24.2.1.7 Yolo-Solano Air Quality Management District

The Project has the potential to affect air quality in the Sacramento Valley Air Basin. Reclamation and DWR will coordinate with the Yolo-Solano Air Quality Management District regarding air quality impacts in the Sacramento Valley Air Basin.

24.2.1.8 Local Governments

The Project has the potential to affect land within Yolo and Sutter counties. Reclamation and DWR will coordinate with these cities potentially affected by the Project. Yolo County has participated on technical teams and landowner and stakeholder coordination.

24.2.1.9 Tribal Governments

Consistent with Executive Order 13175, April 29, 1994 memorandum, and the November 5, 2009 memorandum, Reclamation must establish regular and meaningful consultation and collaboration with tribal officials. Reclamation and DWR met with the Yocha Dehe Tribe on March 2, 2016.

Reclamation will continue to consult with each tribe before taking any action that could affect a tribal government. Under the Federal Trust responsibility, Reclamation will provide full disclosure of the beneficial and adverse impacts of the Project to the tribal government in a manner that provides adequate time for review and response. Reclamation will review comments received and consult with the tribal government prior to decisions related to the Project.

24.2.2 Technical Teams

Reclamation and DWR established several technical teams to help develop and analyze the alternatives. Members of the teams were selected because of their technical expertise in the subject matter. These teams and their membership include:

- Fisheries and Engineering Technical Team: Conducted fish benefit analysis of fish passage design, gate selection/design, and agricultural road crossing design. This analysis included the development of a set of fish passage criteria that identified if adult salmon and sturgeon would be able to pass Project structures and move upstream into the Sacramento River. Members include representatives from Reclamation, DWR, NMFS, USFWS, CDFW, USACE, and Yolo County.
- Hydraulic Modeling Technical Team: Assisted with model selection, model runs and analysis, quality assurance, and quality control. Members include representatives from Reclamation, DWR, and USACE.
- Land Use and Agricultural Technical Team: Confirmed land uses and reviewed agricultural impact modeling and analysis. Members include representatives from Reclamation, DWR, and Yolo County.
- Terrestrial Working Group: Obtained temporary entry permits, performed survey work, and met with landowners. Members include representatives from Reclamation, DWR, USFWS, and CDFW.
- Design and Engineering Technical Team: Established basis of design and cost estimates. Members include representatives from Reclamation, DWR, NMFS, USFWS, CDFW, and USACE.
- GIS and Data Support Team: Set up and maintained a data-sharing portal and the project website. Members include representatives from Reclamation and DWR.

24.3 Landowner and Stakeholder Coordination

24.3.1 Yolo Bypass Fisheries Enhancement Planning Team

During development of the Bay-Delta Conservation Plan, DWR formed a stakeholder group, the Yolo Bypass Fisheries Enhancement Planning Team, which included resource agencies, landowners, and non-governmental organizations (NGOs) to help develop a plan for the Yolo Bypass. As the Project started, the Lead Agencies worked through this venue to coordinate with landowners, NGOs, and stakeholders.

24.3.2 Value Planning

Value Planning is part of the federal process in planning projects. The purpose of Value Planning is to identify project objectives and develop approaches to meet those project objectives (Reclamation 2015). Value Planning includes agency representatives, landowners, NGOs, and other stakeholders but is designed to focus on those that have not been key participants in the alternatives formulation process. Reclamation conducted a Value Planning Session in August 2014.

24.3.3 Working Group

After the Value Planning process, the stakeholders that participated in the process continued to meet independently to advance jointly acceptable projects. Additional stakeholders joined this group, which became the Yolo Bypass Biological Opinion Working Group. The Yolo Bypass Biological Opinion Working Group includes a collection of local agencies, landowners, NGOs, and stakeholders that have interests in the Project. The Lead Agencies started working with this group in 2015 to develop alternatives that would be acceptable to the Yolo Bypass Biological Opinion Working Group members, Lead Agencies, and resource agencies.

The Lead Agencies originally started working with this group to identify and refine alternatives, but have continued coordination during development of the impact analysis in this EIS/EIR. The Yolo Bypass Biological Opinion Working Group meetings occur about once every month or two, depending on material available for discussion. The Lead Agencies, NMFS, USFWS, USACE, and CDFW attend these meetings. The meetings provide a forum for the Lead Agencies to hear concerns from local agencies, landowners, NGOs, and stakeholders, and to share preliminary evaluation assessments for feedback.

24.4 References

Reclamation (United States Department of the Interior, Bureau of Reclamation). 2015. *Plain Text Explanation of Services Offered.* Accessed on June 27, 2017. Available at: https://www.usbr.gov/dso-dec/vp/windows/plaintext.html.

Reclamation (United States Department of the Interior, Bureau of Reclamation) and DWR (California Department of Water Resources). 2013. *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Public Scoping Report.* Available at: https://www.usbr.gov/mp/BayDeltaOffice/docs/public-scoping-report.pdf. July 2013.

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25 List of Preparers and Contributors

Name	Qualifications	Background/Expertise	Participation
Lead NEPA Agency: Bureau of Reclamation			
Janice Piñero	M.A. Organizational Leadership 17 years of experience	Environmental Compliance, Endangered Species Act	Program Manager, Alternatives Development, General Review, Policy Review and Direction
Ben Nelson	B.S. Natural Resources Management 7 years of experience	Environmental Compliance	Project Manager, General Review, Policy Review, NEPA Oversight
Josh Israel, Ph.D.	Ph.D. Ecology 15 years of experience	Fisheries Biologist	Alternatives Development, Analytical Tools Development, Technical Review
Luke Davis	B.A. Environmental Studies 4 years of experience	Environmental Compliance	General Review, Technical Review
Ian Smith	M.S. Environmental Science 8 years of experience	Fisheries Biologist	Fisheries, Technical Review
Nancy Parker	M.S. Civil Engineering 27 years of experience	Water Resources Planning and Operations	CalSim Modeling; CalSim Appendix primary author
Elissa Buttermore	M.S. Fisheries, Wildlife, and Conservation Biology/Toxicology 9 years of experience	Fisheries Biologist	Fisheries, Technical Review
Lead CEQA Agency: California Department of Water Resources			
Karen Enstrom	M.S. Biology / B.S. Wildlife Biology 27 years of experience	CEQA, Environmental Permitting, ESA/CESA, Biological Surveying	Program Manager; General Review; Policy Review; Technical Review; CEQA Agency Review Oversight
Manny Bahia, P.E.	B.S. Civil Engineering 11 years of experience	Water Resources Engineer	Engineering and Hydraulic and Hydrology oversight and review
Rajat Saha, Ph.D., P.E.	Ph.D., Water Resources Engineering 12 years of experience	Water Resources Engineer	Primary Author: Hydrology and Hydraulics; Technical Review Lead Author of following TMs: 1. Hydraulic Impact Analysis of Alt 01, 04, 05, and 06. 2. Cumulative Impact Analyses of YBSHRP and LEBLS projects – both with and without Sea-Level Rise (2070 Projection) Supporting Author of TM on ‘Ten Percent Design for Alternatives 1, 2, and 3’

Name	Qualifications	Background/Expertise	Participation
Francesca Nurmi, P.E.	B.S. Civil Engineering 7 years of experience	Water Resources Engineer	Hydrology and Hydraulic Support
Joshua Urias, P.E.	B.S. Civil Engineering 12 years of experience	Water Resources Engineer	Engineering Support
James Newcomb	B.A. Environmental Studies / Biology 15 years of experience	Fish Habitat Restoration	Project Manager, Alternatives Development, Analytical Tools Development, Technical Review
Josh Martinez	B.A. Environmental Studies 10 years of experience	Fish Habitat Restoration/ Fisheries Biology	Alternatives Development, Analytical Tools Development, Fisheries Benefits Analysis, Technical Review
Edmund Yu	M.S. Environmental Management (Ecology); B.S. Environmental and Resource Sciences 8 years of experience	Fish Habitat Restoration	Alternatives Development, Analytical Tools Development, Fisheries Benefits Analysis, Technical Review
Sheena Holley	M.S. Environmental Science; B.S. Biology 10 years of experience	Habitat Restoration/Threatened and Endangered Species Biology	Alternatives Development, Analytical Tools Development, Fisheries Benefits Analysis, Technical Review
Cooperating, Responsible, and Trustee Agencies			
Heather Swinney	B.S. Earth, Systems, Science, & Policy 13 years of experience	Fish and Wildlife Biologist	Technical Review
John DiGregoria	M.S. Earth Science B.S. Terrestrial Ecology 25 years of experience	Restoration Ecology/ Fish and Wildlife Biologist	Technical Review
Brycen Swart	M.S. Marine Resource Management 12 years of experience	Fisheries Biologist	Alternatives development and analysis
Marty Meisler, PhD, MBA, LEED AP BD+C	Ph.D. Biological Sciences, MBA Sustainability 30 years of experience	Endangered Species, CEQA/NEPA Planner, Design Thinking Practitioner	Managed team that developed Alternative 5
Curt Schmutte, P.E.	B.S. Civil Engineering 39 years of experience	Delta planning/flood control, project management, habitat restoration, modeling	Developed/analyzed Alternative 5, Value Planning team member
Primary Consultant: CDM Smith			
Carrie Buckman, P.E.	M.S. Environmental Engineering 19 years of experience	Water Resources Engineer	Project Manager; Primary Author: Description of Alternatives
Andria Loutsch, AICP	B.S. Economics 21 years of experience	Water Resources Planner	Primary Author: Introduction, Approach to Environmental Analysis
Stephen Dent, Ph.D.	Ph.D. Civil Engineering 9 years of experience	Environmental Engineer	Contributing Author: Water Quality
Donielle Grimsley	B.S. Biology 11 years of experience	Environmental Scientist	Primary Author: Water Quality

Name	Qualifications	Background/Expertise	Participation
Brian Heywood, P.E.	M.S. Civil Engineering 20 years of experience	Water Resources Engineer	Technical Review
Carolyn Huynh	M.S. Environmental Science, Environmental Science and Forestry 3 years of experience	Environmental Scientist	Primary Author: Visual Resources, Population and Housing
Ted Huynh, P.E., T.E.	M.S. Civil Engineering 8 years of experience	Transportation Engineer	Primary Author: Transportation
Anusha Kashyap	M.S. Environmental Engineering 7 years of experience	Environmental Engineer	Primary Author: Groundwater
James LaVelle, Ph.D, BCES	Ph.D. Toxicology/Risk Assessment 36 years of experience	Environmental Toxicologist	Contributing Author: Water Quality
Terichael Office	B.S. Environmental Engineering 3 years of experience	Water Resource Engineer	Primary Author: Land Use Planning and Agricultural Resources, Geology and Soils, Socioeconomics, Environmental Justice
Gwen Pelletier, ENV SP	M.S. Environmental Studies 16 years of experience	Environmental Scientist	Primary Author: Air Quality and Greenhouse Gas Emissions
Asami Tanimoto, P.E., LEED AP BD+C, ENV SP	M. Eng. Chemical Engineering 10 years of experience	Chemical Engineer	Primary Author: Noise
Kassandra Tzou, P.E.	M.S. Environmental Engineering 24 years of experience	Environmental Engineer	Technical Review
Suzanne Wilkins, AICP, ENV SP	B.S. Business Administration 28 years of experience	Planner	Primary Author: Public Services, Utilities, and Power, Hazardous Materials and Health and Safety
John Wondolleck	M.S. Zoology 42 years of experience	Environmental Scientist	Technical Review
Abbie Woodruff	Master of Urban and Environmental Planning 3 years of experience	Water Resource Planner	Primary Author: Other NEPA and CEQA Considerations, Consultation, Coordination, and Compliance
Primary Consultant: HDR			
Betty Dehoney, CEP, PMP, ENV SP	M.S. Biology 35 years of experience	NEPA/CEQA Planner	Task Leader EIS/EIR – Technical Reviewer
Dawn Edwards	M.S. Environmental Science 14 years of experience	Environmental Compliance and Terrestrial Impacts	Assistant Task Leader EIS/EIR; Biological Assessment Lead
Ian Welch	M.S. Biology 18 years of experience	Fish and Wildlife Biologist	Primary Author: Biological Assessment – Aquatics and Terrestrial Chapters

Name	Qualifications	Background/Expertise	Participation
David Ward	M.S. Natural Resources (Fisheries) 32 years of experience	Fisheries Biologist	Technical Review
Mark Stanley	M.S. Geotechnical Engineer 28 years of experience	Geotechnical Engineer	Contributing Author: Cultural Resources and Indian Trust Assets
Shelly Austin	M.S. Forestry 12 years of experience	Botanical and Restoration Ecologist	Primary Author: Vegetation, Wetlands, and Wildlife Resources
Todd Wong	B.S. Conservation Biology 16 years of experience	Terrestrial Biologist	Contributing Author: Vegetation, Wetlands, and Wildlife Resources
Matthew Paquette	B.A. Environmental Policy 17 years of experience	Environmental Scientist	Primary Author: Recreation Resources
David Beauchamp	Environmental Studies 12 years of experience	Water Resources	Contributing Author: Surface Water Supply; Flood Control, Hydraulics, and Hydrology
Morgan Neal	M.A., Marine Affairs, 11 years of experience	Fisheries Biologist	Primary Author: Aquatic Resources and Fisheries, Biological Assessment – Aquatic Species Findings and Mitigation
Ben Onanian	B.S. Marine Biology 6 years of experience	Fisheries Biologist	Contributing Author: Aquatic Resources and Fisheries
Nick Hood	B.S. Aquatic Biology 6 years of experience	Fisheries Biologist	Contributing Author: Aquatic Resources and Fisheries
Jacob Vander Meulen	M.S., Environmental Management (in progress), B.S., Fisheries Biology 7 years of experience	Fisheries Biologist	Contributing Author: Aquatic Resources and Fisheries
Lee Frederickson	B.S. Civil Engineering 40 years of experience	Civil Engineer	Engineering oversight and review
Jeff Weaver	B.S. Civil Engineering 19 years of experience	Water Resource Engineer	Hydrologic Modeling, Water Supply Analysis
Aimee Kindel	M.S. Civil Engineering 6 years of experience	Water Resource Engineer	Primary Author: Flood Control, Hydraulics and Hydrology, Surface Water Supply
Vinson Russo	B.S. Civil Engineering 8 years of experience	Civil Engineer	Channel Design, Modeling, Quantity Estimation, Cost Estimation, Initial Project Site Assessment, Impacts of Groundwater, Spoils Handling
Rusty Jones	M.S. Civil and Environmental Engineering 16 years of experience	1D/2D Hydraulic modeling	Hydraulic Modeling
Chris Acosta	B.S. Agriculture and Biosystems Engineering, Engineering Management 11 years of experience	1D/2D Hydraulic modeling	Hydraulic Modeling

Name	Qualifications	Background/Expertise	Participation
Omar Sencion	B.S. Civil Engineering 10 years of experience	1D/2D Hydraulic modeling	Hydraulic Modeling
Andy McCoy	Ph.D. Civil Engineering – Hydraulics and Water Resources 17 years of experience	1D/2D Hydraulic modeling	Technical Review
Brinton Swift	M.S. Civil Engineering 10 years of experience	1D/2D Hydraulic modeling, sediment transport	Geomorphology Memo, Scour Memo
Eduard Egov	B.S. Civil Engineering 4 years of experience	1D/2D Hydraulic modeling, Civil Design, Cost Estimation	Cost Estimation, Constriction and Constructability, Operation and Maintenance
Bogdan Bogdanovic	M.S. Structural Engineering 15 years of experience	Structural Engineer	Fremont Weir Gate Structure Design, Quantity and Cost Estimation
Sam Planck	M.S. Structural Engineering 25 years of experience	Structural Engineer	Hydraulic Structures, Technical Advisor
Matthew McGuire	M.S. Business Administration 17 years of experience	Mechanical Design for Gate Machinery	Gate Design Concepts
Daniel Gott	B.S. Electrical Engineering 25 years of experience	Electrical Engineer	Conceptual Electrical Design
Mary Mahoney	35 years of experience	Project Coordinator	Project Coordination
Carrie Ulrich	M.S. English 24 years of experience	Technical Writer	Editing
Consultant: Parus Consulting			
Tom Lagerquist	Graduate Studies in Public Policy and Administration 31 years of experience	Cultural Resources Management, Regulatory Compliance	Technical review
John Nadolski	Ph.D. Candidate 30 years of experience	Cultural Resources Management, Historical Archaeology	Contributing Author: Cultural Resources and Indian Trust Assets, cultural resources field surveys
Andrew Miller	M.A. Anthropology 8 years of experience	Cultural Resources Management, Regulatory Compliance	Primary Author: Cultural Resources and Indian Trust Assets

Key: AICP = American Institute of Certified Planners, B.A. = Bachelor of Arts, BCES = Board Certified Environmental Scientist, B.S. = Bachelor of Science, CEP = Certified Environmental Professional, ENV SP = Envision Sustainability Professional, LEED AP BD+C = LEED AP Building Design + Construction, M.A. = Master of Arts, M. Eng. = Master of Engineering, M.S. = Master of Science, P.E. = Professional Engineer, Ph.D. = Doctorate, PMP = Project Management Professional, T.E. Traffic Engineer

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26 Glossary

100-year flood: A flood having a 1 percent chance of being equaled or exceeded in magnitude in any given year.

acre-foot: The quantity of water required to cover 1 acre to a depth of 1 foot. Equal to 1,233.5 cubic meters (43,560 cubic feet).

affect/effect: To affect (a verb) is to bring about a change. An effect (usually a noun) is the result of an action.

affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as a result of a proposed human action.

air quality: Measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

alternatives: Courses of action that may meet the objectives of a proposed action at varying levels, including the most likely future without the project or action. An environmental impact statement (EIS) or an environmental impact report (EIR) identifies and objectively evaluates and analyzes all reasonable alternatives, including a no action alternative.

Ambient Air Quality Standards (AAQS): The U.S. Environmental Protection Agency sets National AAQS, as required by the Clean Air Act as amended in 1990, for pollutants considered harmful to public health or the environment. AAQS are in place for six pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

ambient noise: Also called background noise, ambient noise is the background sound pressure level at a given location, normally specified as a reference level to study a new intrusive sound source.

anadromous fish: Fish that spend a part of their lifecycle in the sea and return to freshwater streams to spawn. Anadromous fish are born in fresh water, migrate to the ocean to grow into adults, and then return to fresh water to spawn.

aquifer: An underground geologic formation of permeable rock that stores, transmits, and yields significant quantities of groundwater to wells and springs.

archaeology: The study of human activity through the recovery and analysis of material culture. The archaeological record consists of artifacts, architecture, biofacts or ecofacts, and cultural landscapes.

Bay Delta Conservation Plan: A habitat conservation plan proposed by the California Department of Water Resources (DWR), United States Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS), and U.S. Department of the Interior Bureau of Reclamation (Reclamation), under the Endangered Species Act, to address the most critical water issues facing California by

constructing new water delivery infrastructure and restoring aquatic habitat. In 2015, the plan was altered and renamed the California WaterFix.

berm: A horizontal strip or shelf built into an embankment or cut to break the continuity of the slope, usually to reduce erosion or to increase the thickness of the embankment at a point of change in a slope or defined water surface elevation. A horizontal step in the sloping profile of an embankment dam. A shelf or artificial ridge that breaks the continuity of a slope.

best management practice: A policy, program, practice, rule, regulation, or ordinance for the use of devices, equipment, or facilities that is an established and generally accepted practice resulting in more efficient use or conservation of water or a practice that has been given to indicate that significant conservation benefits can be achieved.

bypass: A region of land or a large artificial structure designed to convey excess flood waters from a river or stream to reduce the risk of flooding of a key point of interest, such as a city.

CALFED Bay-Delta Program: August 2000 joint Federal and State of California (State) program to address water related issues in the Sacramento-San Joaquin Delta (Delta).

California EcoRestore: A California Natural Resources Agency initiative implemented in coordination with State and Federal agencies to advance the restoration of at least 30,000 acres of Delta habitat by 2020.

California Endangered Species Act (CESA): California legislation that prohibits the "take" of plant and animal species designated by the California Fish and Game Commission as either endangered or threatened. Take includes hunting, pursuing, catching, capturing, killing, or attempting such activity. CESA provides the California Department of Fish and Wildlife (CDFW) with administrative responsibilities over the plant and wildlife species listed under the act as threatened or endangered. CESA also provides CDFW with the authority to permit the take of State-listed species under certain circumstances. See Fish and Game Code 2050–2116.

California Environmental Quality Act (CEQA): California legislation that requires State, regional, and local agencies to prepare environmental impact assessments of proposed projects with potentially significant environmental effects and to circulate these documents to other agencies and the public for comment before making decisions. CEQA requires the lead agency to make findings for all significant impacts identified in an EIR. The lead agency must adopt all mitigation to reduce environmental impacts to a less-than significant level, unless the mitigation is infeasible or unavailable and there are overriding considerations that require the project to be approved. See Public Resources Code 21001.1, 21002, 21080.

California WaterFix: Formerly known as the Bay Delta Conservation Plan, a plan to build two large, four-story tall tunnels to carry fresh water from the Sacramento River under the Delta toward the intake stations for the State Water Project (SWP) and the Central Valley Project (CVP).

CalSim model: CalSim is a planning tool and model designed to simulate the operations of the CVP and SWP reservoir and water delivery system under current and future conditions. CalSim predicts how reservoir storage and river flows would be affected based on changes in system operations. CalSim output is typically used to help assess impacts on water supply, water quality, aquatic resources, and recreation.

Central Valley Project (CVP): As defined by Section 3403(d) of the Central Valley Project Improvement Act, "all Federal reclamation projects located within or diverting water from or to the watershed of the Sacramento and San Joaquin rivers and their tributaries as authorized by the Act of August 26, 1937 (50 Stat. 850) and all Acts amendatory or supplemental thereto,....."

channel: Natural or artificial watercourse, with a definite bed and banks to confine and conduct continuously or periodically flowing water.

confluence: The flowing together of two or more streams; the place of meeting of two or more streams.

crest: The top surface of a weir or dam.

Critical Habitat: A description of the specific areas with physical or biological features essential to the conservation of a listed species and that may require special management considerations or protection. These areas have been legally designated via Federal Register notices.

cubic feet per second (cfs): A measure of the volume rate of water movement. As a rate of stream flow, a cubic foot of water passing a reference section in 1 second of time. One cfs equals 0.0283 meters per second (7.48 gallons per minute). One cfs flowing for 24 hours produces approximately 2 acre-feet.

cultural resources: Prehistoric and historic archaeological sites, architectural/built-environment resources (e.g., levees, weirs, buildings), and places important to Native Americans and other ethnic groups, generally 50 years old or older regardless of their significance

Delta excess conditions: These conditions exist when all water demands in the Delta watershed and export demands are being met by natural flows, and water in excess of that needed to meet Delta standards is flowing out the Delta.

deposition: Material settling out of the water onto the streambed. Occurs when the energy of the flowing water is unable to support the load of suspended sediment. The process of dropping or getting rid of sediments by an erosional agent such as a river or glacier.

dewatering: Removal of groundwater or surface water from a construction site.

distinct population segment: A vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species.

emigration: one-way fish movement from the home area.

Endangered Species Act (ESA) of 1973, as Amended: Federal legislation that is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and to provide programs for the conservation of those species, thus, preventing extinction of plants and animals. The law is administered by USFWS and NMFS, depending on the species.

entrainment: The incidental trapping of fish and other aquatic organisms in water diverted from streams, rivers, and reservoirs.

erosion: The gradual wearing away of land by water, wind, and general weather conditions.

exceedance: The likelihood of flows being higher than a specified flow rate. A flow with a 0.01 annual exceedance probability has a 1 percent likelihood of being exceeded in any given year.

fish passage: The movement of fish between the sea and any river, including upstream or downstream in that river.

fishery: A community of fish and their habitat.

flood: A temporary rise in water levels resulting in inundation of areas not normally covered by water. May be expressed in terms of probability of exceedance per year such as 1 percent chance flood.

floodplain: Any land area susceptible to inundation by floodwaters from any source.

floodway: The channel of a river or other watercourse and adjacent land areas that convey flood waters.

flow: The volume of water passing a given point per unit of time.

flow-dependent habitat: Lifestage-specific habitat, including suitable water depths, velocities, and substrate, that is, in part, contingent on-stream flow.

fry: a stage in juvenile salmonid development when a fish can find food for itself.

gated notch: structural change proposed to develop a deeper opening in the Fremont Weir with operational gates to control flow.

groundwater: Any water naturally stored underground in aquifers or that flows through and saturates soil and rock, supplying springs and wells.

groundwater level: Refers to the water level in a well and is defined as a measure of the hydraulic head in the aquifer system.

groundwater pumping: Quantity of water extracted from groundwater storage.

groundwater recharge: The natural and intentional infiltration of surface water into the zones of saturation.

habitat: The place or environment where a plant or animal naturally lives and grows.

habitat conservation plan: A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species; usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area.

headworks: Any structure at the head or diversion point of a waterway. It is used to divert water from a river into a canal or from a large canal into a smaller canal.

hydraulics: Study of the practical effects and control of moving water; used to refer to the relationship among channel geometry and flow, velocity, and depth of water.

hydrology: Scientific study of the properties, distribution, and behavior of water.

hydrostatic pressure: The pressure of water at a given depth resulting from the weight of the water above it.

Indian Sacred Sites: Historic properties of religious and cultural significance to Indian tribes.

Indian Trust Assets: Indian trust assets are legal interests in property held in trust by the federal government for federally recognized Indian tribes or individual Indians. “Assets” are anything owned that has monetary value.

inflow: Water that flows into a body of water.

intake: Any structure through which water can be drawn into a waterway. Any structure in a reservoir, dam, or river through which water can be discharged

lead agency: The government agency that has the principal responsibility for carrying out or approving a project and therefore the principal responsibility for preparing CEQA/National Environmental Policy Act (NEPA) documents. For the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project EIS/EIR, Reclamation is the Federal lead agency under NEPA, and DWR is the State lead agency under CEQA.

levee: A natural or artificial barrier that helps keep rivers from overflowing their banks.

methylmercury (MeHg): The organic form of mercury that accumulates in the food web and a potent neurotoxin that can impair reproduction and fetal development. Mercury is transformed by a process called methylation into methylmercury, which can be accumulated in the muscle and fatty tissue of fish.

migration corridor: A set route that migratory animals follow when they migrate from one area to another.

National Environmental Policy Act (NEPA): Federal legislation establishing the national policy that environmental impacts will be evaluated as an integral part of any major Federal action. Requires the preparation of an EIS for all major Federal actions significantly affecting the quality of the human environment.

Natural Community: A distinct and reoccurring assemblage of plants and animals associated with specific physical environmental conditions and ecological processes.

Notice of Determination: A brief notice to be filed by a public agency after it approves or determines to carry out a project subject to the requirements of CEQA.

outmigration: The seasonal movement of anadromous fish from fresh to salt water.

overtopping: Flow of water over the top of a dam or embankment.

paleontology: The study of the forms of life existing in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms.

parr: a stage in juvenile salmonid development when a fish feeds on small invertebrates and develops a pattern of spots and bars. This phase is larger than fry and smaller than smolts.

predation: a biological interaction where a predator (an organism that is hunting) feeds on its prey (the organism that is attacked).

public involvement: Process of obtaining citizen input into each stage of the development of planning documents. Required as a major input into any EIS or EIR.

qualitative: Having to do with quality or qualities. Descriptive of kind, type, or direction, as opposed to size, magnitude, or degree.

quantitative: Having to do with quantity, capable of being measured. Descriptive of size, magnitude, or degree.

rearing habitat: Areas where larval and juvenile fish find food and shelter.

Reasonable and Prudent Alternative: Alternative action identified during formal consultation (under Section 7 of the ESA) that: 1) can be implemented in a manner consistent with the intended purpose of the action; 2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; 3) are economically and technologically feasible; and 4) USFWS or NMFS believes would avoid the likelihood of jeopardizing the continued existence of listed species or result in the destruction or adverse modification of critical habitat (50 CFR 402.02).

Record of Decision: Concise, public, legal document required under NEPA that identifies and publicly and officially discloses the responsible official's decision on an alternative selected for implementation. It is prepared following completion of an EIS.

refuge: Wildlife refuges—certain portions of land set aside and managed by USFWS or CDFW to provide a water supply and vegetative habitat for migrating waterfowl and wildlife.

Sacramento-San Joaquin Delta (Delta): The legal Delta, as described in the California Water Code Section 12220, generally extends from Sacramento in the north, to Tracy to the south, and from Interstate 5 in the east to Collinsville in the west. The Delta covers approximately 738,000 acres.

salinity: The amount of dissolved salts in a given volume of water.

salmonids: Fish of the family Salmonidae, such as salmon and trout (including steelhead).

scenic vista: A viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public.

sediment: Any finely divided organic and/or mineral matter deposited by air or water in nonturbulent areas.

sedimentation: The phenomenon of sediment or other fine particulates entering a water body or being disturbed from the bottom of a water body such that they move downstream and settle on the substrate in other aquatic areas.

seepage: The slow movement or percolation of water through soil or rock. The movement of water into and through the soil from unlined canals, ditches, and water storage facilities.

siphon: A system of pipes and valves that may be used to convey water to a lower level over intervening higher ground without the use of a pump.

slough: A muddy or marshy area; a secondary channel of a river delta, usually flushed by the tide.

slurry wall: A civil engineering technique used to build reinforced concrete walls in areas of soft earth close to open water or with a high groundwater table. This technique is typically used to build diaphragm walls surrounding tunnels and open cuts and to lay foundations.

smolt: A young salmon that is undergoing physiological and morphological changes for life in seawater. Subyearling smolts are generally between 70 and 120 millimeters in fork length, whereas yearling smolts are usually larger than 180 millimeters in fork length.

spawning: The releasing and fertilizing of eggs by fish.

State Water Project: California's State-owned and -operated water project, consisting of 22 dams and reservoirs, which delivers water 600 miles from the Sacramento Valley to Los Angeles.

stranding: Any event in which fish are restricted to poor habitat as a consequence of physical separation from a main body of water.

subsidence: A local mass movement that involves principally the gradual downward settling or sinking of the earth's surface with little or no horizontal motion.

total maximum daily load: Estimates of the amount of specific pollutants that a body of water can safely take without threatening beneficial uses.

tributary: A stream flowing into a larger stream or a lake.

turbidity: A measure of the cloudiness of water caused by the presence of suspended matter. Turbidity in natural waters may be composed of organic and/or inorganic constituents and has direct implications to drinking water treatment.

visual resources: The natural and artificial features of a landscape that characterize its form, line, texture, and color.

water year: A continuous 12-month period for which hydrological records are compiled and summarized. In California, a water year begins October 1 and ends September 30 of the following year.

water year hydrologic classification: Characterization of the hydrologic record for streams into wet, normal, and dry periods. Based on the Sacramento Valley Index, water year classifications are determined using the following equation:

$$INDEX = 0.4 * X + 0.3 * Y + 0.3 * Z$$

Where:

X = Current year's April through July Sacramento Valley unimpaired runoff

Y = Current October through March Sacramento Valley unimpaired runoff

Z = Previous year's index

Classification	Millions of Acre-Feet
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4

weir: A barrier, such as a small dam, that restricts flow in a stream to raise water level or that diverts flow into a desired course.

Yolo Bypass: One of two flood bypasses in California's Sacramento Valley located in Yolo and Solano counties. Through a system of weirs, the bypass diverts floodwaters from the Sacramento River away from the city of Sacramento and other nearby riverside communities.

Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan: Prepared jointly by DWR and Reclamation to address two specific Reasonable and Prudent Alternative Actions set forth in the NMFS Operation Biological Opinion:

- Action I.6.1: Restoration of Floodplain Rearing Habitat through the increase of seasonal inundation within the lower Sacramento River basin
- Action I.7: Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon through the modification of Fremont Weir and other structures of the Yolo Bypass