Chapter 28
Environmental Justice

28.0 Summary Comparison of Alternatives

A summary comparison of a number of important environmental justice impacts is provided in Figure 28-0. This figure provides information on the magnitude of environmental justice impacts that are expected to result from all alternatives. Each alternative would potentially result in adverse environmental justice effects.

As depicted in Figure 28-0, environmental justice would be adversely affected under each alternative, with the exception of the No Action Alternative. Alternatives 4, 6B, and 7 would result in 22 environmental justice impacts, whereas Alternatives 3, 5, and 4A would result in 18 environmental justice impacts. Environmental justice impacts resulting from the remaining alternatives would fall within the 18 to 22 impact range. Potentially adverse impacts span many resource areas. For the preferred alternative, 4A, adverse environmental justice-related impacts would occur with respect to the following resources: land use, socioeconomics, aesthetics, cultural, public services and utilities, noise, and public health.

Table ES-8 in the Executive Summary provides a summary of all impacts disclosed in this chapter.

28.1 Introduction

This chapter analyzes the potential for the alternatives to cause disproportionately high and adverse human health or environmental effects on minority and low-income populations. This determination is required under Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Federal Register [FR] 7629), which requires an analysis of federal actions that have the potential to result in disproportionately high and adverse effects on minority and low-income populations. Memorandum No. ECM 95-3 (U.S. Department of the Interior 1995a) provides guidance for complying with EO 12898 and evaluation of the equity of impacts imposed on these populations relative to the benefit of the action. Unlike the executive order, CEQA does not require an analysis of environmental justice.

For purposes of this analysis, the definitions of minority and low-income populations provided in the Council on Environmental Quality's (CEQ's) *Guidance for Agencies on Key Terms in Executive Order 12898* (Council on Environmental Quality 1997) are used.

Minority individuals are defined as members of the following population groups.

- American Indian or Alaskan Native.
- Asian or Pacific Islander.
- Black.
- Hispanic.

Minority populations are identified by the following factors.

- Where the minority population percentage of the affected area is meaningfully greater than the minority population percentage of the general population. Examples would include small-scale minority communities, towns, villages, or American Indian reservation lands that may be located near or adjacent to project areas. Such groups or communities may be small, with highly concentrated minority populations, located within larger counties that are predominantly non-minority (U.S. Department of Agriculture 2014).
- Where the minority population percentage of the affected area exceeds 50% (Council on Environmental Quality 1997).

Low-income populations are identified based upon poverty thresholds provided by the U.S. Census Bureau (Council on Environmental Quality 1997:25), and identified as one of the following.

- The population percentage below the poverty level is meaningfully greater than that of the population percentage in the general population.
- The population percentage below the poverty level in the affected area is equal to or exceeds 20% (see Section 28.2.1, *Identification of Environmental Justice Populations in the Study Area*, for additional discussion on how this threshold was reached).

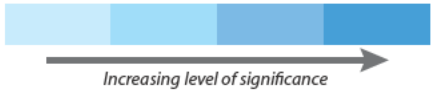
Significant concentrations of minority or low-income individuals are sometimes referred to as *environmental justice populations*. Historically, low-income and minority populations have suffered a greater share of the adverse environmental and health effects of industry and development relative to the benefits. The identification and mitigation of this potentially disproportionate burden is referred to as *environmental justice* (Rechtschaffen and Gauna 2002:3). The current regulatory framework for environmental justice reflects the convergence of civil rights concerns and environmental review processes. In the 1980s community organizers and environmental regulators identified three interrelated concerns. First, these groups identified a significant correlation between hazardous waste and other polluting facilities and demographic concentrations of minority and low-income communities. Second, advocates noticed that minority and low-income communities incurred a greater burden of environmental consequences relative to the benefits of industry and development, compared to the population at large. Third, minority and low-income communities often suffered a relative lack of access and involvement in environmental decision making relative to the population at large (Rechtschaffen and Gauna 2002:3). Environmental justice is now regulated through federal policy, with the assessment of environmental justice effects occurring as part of the National Environmental Policy Act (NEPA) process.

This chapter first provides an overview of the minority and low-income populations in the study area (the area in which impacts may occur) that are relevant for analysis of environmental justice effects. The study area consists of the geographic vicinity surrounding the footprint of the Plan Area (the area covered by the project) where effects have the potential to affect minority and low-income populations. A discussion of the regulatory setting follows, identifying the laws and policies that govern the decision-making processes of relevant federal agencies with a role in implementing the project. This chapter then analyzes the potential for the alternatives to result in disproportionately high and adverse environmental or health consequences on minority and low-income populations. This chapter does not analyze effects on community character, social and economic characteristics, or the balance of population, employment and housing; these topics are covered in Chapter 16, *Socioeconomics,* Sections 16.3.3 and 16.3.4.

Chapter 28 – Environmental Justice	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Number of impacts that could potentially result in adverse EJ effects	0	2	20	20	19	20	21	19	18	22	18	19	22	20	22	21	19	18	20	19
	n/a	n/a	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)



n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure 28-0
Comparison of Impacts on Environmental Justice

28.2 Environmental Setting/Affected Environment

28.2.1 Identification of Environmental Justice Populations in the Study Area

The following discussion describes minority, Hispanic, and low-income communities in the study area based on data from the 2010 decennial census. This section first identifies the census blocks with meaningfully greater total minority and Hispanic populations. A description of the overall distribution of minorities in the study area as well as relevant cultural practices and places follows. The section then describes block groups with meaningfully greater low-income populations as well as relevant employment characteristics associated with these populations.

The U.S. Census Bureau collects comprehensive demographic data every 10 years during the decennial census. This analysis uses data from the 2010 decennial census data (i.e., U.S. Census Bureau 2010). The U.S. Census Bureau collects demographic information on ethnicity at the level of census blocks (the smallest geographic unit used by the U.S. Census Bureau). Generally, several census blocks make up block groups, which make up census tracts. The population of a census block can vary, depending on the urban or rural nature of the area. Hispanic status is considered a geographic place of origin, rather than ethnicity, by the U.S. Census Bureau and is collected at the block level.

28.2.1.1 Meaningfully Greater Populations

Total minority data includes the constituent ethnic categories of Black/African-American, Asian, Native Hawaiian or Pacific Islander, and American Indian or Alaskan Native. Hispanic populations include persons originating in or descended from populations in Latin America and portions of the Caribbean. Consistent with the CEQ's 1997 Guidance, census blocks with greater than 50% total minority or Hispanic populations (minorities or minority populations) were identified within the study area.

Poverty status data is collected by the U.S. Census Bureau at the level of census block groups, a geographic unit that includes census blocks but is smaller than census tracts. For purposes of this analysis, low-income populations consist of persons living below the 2010 poverty threshold as defined by the U.S. Census Bureau (U.S. Census Bureau 2010). Meaningfully greater low-income populations were identified by low-income block groups (i.e., low-income populations) that contained 20% or greater low-income individuals (i.e., below the 2010 poverty threshold). Because the income required to sustain a household varies in relation to the number of individuals dependent upon a given quantity of income, there is no single threshold for poverty status (U.S. Census Bureau 2010). The 20% threshold was used because the cost of living in California is higher than elsewhere in the country, and thus the use of a 50% threshold might incorrectly under-identify low-income populations in the study area.

28.2.1.2 Minority Populations

Figure 28-1 depicts the census blocks with greater than 50% minority populations within the Plan Area. These data were generated based upon census data collected for all minority and Hispanic populations within the Plan Area, and included Appendix 28A, *Census Data,* Tables 28A-1 and 28A-2. In general, Figure 28-1 shows a wide distribution of census blocks with meaningfully greater

minority residents. Areas exhibiting high proportions of minority residents are present in both urban and rural areas, with many agricultural areas in the interior Delta exhibiting high proportions of minority residents.

The portion of the city of Sacramento within the study area is relatively small compared with the city's total urban area, but a concentration of minority residents is present in the Pocket area, west of Interstate 5 (I-5) and east of the Sacramento River. A similar concentration of minority residents is present immediately east of I-5 on both sides of Meadowview Road.

Urban areas in the city of Stockton also demonstrate high proportions of minority residents. Concentrations occur along I-5 going north from downtown Stockton. New development north of Mosher Slough in north Stockton also exhibits a high proportion of minority residents. A large cluster of minority residents north of Stockton is present near Stagg High School, just west of Akers. The areas south of the Port of Stockton on both sides of I-5 contain a high proportion of minority residents. The neighborhoods bounded by Charter Road in the north, I-5 to the east, and French Camp slough to the west and south also have high proportions of minority residents.

Minority residents in the city of Tracy, located in the southern end of the Delta, are mostly clustered on the edges of the urban area. Minority residents in other communities in the Delta, such as Brentwood and Oakley, do not generally cluster and are distributed throughout these areas. For example, census statistics for Brentwood show that only a few areas in the urbanized area show concentrations of minority residents, with the largest clusters located northeast of the community in the rural, agricultural areas. In the community of Oakley, a large concentration of minority residents is located east of Oakley Elementary School and south of State Route (SR) 4.

The city of Antioch exhibits relatively few areas with high proportions of minority residents, although one distinct cluster is located northeast of the city near Antioch High School, just east of Pittsburg. The city of Pittsburg, however, is almost completely composed of areas identified as having high proportions of minority residents.

As mentioned previously, there is a widespread distribution of areas identified as having high proportions of minority residents. These areas include a number of rural, agricultural communities in the study area. Many of the census blocks displayed in Figure 28-1 are relatively large because of the low population density residing in these areas. These census data show that the rural communities of Clarksburg, Hood, Courtland, Paintersville, Vorden, Locke, Walnut Grove, Ryde, Isleton, Maine Prairie, Bunker, Oxford, Thornton, Holt, and Gillis exhibit meaningfully greater proportions of minority residents. In addition to these communities, large rural areas outside designated communities also contain high proportions of minority residents, many of which have social and economic ties to the larger urban areas of Sacramento, Stockton, Tracy, Antioch, and Pittsburg.

28.2.1.3 Hispanic Residents

Figure 28-1 also includes the distribution of areas with meaningfully greater proportions of Hispanic residents in the study area. Of minority groups present in the study area, Hispanics are the most widely dispersed, and the concentrations of Hispanic populations are the most varied in their location, being present in both urban and rural locations. Of the major urban locations in the study area, Hispanic residents are the most concentrated in Pittsburg, with a large presence throughout the urban area centered on Railroad Avenue and California Avenue. High proportions of Hispanic residents are also located in Antioch, particularly in areas north of SR 4 and northeast of the Antioch

Fairgrounds. To the east, Oakley has a concentrated population of Hispanic residents in the northeastern end of the city, south of SR 4 and close to its intersection with O'Hara Avenue. Other urban areas in the western Delta with high proportions of Hispanic residents include Brentwood, where a concentrated population of Hispanic residents is present along SR 4 north to Oakley. These areas are also near Knightsen, although the concentrated areas of Hispanic residents are generally in suburban areas along SR 4.

Stockton also has a large distribution of Hispanic residents, although many of the areas with meaningfully greater proportions are scattered throughout the urban sections near the I-5/SR 4 interchange and areas of downtown Stockton north of Weber Point. The Hispanic population in Tracy is also relatively clustered, generally located east of Tracy Boulevard in the urban area.

Meaningfully greater proportions of Hispanic residents are present throughout the rural, agricultural lands of the Delta. A number of the smaller Delta communities discussed above also have concentrated Hispanic populations, including smaller towns on the periphery of the Delta such as Byron, Carbona, Banta, Cochrane, Lathrop, Gillis, Holt, Thornton, West Sacramento, Yolo, Bunker, Maine Prairie, and Rio Vista. Hispanic populations are also present in the small towns along the Sacramento River, including Clarksburg, Hood, Courtland, Paintersville, Vorden, Locke, Walnut Grove, Ryde, and Isleton. Finally, Hispanic populations are present on a number of agricultural islands and tracts outside the direct influence of a town center, especially in the northwest (centered loosely in Bunker), the eastern edge (east of Isleton), and the southern end (centered loosely in Holt) of the Delta.

28.2.1.4 Characteristics of Relevant Minority Populations

The following discussion presents socioeconomic and cultural information pertaining to individual minority groups in the Delta and vicinity. The information presented here was gathered primarily through an outreach effort conducted by the Delta Habitat Conservation and Conveyance Program. The outreach effort solicited and compiled the information provided by respondent members of minority groups regarding cultural significant practices as well as subsistence activity. This information was augmented with related secondary sources, and is meant to provide an example of the types of behaviors present in the diverse Delta area that may be affected by the action alternatives.

28.2.1.5 Cultural Practices and Social Activities

Cultural practices associated with particular minority groups, such as dancing, singing, holiday celebrations, and religious observances, may take place as part of the social activities described below. Unless otherwise indicated, the source of information for the following discussion is the Environmental Justice Community Survey Summary Report prepared for the project (California Department of Water Resources 2010).

The Delta is home to many social activities and special events that residents view as important for bringing people together and maintaining a sense of community. Activities valued by residents throughout the Delta include agricultural activities, extracurricular activities associated with schools, wine-tasting events, recreational activities, library fundraisers, religious events, educational activities, street fairs, farmers' markets, health fairs, and cultural events.

Examples of events that are important to Delta communities include the Courtland Pear Fair, Catfish Jubilee, Clarksburg Fun Run, Tracy Bean Festival, Fourth of July parades, Stockton Asparagus

Festival, Rio Vista Bass Festival, Creek Walk, Sacramento Jazz Festival and Jubilee, Pittsburg Seafood Festival, Ag Venture Days, Isleton Crawdad Festival (renamed the Cajun Festival in 2012) and annual pumpkin patches. These activities and events draw both minority group and nonminority group participants.

Input received through the lead agencies outreach effort indicates that multiple ethnic/racial groups in the Delta participate in activities and events such as Hot Summer Nights, Jazz Fest, farmers' markets, and Thursday Car Shows. However, many activities and events are more strongly associated with specific minority groups.

28.2.1.6 Culturally Relevant Places, Neighborhoods, Businesses, and Farmlands

The following discussion provides an overview of places and businesses of cultural relevance to minority groups in the Delta that are near the footprint of the action alternatives and therefore may be relevant to environmental justice effects. Because many Delta residents share values and a way of life that emphasizes a rural lifestyle, the vast majority of places and businesses in Delta communities attract people from several racial and ethnic groups. During early outreach efforts, specific responses were not received related to places or businesses that are culturally valued by Black/African-American, Native Hawaiian and Pacific Islander, and American Indian or Alaska Native residents. However, culturally valued places and businesses for Delta minority groups may include places such as religious institutions, community centers, favored hunting or fishing locations, neighborhoods, the Delta's waterways, and minority-owned markets and restaurants.

Asian communities with strong cultural ties to water may value the Delta's waterways. Specific points of interest to Asian communities may include the Chinese and Japanese area of Isleton and Locke's Chinatown. The Chinese and Japanese area of Isleton is registered today as a national historic district. Locke's Chinatown represents the largest, most complete example of a rural, agricultural Chinese-American community in the United States (National Park Service 2010). Although some Chinatowns in the Delta (e.g., Walnut Grove, Courtland, Rio Vista) began to disappear during the middle of the 20th century, Locke remained primarily Chinese through the 1970s (National Park Service 2010). Today, the number of Chinese residents in Locke is low, they are typically older and retired, and the total population of Locke is estimated at around 70.

Agricultural issues were also raised by ethnic groups during outreach. Specifically, ethnic groups cited agricultural resources as one of the best attributes of the Delta. Delta ethnic groups are concerned about water rights, lack of water, and salinity. Most of the respondents indicated that Latinos are the primary ethnicity employed by the agricultural industry in the Delta; however, some respondents indicated other groups, such as Asian, German, Portuguese, Italian, and Caucasian, are the primary ethnicity employed by the industry.

28.2.1.7 Subsistence and Recreational Activities

This section provides an overview of subsistence activities for individual Delta minority groups. According to Silver et al. (2007), fishing is a valued activity for minority groups in the Delta. For these populations, fishing is both a social or recreational activity and a food source. People who catch and eat fish as one of the primary food sources are often considered subsistence fishers. The U.S. Environmental Protection Agency (EPA) describes subsistence fishers as people who rely on noncommercial fish as a major source of protein and suggests that subsistence fishers tend to

consume noncommercial fish and/or shellfish at higher rates than other fishing populations, and for a greater percentage of the year, for cultural and/or economic reasons (U.S. Environmental Protection Agency 1994; U.S. Environmental Protection Agency 1996). The National Marine Fisheries Service (NMFS) also describes subsistence fishing as fishing for personal consumption or traditional/ceremonial purposes (NOAA 1997). Native American, lower income urban, rural, and Asian-American populations often include subsistence fishers (U.S. Environmental Protection Agency 1997).

Fish found in many waterways throughout the United States have high levels of toxins because of water pollution. Toxins pose a health risk when these fish are consumed by humans. Mercury is found in the Delta because it naturally occurs there and because of human activities, such as historic gold mining in the Delta's upper tributaries. Delta fish consumption is of particular concern because of contamination by methylmercury, a neurodevelopmental toxin (Silver et al. 2007).

Fish consumption rates differ for specific subpopulations, based on factors such as race, ethnicity, age, and sex (Office of Environmental Health Hazard Assessment 2001). Throughout the United States, minority groups, low-income communities, tribes, and other indigenous peoples tend to have higher fish consumption rates than the general population (U.S. Environmental Protection Agency 2002) with subsistence fishers consuming over eight times the general population consumption level.

Because of high fish consumption rates, minority populations throughout the United States tend to have high levels of mercury (particularly Asians, Pacific Islanders, and Native Americans) (Silver et al. 2007). Minority and low-income populations throughout the United States have also been found to have a low awareness of the risks involved with consuming fish contaminated with mercury (Silver et al. 2007). Fish consumption rates for subsistence fishers vary by season and availability of preferred species. The following discussion presents information about subsistence fishing by individual Delta minority groups.

According to key informant interviews, sportfishing is practiced year-round in the Delta. Southeast Asians, Latinos, and houseboat residents commonly catch and consume catfish, largemouth bass, bluegill, and carp (California Department of Health Services 2004). Southeast Asians also harvest clams for consumption. The results of the interviews with San Joaquin County health and environmental health professionals indicate that Southeast Asian, Latino, and African-American populations residing in the County may be at greater health risk attributable to fish contamination because of their fish consumption practices (California Department of Health Services 2004). These fish consumption trends may be similar in other areas of the Delta.

Results of the interviews with Sacramento County community-based organizations and community members indicate that the African-American community eats fish regularly (once a week) that is caught locally or purchased in stores or restaurants (California Department of Health Services 2004). The sportfish that are caught include catfish, bass, crappie, sturgeon, and carp (California Department of Health Services 2004).

Southeast Asians, particularly Vietnamese and Cambodians, fish regularly in Delta water bodies (California Department of Health Services 2004; Miller 2007). Representatives of a San Joaquin County Southeast Asian community-based organization have indicated that they believe that 80–90% of Southeast Asians residing in the County catch and/or eat fish caught in Delta water bodies (California Department of Health Services 2004). Cambodians, Lao, Hmong, and Vietnamese are reportedly the groups that most often fish. Locally harvested clams are eaten during summer. Many

Asians also purchase fish and shellfish from door-to-door vendors or at Asian farmers' markets. These recreation and consumption patterns may be similar to those in other Delta counties.

Fish and fishing provide links to traditional fishing and use of the Mekong Delta for Cambodians (Miller 2007), and fish is the main source of food for Delta Cambodian communities (Bowman 2008). Fish and shellfish caught locally and consumed regularly (two to three times per week) by the Cambodian community in San Joaquin County include catfish, striped bass, bluegill, salmon, crawfish, and trout (California Department of Health Services 2004). In addition, many Cambodians reportedly eat locally caught catfish daily (California Department of Health Services 2004). Awareness of the health risks associated with consumption of contaminated fish appears to be low in the Cambodian community in San Joaquin County. For example, Cambodian-speaking participants in a 2003 focus group held in Stockton indicated that they were not aware of these health risks (California Department of Health Services 2004). These subsistence trends for Cambodian residents of San Joaquin County may be similar to those in other areas of the Delta.

The San Joaquin County Vietnamese community eats fish and shellfish regularly (approximately two to three times per week) (California Department of Health Services 2004). Striped bass and catfish are caught locally and consumed by the Vietnamese community.

Although limited data exist for subsistence fishing by NHPI Delta residents, in a study of fish consumption practices by low-income minority groups in the Delta, Silver et al. (2007) found that fish consumption by this minority group was relatively high. Specifically, Vietnamese, other Asians and Pacific Islanders (which included all Asians except for Hmong, Cambodian, Vietnamese, and Filipina participants), and African-American participants had the highest fish consumption rates, and white and Native American participants the lowest (Silver et al. 2007).

Pomo Indian Tribes eat fish, caught by themselves or someone they know, from nearby water bodies, such as Clear Lake and the Sacramento River, and many local tribe members eat catfish, crayfish, bass, salmon, trout, and hitch from local water bodies regularly (California Department of Health Services 2004).

The results of a focus group conducted in Spanish with representatives of a community-based organization indicate that many Delta Latinos eat fish regularly (at least once a week) that they catch in local water bodies (including the Delta) or buy in local markets (California Department of Health Services 2004). The sportfish caught include striped bass, catfish, and sturgeon. According to the focus group, the frequency of fish consumption among local Latinos depends on the agricultural season and Latinos' work schedules (California Department of Health Services 2004). Focus group participants also indicated that they believe Latinos are generally unaware of the Delta sportfish health advisory and have little concern about mercury contamination in fish but some concern about pesticide contamination.

28.2.2 Low-Income Populations

Figure 28-2 shows the distribution of areas with meaningfully greater proportions of low-income households in the study area. Low-income populations were identified based on the Federal poverty threshold in 2010 as defined by the U.S. Census Bureau (U.S. Census Bureau 2011: 61). The following section describes the distribution of low-income populations in the study area. Sacramento has two distinct areas with a high concentration of low-income residents. One is located east of I-5 near Meadowview Road; the other population is located on the northwest side of downtown near Pioneer Memorial Bridge and Jibboom Street, between the downtown rail yards and the American River.

There are also areas of low-income populations in the pocket area of Sacramento. Much of neighboring West Sacramento also has high proportions of low-income residents, especially in the areas north of I-80. These data were generated based upon census block groups identified as having meaningfully greater low-income populations, in Appendix 28A, *Census Data,* Table 28A-3.

South of Sacramento, Mokelumne City and Thornton are also considered low-income areas, as well as much of the surrounding rural, agricultural area.

Stockton has a number of low-income clusters, with low-income residents located near downtown and Weber Point, along North Pacific Avenue, as well as to the north near March Lane, Benjamin Holt Drive, and Hammer Lane, and to the south of the Port of Stockton, and on the north side of French Camp Slough. French Camp also has a population of low-income residents west of I-5. Lathrop has a population of low-income residents east of I-5, although much of this low-income population is technically located outside of the Delta.

Identifiable clusters of low-income populations are in Tracy to the east of Tracy Boulevard, and to the north of Valpico Road. Low-income populations are also located along the SR 4 Corridor in Brentwood, Oakley, Antioch, and Pittsburg. The most widespread area of low-income residents is in the interior Delta among the islands and tracts northwest of Holt. These populations are located on Victoria Island, Woodward Island, Bacon Island, Jones Tract, McDonald Island, Mandeville Island, Wright Tract, Rindge Tract, and the various small islands in between.

These areas are generally sparsely populated, but the populations on these islands are considered to be low-income. These residents are anticipated to be tied socially and economically to the larger nearby urban areas on the periphery of the Delta including Tracy, Stockton, and the urban centers in the western end of the Delta because nearby urban centers are expected to provide employment opportunities, goods, services, and entertainment otherwise unavailable in rural agricultural areas. Multigenerational families may also have extended family members residing in nearby urban centers.

Appendix 28A, *Census Data,* Table 28A-3, identifies census block groups that meet the meaningfully greater threshold for low income (20% or more of the population meets the 2010 poverty threshold). These data were used to generate Figure 28-2 and to identify the distribution of low-income populations in the study area. This table also compares the average earnings of the population in each of these block groups, to the average income for the relevant County. These two data sets (the block group and County-based averages) provide a means of comparing the relative earning of the block group to income trends in the region. With the exception of a small agricultural population in San Joaquin County west of French Camp, average income estimates among low-income Delta residents are lower than the County averages. Appendix 28A, *Census Data*, Table 28A-3, thus provides a means of showing the relative poverty of the census block groups that meet the meaningfully greater threshold, and supports the use of the 20% threshold, which identifies a greater number of relatively impoverished populations than the typical 50% threshold would reveal.

28.2.2.1 Patterns of Employment for Low-income Populations

In general, populations in low-income clusters in the Delta have a smaller proportion of residents in the labor force (approximately 51%) compared with the Delta counties, which range from around 59% in San Joaquin County to nearly 65% in Contra Costa County. In addition, the unemployment rate among the civilian labor force for those households in low-income clusters is substantially

higher than what is present in the surrounding counties (approximately 20%, compared with between 4 and 10% for the counties).

Of those residents employed in the low-income areas, employment in the service occupations is typically higher than in the surrounding counties, with approximately 20% of the population in low-income clusters in the field. Additionally, occupations in production and transportation are of a higher proportion for the low-income population (approximately 18%) compared with the proportions seen in the surrounding counties. Finally, occupations in farming, fishing, and forestry are elevated for low-income populations (approximately 4%), although this proportion is similar to the level seen in San Joaquin County as a whole.

Overall, the distribution of employment for the low-income Delta population by industry is similar to the distribution seen for the surrounding counties, with the proportions for low-income Delta populations within the range seen across the counties. This is generally true for industries such as manufacturing, wholesale trade, retail trade, transportation, and information management.

A slightly higher proportion of low-income residents are employed in the arts, entertainment, recreation, accommodation, and food service industries (approximately 10%) than in the surrounding counties. A higher proportion is also present in construction (approximately 8%) and other services (approximately 5%). The class of worker in low-income populations in the Delta is typically similar to the distribution seen among the surrounding counties, although there is a slightly smaller proportion of self-employed workers (approximately 5.3%).

The lifestyles of low-income residents in the Delta range from rural, agricultural lifestyles in the interior of the Delta to urban lifestyles in the surrounding cities of Sacramento, Stockton, Tracy, Antioch, and Pittsburg. As described above, a high proportion of low-income residents of the Delta work in the service fields, including food service. A high proportion of low-income Delta residents also work in agriculture, including seasonal agriculture.

28.3 Public Outreach

Public outreach is central to the principles of environmental justice, and an important component of meeting the goals identified in EO 12898.

The EIR/EIS lead agencies conducted a total of 22 public scoping meetings throughout California during 2008 and 2009. A summary of the public scoping activities and an overview of comments received during the public scoping process are provided in Chapter 32, *Public Involvement, Consultation, and Coordination*, Section 32.1.1. During these scoping meetings and other outreach efforts conducted in 2010, various concerns regarding potential effects on specific racial and ethnic minorities were expressed by members of the public. These concerns were generally associated with potential effects on important cultural landmarks, cultural practices (e.g., subsistence activities), and community character (California Department of Water Resources 2010). The Environmental Justice Community Survey Summary Report prepared for the project (and conducted by the Delta Habitat Conservation and Conveyance Program) summarizes the 2010 outreach effort that involved soliciting and compiling information provided by respondent members of minority groups regarding cultural significant practices as well as subsistence activity (California Department of Water Resources 2010). The results of this survey effort are described in Section 28.2.1.5 through 28.2.1.7.

Chapter 32, *Public Involvement, Consultation, and Coordination*, provides a summary of the public involvement and outreach activities conducted for the project EIR/EIS, contains information regarding the federal and state agencies that are participating in the CEQA and NEPA processes leading to the development of the EIR/EIS for the project, and a summary of some of the public involvement, consultation, and coordination activities conducted as part of the larger project program independent of any EIR/EIS process.

The following summary of outreach activities and strategies, consistent with EO 12898, presents how scoping and other outreach considered minority and low-income populations. These activities included the following.

- Providing notification and announcements of scoping meetings in ethnic newspapers on ethnic radio stations.
- Conducting scoping meetings within affected communities during evening hours in an effort to involve low-income and minority communities outside of working hours.
- Providing translators at public scoping meetings.
- Providing the project Website in Spanish.
- Providing a multi-lingual information hotline for project information in English, Spanish, Tagalog, Vietnamese, or Chinese (Mandarin).

Chapter 32, *Public Involvement, Consultation, and Coordination*, describes outreach efforts and coordination for the project.

28.4 Regulatory Setting

28.4.1 Federal Plans, Policies, and Regulations

28.4.1.1 Executive Order 12898

EO 12898 (Section 1-101) requires federal agencies to identify and address any disproportionate environmental or health impacts that federal actions or programs create on minority and low-income populations. Two specific provisions of EO 12898 provide further guidance to federal agencies. Section 1-103 requires that each federal agency develop an agency-specific environmental justice strategy defining how the agency will identify disproportionate adverse effects on minority and low-income populations and attempt to avoid those effects. Section 2-2 requires that federal agencies perform their actions and programs in a manner that neither excludes minority and low-income populations from relevant participation in the action or program nor denies those groups the benefits of the action.

28.4.1.2 Council on Environmental Quality Guidance (1997)

Council on Environmental Quality guidance (Council on Environmental Quality 1997) for performing environmental justice analyses as part of the NEPA process provides definitions, thresholds, and overall methodological guidance for environmental justice analyses. Please refer to Section 28.5.1, *Methods for Analysis*, for an overview of the CEQ guidance used in this analysis.

28.4.1.3 Environmental Compliance Memorandum No. ECM 95-3

Memorandum No. ECM 95-3 provides guidance for complying with EO 12898 for U.S. Department of the Interior actions and programs (U.S. Department of the Interior 1995a). It stipulates that environmental documents prepared by U.S. Department of the Interior agencies shall analyze the impact of agency actions on minority and low-income populations. The memorandum directs agencies to evaluate the equity of the impacts imposed on these populations relative to the benefit of the action. The relevant environmental document should identify any such impacts, or the absence of impacts, on minority and low-income populations.

28.4.1.4 U.S. Department of the Interior

Environmental Justice Strategic Plan – 1995

EO 12898 requires federal agencies to develop agency-specific environmental justice plans. The U.S. Department of the Interior (DOI or Department) has adopted a plan that governs the actions of all agencies within the DOI, including the Bureau of Reclamation, and the U.S. Fish and Wildlife Service (USFWS). The U.S. Department of the Interior Environmental Justice Strategic Plan – 1995 provides the following goals (1995b).

- **Goal 1:** The Department will involve minority and low-income communities as we make environmental decisions and assure public access to our environmental information.
- **Goal 2:** The Department will provide its employees environmental justice guidance and with the help of minority and low-income communities develop training which will reduce their exposure to environmental health and safety hazards.
- **Goal 3:** The Department will use and expand its science, research, and data collection capabilities on innovative solutions to environmental justice-related issues (for example, assisting in the identification of different consumption patterns of populations who rely principally on fish and/or wildlife for subsistence).
- **Goal 4:** The Department will use our public partnership opportunities with environmental and grassroots groups, business, academic, labor organizations, and federal, Tribal, and local governments to advance environmental justice.

This plan is identified by Reclamation as the relevant policy that governs analysis of environmental justice for agency actions (Bureau of Reclamation 2010). The plan in turn reflects the DOI's early guidance implementing EO 12898 (U.S. Department of the Interior 1995a). This guidance indicates that agencies within DOI should identify the effects of agency actions on minority and low-income communities and analyze the equity of the distribution of benefits and risks of agency actions, as described above (U.S. Department of the Interior 1995a). As an agency under DOI, USFWS subject to this policy, and also refers to the text of EO 12898 in its NEPA guidance (U.S. Fish and Wildlife Service 1999:35).

28.4.1.5 National Oceanic and Atmospheric Administration, National Marine Fisheries Service

The *National Oceanic and Atmospheric Administration Procedures for Implementing NEPA* provides guidance on compliance with EO 12898 in the agency administrative order discussing NEPA compliance (NAO 216-6):

- Consideration of EO 12898 should be included in NOAA NEPA documentation for decision making purposes.
- The analysis of effects provided for compliance with NEPA should include consideration of health, economic, and social effects on minority and low-income communities.
- Mitigation measures should address significant or adverse effects on minority or low-income communities.

28.4.2 State Plans, Policies, and Regulations

28.4.2.1 California Senate Bill 115 (Solis)

Approved in 1999, California Senate Bill 115 (Solis) added Section 65040.12 to the Government Code and Part 3 to Division 34 of the Public Resources Code, both of which concern environmental justice. The bill provides that the Office of Planning and Research is the coordinating agency in California state government for environmental justice programs. The bill also 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 and policies."

28.4.2.2 California Government Code Section 65040.12

For the purposes of Government Code Section 65040.12, environmental justice is defined 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."
Section 65040.12 requires the Office of Planning and Research to take the following actions.

1. Consult with the Secretaries of the California Environmental Protection Agency (Cal-EPA), the Resources Agency, and the Business, Transportation and Housing Agency, the Working Group on Environmental Justice established pursuant to Section 72002 of the Public Resources Code, any other appropriate state agencies, and all other interested members of the public and private sectors in this state.
2. Coordinate the office's efforts and share information regarding environmental justice programs with CEQ, EPA, the General Accounting Office, the Office of Management and Budget, and other federal agencies.
3. Review and evaluate any information from federal agencies that is obtained as a result of their respective regulatory activities under federal EO 12898, and from the Working Group on Environmental Justice established pursuant to Section 72002 of the Public Resources Code.

Section 65040.12 also requires the Office of Planning and Research to establish guidelines for addressing environmental justice issues in city and county general plans, including planning methods for the equitable distribution of public facilities and services, industrial land uses, and the promotion of more livable communities.

28.4.2.3 Public Resources Code Sections 71110–71116

Public Resources Code Sections 71110–71116 require Cal-EPA to develop a model environmental justice mission statement for boards, departments, and offices in the agency. Section 71113 requires Cal-EPA to convene a Working Group in Environmental Justice to develop a comprehensive environmental justice strategy. The sections also require this strategy to be reviewed and updated.

Finally, Section 71116 establishes a small grant program for nonprofit organizations and federally recognized tribal entities to research environmental justice issues in their community and address larger environmental justice issues.

28.4.2.4 California Resources Agency

The California Resources Agency's environmental justice policy (California Resources Agency 2003) also applies to the California Department of Water Resources (DWR). This policy implements the requirements of California Government Code Section 65040.12 for California Resources Agency actions and programs. The policy states that these provisions apply to agency actions, which are defined as (California Resources Agency 2003:2) follows.

- Adopting regulations.
- Enforcing environmental laws or regulations.
- Making discretionary decisions or taking actions that affect the environment.
- Providing funding for activities affecting the environment.
- Interacting with the public on environmental issues.

The policy states that these goals shall be implemented through the following means:

- Identifying relevant populations that might be adversely affected by programs or projects submitted by outside parties, as appropriate.
- Seeking out and consulting with community groups and leaders to encourage communication and collaboration prior to taking actions that may have an impact on the environment, environmental laws or policies.
- Broadly distributing public information, in multiple languages if appropriate, to encourage participation in public processes.
- Ensuring that public documents and notices relating to environmental issues that may have an impact on human health are concise, understandable, and readily accessible to the public, printed in multiple languages if appropriate.
- Holding required public meetings, hearings, and workshops at times and in locations that encourage meaningful public participation by members of affected communities.
- Working in conjunction with other federal, state, regional, and local agencies to ensure consideration of disproportionate impacts on relevant populations.
- Fostering broad access to existing and proposed data sets and technology to better identify, analyze, and respond to environmental justice issues.
- Providing appropriate training to staff on environmental justice issues so that recognition and consideration of such issues are incorporated into daily program activities.

Collectively, these policies stand for the principle that state agencies should analyze the effects of their actions on minority and low-income groups, and seek to avoid disproportionate effects on these groups where feasible. This chapter analyzes the compatibility of the project alternatives with these policies, as described in Section 28.5.3, *Effects and Mitigation Approaches*, and Section 28.5.4, *Effects and Mitigation Approaches—Alternatives 4A, 2D, and 5A.*

28.4.2.5 Environmental Justice Compliance and Enforcement Working Group

Cal-EPA created the Environmental Justice Compliance and Enforcement Working Group in 2013. The working group coordinates compliance and enforcement of state environmental laws in California communities that are most affected by pollution. Members include the enforcement chiefs from Cal-EPA, the Department of Toxics Substances Control, the Department of Pesticide Regulation, the Department of Resources Recycling and Recovery, the Air Resources Board, and the State Water Resources Control Board, as well as a representative from the Office of Environmental Health Hazard Assessment.

28.5 Environmental Consequences

28.5.1 Methods for Analysis

The following subsection describes how disproportionately high and adverse effects on environmental justice populations were identified. This methodology follows the general guidance provided by EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, CEQ's *Environmental Justice: Guidance under the National Environmental Policy Act* (Council on Environmental Quality 1997), and EPA's *Toolkit for Assessing Potential Allegations of Environmental Injustice* (U.S. Environmental Protection Agency 2004).

The EPA's *Toolkit for Assessing Potential Allegations of Environmental Injustice* is a conceptual and substantive framework for understanding the Agency's environmental justice program. The Toolkit provides research tools and a systematic approach to assess and respond to potential allegations of environmental injustice as they occur, or to prevent injustices from occurring in the first place. This guidance also sets forth various indicators and tiered phases for performing an environmental justice analysis. This document is oriented to identifying vulnerable communities and the stressors that may adversely impact these communities. The Toolkit acknowledges the potential usefulness of various techniques to identify the communities or population potentially affected by a government action. A "Proximity Analysis" may be conducted where the exposure to a contaminant is correlated with distance from the source of the contaminant. The Toolkit also notes that a more refined analysis might include using a GIS platform to provide a spatial overlay of the location of various sources and the total mass of contaminants released with the location of community residences.

This subsection first describes the relevant definitions that govern the analysis of environmental justice effects, and then follows with a description of the methodology used to identify minority and low-income populations as well as disproportionately high effects on minority and low-income communities associated with the alternatives.

28.5.1.1 Definitions

The following definitions were used to identify relevant populations and guide analysis of environmental justice issues. These definitions come from the CEQ guidance and EPA *Toolkit for Assessing Potential Allegations of Environmental Injustice*.

Minorities: Environmental justice guidance from CEQ defines minority persons as "individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or

Pacific Islander; Black (not of Hispanic origin); or Hispanic" (Council on Environmental Quality 1997:25). Hispanic or Latino refers to a place of origin whereas American Indian, Alaskan Native, Asian, Pacific Islander, and Black or African-American (as well as White or European-American) refer to racial categories; thus, for census purposes, individuals classify themselves into racial categories as well as place of origin categories, including Hispanic/Latino and non-Hispanic/Latino. The U.S. Census 2010 allowed individuals to choose more than one race. For this analysis, consistent with guidance from CEQ and EPA (U.S. Environmental Protection Agency 2004:25), minority refers to people who are Hispanic/Latino of any race, as well as those who are non-Hispanic/Latino of a race other than White or European-American.

Low-income: The CEQ environmental justice guidance (Council on Environmental Quality 1997:25) suggests low-income populations be identified using the national poverty thresholds from the U.S. Census Bureau.

Reference populations: The EPA *Toolkit for Assessing Potential Allegations of Environmental Injustice* identifies the concept of a reference population. A reference population consists of a sample of the general population in a community, state, or other appropriate geographic unit used to compare the severity of effects in an environmental justice population relative to the general population. The reference population provides a benchmark for determining if the relative incidence of particular health effects in an environmental justice population significantly exceed the typical incidence of those health effects. Where the incidence in the environmental justice population significantly exceeds the incidence in the reference population there may be a disproportionately high and adverse effect in the environmental justice population. For purposes of this assessment, the reference population is generally the study area.

Disproportionately high and adverse effects: For the purposes of this assessment disproportionately high and adverse effects are defined per the CEQ environmental justice guidance. Health effects are disproportionately high and adverse if they are significant and exceed or are likely exceed the risk to the general population or other appropriate reference population. Health effects are also disproportionately high and adverse if they would disproportionately affect a minority or low-income population through multiple or cumulative exposures to a population (Council on Environmental Quality 1997:26).

Environmental effects are disproportionately high and adverse if they are adverse under NEPA and disproportionately affect a minority or low-income community as described below. For geographically discrete environmental effects such as noise effects, the demographics of the affected population were analyzed. Where minority or low-income individuals constitute a meaningfully greater population, a disproportionately high and adverse finding is made.

28.5.1.2 Overview of Methods

The EPA *Toolkit for Assessing Potential Allegations of Environmental Injustice* (U.S. Environmental Protection Agency 2004) provides a general roadmap and methodology for the assessment of environmental justice effects. Per this guidance, environmental justice effects are identified in a phased process with the following steps.

Problem Formulation: During this phase, agencies should identify the scope of the action or program that may have environmental justice consequences and integrate the environmental justice assessment with parallel environmental review processes (U.S. Environmental Protection Agency 2004:20).

For this chapter, the scope of the problem subject to analysis consists of the action alternatives that involve proposed water conveyance facilities and other conservation measures or Environmental Commitments described in Chapter 3, *Description of Alternatives*, Section 3.3.

Data Collection: During this phase the agency should collect information about sources of environmental or health effects in environmental justice populations and identify minority and low-income groups as well as appropriate reference populations (U.S. Environmental Protection Agency 2004:20).

In Section 28.2, *Environmental Setting/Affected Environment*, of this chapter, information about the distribution of environmental justice populations in the study area is presented. Detailed demographic data was collected for the minority and low-income populations as defined in the CEQ guidance, above, from the U.S. Census Bureau website. Low-income data was collected for each census block group, and minority data was collected for each census block within the study area.

Identification of Adverse Effects: During this phase the agency identifies significant environmental and health effects associated with the agency action or program that may affect environmental justice populations (U.S. Environmental Protection Agency 2004:20).

- This environmental justice assessment is limited to effects that have been identified as adverse even with mitigation. These effects were then carried forward and screened for their potential to result in disproportionate adverse effects on environmental justice populations. For effects that were determined not adverse, no additional evaluation is needed because those effects would not result in disproportionate effects on minority and low-income populations. This method of screening effects is consistent with the CEQ guidance (Council on Environmental Quality 1997:25). Effects identified as adverse, even after mitigation was considered, are analyzed in this chapter to determine if they would result in a disproportionately high and adverse effect on an environmental justice population, as described below.
- **Identification of Disproportionate Effects:** During this phase of the assessment the agency screens significant effects identified for other resources to determine if any of these environmental consequences may disproportionately affect an environmental justice population (U.S. Environmental Protection Agency 2004:21). Environmental effects are disproportionate if they are adverse under NEPA, and occur in census blocks with greater than 50% total minority or Hispanic populations (minorities or minority populations) or in census block groups where low-income individuals (i.e., below the 2010 poverty threshold) are greater than 20%. Where effects are identified as adverse under NEPA, this analysis further identifies whether the adverse effects would result in disproportionately high and adverse effects on minority or low-income populations. This chapter analyzes effects that would remain adverse after mitigation, which also have the potential to result in effects on discernible and discrete concentrations of meaningfully greater minority and low-income populations.

28.5.2 Determination of Effects

CEQ guidance provides relevant thresholds for identification of environmental justice effects. As described above, the CEQ guidance identifies three factors to be considered to the extent practicable when determining whether environmental effects are disproportionately high and adverse (Council on Environmental Quality 1997:26–27).

- Whether there is or would be an effect on the natural or physical environment that adversely affects a minority population, or low-income population. Such effects may include ecological, cultural, human health, economic, or social effects on minority communities, low-income communities, or Indian tribes when those effects are interrelated to effects on the natural or physical environment. For the purposes of this analysis an adverse effect on a minority population is found where environmental effects would occur in a location where minorities constitute greater than 50% of the population or low-income individuals constitute 20% or more of the population.
- Whether the environmental effects may have an adverse effect on minority populations, or low-income populations, which appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group. For the purposes of this analysis an effect appreciably exceeds the effect on the general population if it would occur in a location where minorities constitute greater than 50% of the population or low-income individuals constitute 20% or more of the population.
- Whether the environmental effects occur or would occur in a minority population or low-income population affected by cumulative or multiple adverse exposures from environmental hazards that appreciably exceed the cumulative or adverse exposure of the population at large. For the purposes of this analysis an effect appreciably exceeds the effect on the general population if the affected population is greater than 50% minority or 20% or greater low-income.

These standards are consistent with the standards of the California Resources Agency Environmental Justice Policy. This policy states that the Resources Agency and the constituent departments shall (California Resources Agency 2003:2) undertake the following.

- Identify relevant populations that might be adversely affected by programs or projects submitted by outside parties, as appropriate.
- Work in conjunction with other federal, state, regional, and local agencies to ensure consideration of disproportionate impacts on relevant populations.

28.5.3 Effects and Mitigation Approaches

28.5.3.1 Issues Not Analyzed in Detail

Effects outside the Plan Area

Upstream of the Delta

Effects upstream of the Delta will be limited to the incidental changes in reservoir levels associated with the selected operational scenario, as described in Chapter 3, *Description of Alternatives*, Section 3.6.4.2. Current modeling shows that the operational scenarios have a minimal effect on upstream reservoir levels, and that precipitation and inflow are much stronger drivers of reservoir levels. Because operational changes will result in few, if any, physical effects on the environment, these operational changes are not analyzed for their potential to result in disproportionate adverse effects on minority or low-income populations.

State Water Project/Central Valley Project Export Service Areas

Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, and 9 are expected to increase water supply reliability in the export service areas. Overall, this would have beneficial effects on water supply conditions in these regions, with associated benefits for constituent populations that consume water or that work in water consumptive industries (i.e., agriculture-related industries), and economic security for those industries that rely on water. Therefore, these action alternatives are not anticipated to have direct, physical effects in the State Water Project (SWP)/Central Valley Project (CVP) Export Service Areas that would disproportionately affect minority or low-income populations. There would be beneficial effects on the population at large in the export service areas that cannot be reduced to discrete benefits for any particular segment of the population.

The economic effects of the alternatives that would result in reduced water for the Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2, and in Chapter 16, *Socioeconomics*, Section 16.3.3*.* These effects may include economic effects on water-consumptive industries such as agriculture, and associated employment opportunities. To the extent that the burden of such an impact would fall upon minority or low-income populations, a disproportionally high and adverse effect may occur. Appendix 5B, *Responses to Reduced South of Delta Water Supplies,* describes various mechanisms by which recipients of Delta water supplies could respond, based on alternative water supplies, conservation, and other approaches. Regional and local responses would depend on local conditions (for example, availability of groundwater), the duration of any reduction in supply, and on individual decision-makers including landowners and elected officials. Because the magnitude, timing, and location of reductions in supply is unknown, it is uncertain whether a disproportionally high and adverse effect would result from implementation of those action alternatives that would reduce exports from the Delta.

Environmental Justice Impacts of Delivery Reliability

Increased water delivery reliability could result in beneficial impacts on minority or low-income communities. These beneficial impacts could occur in areas where a large proportion of economic activity is dependent on agricultural production and in which the agricultural labor force is primarily composed of minority or low-income workers. Minority populations of counties within San Joaquin Valley and the Tulare Basin are estimated to range from 54% in Stanislaus County to 68% in Tulare County (Aguirre International 2005). In addition, an estimated 99 percent of agricultural-related employment within the San Joaquin Valley and Tulare Basin is composed of minority or low-income workers (Aguirre International 2005). Increased water delivery reliability to San Joaquin Valley and Tulare Basin would result in stabilization of employment opportunities. Because agricultural-related employment within the San Joaquin Valley and Tulare Basin is predominantly composed of low-income and minority workers, the increase in reliability of water deliveries could result in a beneficial effect on these worker's employment and income levels.

Conversely, reductions in water deliveries could result in a disproportionate impact on minority or low-income communities. As with increased delivery reliability, reductions in deliveries could occur in areas where a large proportion of economic activity is dependent on agricultural production and in which the agricultural labor force is primarily composed of minority or low-income workers. Reducing exports to the San Joaquin Valley and Tulare Basin would result in reduced deliveries to agricultural users and associated reduction in employment opportunities. Because agricultural-related employment within the San Joaquin Valley and Tulare Basin is predominantly composed of

low-income and minority workers, the reduction in water deliveries could result in an adverse effect to these worker's employment and income levels.

Water deliveries to southern California are made to a broad range of municipal and industrial users. The broad range of uses makes it difficult to determine if there would be either a beneficial effect on minority or low-income workers if water deliveries were to increase in reliability or a disproportionate adverse effect if water deliveries were to decrease. However, similar to conditions in the San Joaquin Valley and Tulare Basin, increased water delivery reliability would be expected to stabilize employment and income levels within the delivery areas. Conversely, reductions in deliveries would be expected to result in an adverse effect on employment and income within the delivery areas.

Resource Topics

Elsewhere in the Final EIR/EIS, adverse effects regarding geology and seismicity, hazards and hazardous materials, and minerals were not identified, or effects that were determined to be adverse are not relevant to environmental justice populations. Typical effects associated with geology and seismicity are not adverse and thus would not contribute to disproportionate impacts on environmental justice populations. An adverse effect related to hazards has to do with the potential for bird-aircraft strikes in the vicinity of airports. Adverse effects on mineral resources are related to potential loss of access to resource extraction sites and loss of availability of locally important natural gas wells as a result of implementing Conservation Measure (CM) 2 through CM21. Those impacts are not expected to disproportionately affect minority and low-income populations. The socioeconomic effects resulting from the loss of natural gas wells are discussed in Chapter 16, *Socioeconomics*, Sections 16.3.3. and 16.3.4. Therefore, they were not carried forward in this environmental justice assessment.

Adverse effects were identified for the following resource topics, but they were not carried forward for detailed analysis in this environmental justice assessment for other reasons. Some of these chapters were excluded because the effects identified in the relevant chapters do not have the potential to affect minority and low-income populations. For example, Chapter 14, *Agricultural Resources*, Sections 14.3.3.2 through 14.3.3.16 and Sections 14.3.4.2 through 14.3.4.4, address conversion of farmland and the reduction in land available for cultivation and constraints on crop types. This information was used in the socioeconomic assessment (Chapter 16, *Socioeconomics*, Sections 16.3.3.2 through 16.3.3.16 and Sections 16.3.4.2 through 16.3.4.4) to estimate changes in agricultural-related employment for each alternative. This socioeconomic effect is analyzed in this environmental justice analysis, whereas effects identified in Chapter 14, Sections 14.3.3.2 through 14.3.3.16 and Sections 14.3.4.2 through 14.3.4.4, are not analyzed in detail. The following discussion describes the reasons specific resource topics were not analyzed in greater detail in this chapter.

Water Supply

Chapter 5, *Water Supply*, Sections 5.3.3.2 through 5.3.3.16 and Sections 5.3.4.2 through 5.3.4.4, analyze the potential for the action alternatives to alter patterns of water delivery and water supply reliability both north and south of the study area. The chapter analyzes changes in delivery patterns and reliability for both agricultural and municipal and industrial users that receive water from the SWP and CVP. Changes in water delivery or reliability would not directly result in effects on environmental justice populations because water supply changes alone would not be adverse without considering the secondary socioeconomic effects that could potentially result from such a

reduction. Most of the action alternatives (except Alternatives 6A, 6B, 6C, 7, and 8) would increase average annual water supply deliveries south of the Delta and water supply reliability. For those alternatives that would result in average annual reductions in SWP and CVP deliveries south of the Delta, potential disproportionate effects on environmental justice populations are referenced in the *Socioeconomics* sections below. Also, see Chapter 30, *Growth Inducement and Other Indirect Effects*, for discussion on any indirect impacts on export service areas. Changes to water supply alone would not result in environmental effects that could disproportionately affect environmental justice populations. For these reasons, effects in this chapter are not carried forward for environmental justice analysis.

Surface Water

Chapter 6, *Surface Water*, Sections 6.3.3.2 through 6.3.3.16 and Sections 6.3.4.2 through 6.3.4.4, analyze the potential effects of the action alternatives on surface water resources within the Delta, areas upstream of the Delta, and portions of the SWP and CVP Export Service Areas that could be directly affected by implementation of the action alternatives. The surface waters analyzed in Chapter 6, Sections 6.3.3.2 through 6.3.3.16 and Sections 6.3.4.2 through 6.3.4.4, include Sacramento River upstream of the Delta and downstream of Keswick Dam, Trinity River downstream of Lewiston Reservoir, Feather River downstream of Thermalito Dam, American River downstream of Nimbus Dam, surface water diversions into Yolo Bypass, representative Delta channels, and San Joaquin River upstream of the Delta. Of the impact mechanisms discussed in Chapter 6, *Surface Water*, Impact SW-7, *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam due to the construction and operation of new conveyance facilitates,* was reviewed to determine the potential for effects on environmental justice populations.

As described in detail in Chapter 6, *Surface Water*, Sections 6.3.3.2 through 6.3.3.16 and Sections 6.3.4.2 through 6.3.4.4, under Impact SW-7, the action alternatives would not result in an increase in exposure of people or structures to flooding due to construction or operations of the conveyance facilities or construction of the habitat restoration facilities because the facilities would be required to comply with the requirements of the U.S. Army Corps of Engineers, Central Valley Flood Protection Board, and DWR to avoid increased flood potential. Consequently, this effect is not carried forward in this environmental justice analysis.

Groundwater

Chapter 7, *Groundwater*, Sections 7.3.3.2 through 7.3.3.16 and Sections 7.3.4.2 through 7.3.4.4, analyze the potential for construction of the water conveyance facilities and long-term operational conditions to result in effects on groundwater resources in lands adjacent to the proposed conveyance facilities. Chapter 7, Sections 7.3.3.2 through 7.3.3.16 and Sections 7.3.4.2 through 7.3.4.4, also analyze the potential for changes in patterns of conjunctive use (rotating use of groundwater and surface water) in the export service areas. The action alternatives would generally improve patterns of conjunctive use and the potential for groundwater overdraft by increasing surface water reliability in the export service areas. Effects on local groundwater resources and increased use of surface water in export areas would not result in a disproportionate effect on environmental justice populations because local groundwater changes and effects on wells adjacent to dewatering areas would be mitigated and groundwater changes in export areas would be beneficial. Therefore, these effects are not carried forward for analysis.

Water Quality

Chapter 8, *Water Quality*, analyzes the effects of the alternatives on water quality within the study area defined for that chapter. Where these effects are relevant to public health issues, they are carried forward for analysis in this chapter. Relevant impacts from Chapter 25, *Public Health*, are analyzed in detail.

Soils

Chapter 10, *Soils*, Sections 10.3.3.2 through 10.3.3.16 and Sections 10.3.4.2 through 10.3.4.4, examine the potential effects of soil erosion, loss of topsoil, land subsidence, and corrosive, expansive, or compressible soils. The loss of topsoil would be adverse. Though the loss of topsoil may reduce the quality or quantity of agricultural lands available for cultivation and may result in an indirect effect on agricultural employment, it would not directly result in effects on environmental justice populations. However, Chapter 16, *Socioeconomics,* Sections 16.3.3.2 through 16.3.3.16 and Sections 16.3.4.2 through 16.3.4.4, Impact ECON-1, estimates changes in agriculture-related employment, including agricultural jobs, as a result of the action alternatives and those changes in agriculture-related employment are discussed in this chapter. Effects on soils are not carried forward for environmental justice analysis.

Fish and Aquatic Resources

Chapter 11, *Fish and Aquatic Resources*, Sections 11.3.4.2 through 11.3.4.16 and Sections 11.3.5.2 through 11.3.5.4, examine the effect that construction and operation of water conveyance features and implementation of conservation measures may have on fish and the aquatic environment. Effects on fish and aquatic resources would not directly result in effects on environmental justice populations. Indirect public health effects, such as the potential for increased uptake of methylmercury in target species of fish pursued by subsistence fishermen in the Delta, are examined in Chapter 25, *Public Health*, Sections 25.3.3.2 through 25.3.3.16 and Sections 25.3.4.2 through 25.3.4.4, Impacts PH-3 and PH-7. The action alternatives are not expected to create conditions that would substantially increase bioaccumulation of methylmercury or pesticides in Delta fish species. Therefore no public health issues related to subsistence fishing on environmental justice populations would occur.

Terrestrial Biological Resources

Chapter 12, *Terrestrial Biological Resources*, Sections 12.3.3.2 through 12.3.3.16 and Sections 12.3.4.2 through 12.3.4.4, analyze the effect that construction and operation of water conveyance facilities and implementation of conservation actions would have on natural communities and habitats, wildlife and plants. Effects on these resources would not result in direct or discernible indirect effects on environmental justice populations.

Agricultural Resources

Chapter 14, *Agricultural Resources*, Sections 14.3.3.2 through 14.3.3.16 and Sections 14.3.4.2 through 14.3.4.4, identify numerous adverse effects associated with the construction of conveyance facilities and implementation of restoration measures. Specific adverse effects examined include the conversion of important farmland, conversion of farmland under Williamson Act contracts, and constraints on crop selection, as a result of construction of the proposed water conveyance facilities and implementation of the habitat restoration measures. The reduction in land available for

cultivation and constraints on crop types may reduce agricultural employment opportunities. The agricultural work force has a high proportion of minority and low-income workers, therefore effects on these employment opportunities may be adverse for purposes of environmental justice. Since the effects addressed in Chapter 14, Sections 14.3.3.2 through 14.3.3.16 and Sections 14.3.4.2 through 14.3.4.4 (e.g., conversion of important farmland and constraints on crop selection) would not directly affect minority and low-income populations, but may result in indirect effects on the agricultural economy, effects on agricultural land and crop types are not carried forward for environmental justice analysis. However, Chapter 16, *Socioeconomics,* Sections 16.3.3.2 through 16.3.3.16 and Sections 16.3.4.2 through 16.3.4.4, Impact ECON-1, estimates changes in employment including agricultural jobs, and those changes in employment are addressed in this chapter. The assessment of potential effects on minority and low-income populations as a result of changes in employment is addressed below.

Recreation

Chapter 15, *Recreation*, Sections 15.3.3.2 through 15.3.3.16 and Sections 15.3.4.2 through 15.3.4.4, analyze the potential for the construction and operation of the proposed water conveyance facilities and conservation actions to reduce recreational opportunities, interrupt recreational activities, degrade recreational facilities, or conflict with recreational policies. Chapter 15, Sections 15.3.3.2 through 15.3.3.16 and Sections 15.3.4.2 through 15.3.4.4, identify temporary effects on recreational facilities and opportunities, and temporary alteration of recreational boat navigation. It also identifies the potential for permanent alteration of recreational boat navigation. Although effects on particular facilities or recreational navigational routes may be adverse, the action alternatives are not expected to have an effect on the overall availability of water-based recreational opportunities in the study area because of the scale of the Delta in relation to the project. Impacts on recreational facilities and opportunities are not carried forward for environmental justice analysis because adequate alternative recreational opportunities and facilities exist in the Delta, therefore temporary loss of particular facilities will not result in a disproportionate effect on environmental justice populations.

Chapter 15, *Recreation*, Sections 15.3.3.2 through 15.3.3.16 and Sections 15.3.4.2 through 15.3.4.4, identify potential impacts on specific recreational facilities where fishing occurs under Impact REC-2 and associated recreational fishing under Impact REC-4. Affected facilities where construction noise may temporarily diminish the quality of fishing include the Clarksburg Boat Launch (fishing access), the Georgiana Slough Fishing Access, Clifton Court Forebay, Cliffhouse Fishing Access, Delta Meadows River Park, Westgate Landing Park, and Brannan and Sherman Islands. The number of fishing access sites that would actually be affected would be limited to sites specific to the selected action alternative. For each alternative, at least some fishing venues and levee access points would be temporarily disrupted. Subsistence fishing in the Delta region is a significant activity among minority and low-income populations (Shilling et al. 2010:2). However shoreline fishing opportunities occur throughout the Delta region, in each of the five zones identified in a study performed by the California Department of Parks and Recreation (Delta Protection Commission 1997). In addition, the entire Sacramento River corridor is used for fishing, as described by Shilling et al. (2010:2). For example, fishermen intensely utilize the banks of the Sacramento River in the Pocket Area, north of the intakes for the tunnel and canal options (Shilling et al. 2010:2). While the action alternatives would affect subsistence fishing at the specific locations identified in Chapter 15, *Recreation*, the construction of conveyance facilities is not expected to inhibit subsistence fishing overall. Because the Delta region contains an abundance of fishing locations generally (Delta

Protection Commission 1997), and alternative locations near the action alternatives specifically are available (Shilling et al. 2010:2), the impacts described in Chapter 15, Sections 15.3.3.2 through 15.3.3.16 and Sections 15.3.4.2 through 15.3.4.4, would not significantly diminish the overall availability of opportunities for subsistence fishermen. Alternative fishing venues and levee access points would remain open under all action alternatives.

Chapter 15, *Recreation*, Sections 15.3.3.2 through 15.3.3.16 and Sections 15.3.4.2 through 15.3.4.4, Impact REC-1, identifies some permanent effects on recreational facilities that would result from the action alternatives. However, because substantial alternative venues exist this would not result in substantial effects on minority or low-income populations. Please refer the analysis of cumulative effects in Chapter 15, *Recreation*, Section 15.3.5, for a discussion of the alternative recreational opportunities in the Delta and their relationship to permanently affected facilities.

Transportation

Chapter 19, *Transportation*, analyzes the effects on traffic systems and patterns of traffic circulation. Because these effects, with mitigation, would not be adverse, these effects are not carried forward for detailed analysis in this chapter. Prior to construction, the project proponents would be responsible for implementing a site-specific construction traffic management plan, as described under Mitigation Measure TRANS-1a in Chapter 19, *Transportation*, which would mitigate potential adverse traffic-related effects on low-income or minority populations in the project area.

Energy

Chapter 21, *Energy*, Sections 21.3.3.2 through 21.3.3.16 and Sections 21.3.4.2 through 21.3.4.4, analyze the potential for the construction and operation of conveyance facilities to increase energy demand temporarily or permanently. Increases in energy demand associated with the conveyance facilities alone, would not result in discernible effects on discrete and identifiable environmental justice populations because the production and delivery of electrical power occurs on a regional or even national level, so localized increases in demand cannot be traced to effects on particular populations.

Air Quality and Greenhouse Gases

Chapter 22, *Air Quality and Greenhouse Gases*, examines the potential for the action alternatives to increase greenhouse gas emissions and contribute to climate change. The relationship between effects associated with climate change and environmental justice is discussed in Section 28.5.3.2, *No Action Alternative*.

Chapter 22 examines the potential for implementation of conveyance facilities to generate cumulative greenhouse gas emissions from increased CVP pumping. As described in Impact AQ-23 in Chapter 22, operation of the CVP yields the generation of emissions-free hydroelectric energy which is sold into the California electricity market. Implementation of Alternative 4 could result in a reduction of this electricity for sale from the CVP to electricity users. This reduction in the supply of greenhouse gas (GHG) emissions-free electricity to the California electricity users could result in a potential indirect effect of the project, as these electricity users would have to acquire substitute electricity supplies that may result in GHG emissions (although additional conservation is also a possible outcome as well). While this may impact users in the project area, it cannot be determined that it would amount to a disproportionate impact on low-income and minority populations in specific locations. Similarly, Impact AQ-27 discussed the generation of cumulative GHG emissions

from implementation of CM2–CM11. The restoration and enhancement actions under Alternative 4 could result in an adverse impact if activities are inconsistent with applicable GHG reduction plans, do not contribute to a lower carbon future, or generate excessive emissions, relative to other projects throughout the state. Although mitigation is available to reduce this impact, it may still be adverse. However, it cannot be determined that it would amount to a disproportionate impact to low-income and minority populations in specific locations. Therefore, effects from generation of cumulative GHG emissions are not analyzed in this chapter.

Chapter 22 also examines the potential for criteria pollutants, such as reactive organic gases (ROG) and nitrogen oxides (NO_X), to exceed local and federal air quality management district thresholds. As described in Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.1.2, ROG and NO_X are considered regional pollutants because they affect air quality on a regional scale. They may have an impact on the project area, but it cannot be determined that it would amount to a disproportionate impact on low-income and minority populations in specific locations. Therefore, effects from ROG and NO_X are not analyzed in this chapter.

Public Health

Chapter 25, *Public Health*, Sections 25.3.3.2 through 25.3.3.16 and Sections 25.3.4.2 through 25.3.4.4, Impact PH-7 identifies the potential for future conservation measures, or Environmental Commitments for Alternatives 4A, 2D and 5A, to increase methylation of mercury as a result of the creation of new habitat and natural communities in the study area. This effect is specifically associated with implementation of tidal wetland habitat restoration, floodplain habitat restoration, freshwater marsh habitat restoration, and possibly *CM2 (Yolo Bypass Fisheries Enhancements*. These measures could create conditions resulting in increased methylation of mercury within the Delta per unit time, increased biotic exposure to and uptake of methylmercury, and result in increased mercury bioaccumulation in fish tissues. These measures would be implemented alongside a methylmercury management measure (CM12, or Environmental Commitment 12, depending on the alternative), which would seek to manage and reduce methylmercury mobilization levels in the Delta. In addition, existing Office of Environmental Health Hazard Assessment (OEHHA) standards would reduce the public's exposure to mercury-contaminated fish. Because these future conservation measures have not been refined with the level of detail associated with a project-level action, the precise potential for increases in methylmercury associated with these actions cannot currently be described, but instead are analyzed in this chapter at a programmatic level. Project-level increases in the bioaccumulation of mercury in Delta fish species associated with specific alternatives are also analyzed in this chapter.

Paleontological Resources

Chapter 27, *Paleontological Resources,* Sections 27.3.3.2 through 27.3.3.16 and Sections 27.3.4.2 through 27.3.4.4*,* analyze the potential for the construction of conveyance facilities and conservation measures to adversely affect fossils and other paleontological resources that may be scientifically important or of interest to the public. Effects on paleontological resources would not result in effects on environmental justice populations because the loss of paleontological resources would be of significance to the population at large.

28.5.3.2 No Action Alternative

The No Action Alternative includes continued implementation of SWP/CVP operations, maintenance, enforcement, and protection programs by federal, state, and local agencies and

nonprofit groups, as well as projects that are permitted or are assumed to be constructed by 2060. Climate change that would occur with or without the project is also part of the No Action Alternative. A complete list and description of programs, plans, and other assumptions considered under the No Action Alternative is provided in Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*. These actions are limited to Existing Conditions and programs adopted during the early stages of development of the EIR/EIS, facilities that are permitted or under construction during the early stages of development of the EIR/EIS, and foreseeable changes in development that would occur with or without the project. Many of the ongoing projects and programs in the Delta could have potential consequences for minority and low-income populations.

As shown in Figures 28-1 and 28-2, minority and low-income populations are distributed across the study area. The study area is therefore sensitive for environmental justice effects because adverse environmental effects associated with actions in this area have the potential to disproportionately affect these populations, based on their distribution and presence throughout the study area. For example, highly localized construction effects, such as emissions of toxic air contaminants or diesel particulate matter (DPM) during construction of individual development projects, levee repair, or restoration projects, may occur where there is a high concentration of minority and low-income populations. The Central Valley is also generally sensitive for environmental justice effects, as program-level environmental review for regional projects demonstrate (Bureau of Reclamation 2011a:9-4).

SWP/CVP Operations

As described in Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions,* SWP/CVP operations identified as continuing actions under the No Action Alternative include repair, maintenance, or protection of imperiled infrastructure such as levees, and may also include actions for water quality management, habitat and species protection, or flood management. These actions could result in adverse effects such as displacement of residents or homes as a result of right of way acquisition, construction noise effects on noise sensitive land uses, or emissions of air quality pollutants proximate to sensitive receptors, which may affect local populations in the study area. Depending on the spatial distribution of these effects, minority or low-income populations could be disproportionately affected. Because the precise location of maintenance, repair, and rehabilitation of facilities is not known, the affected environmental justice populations cannot be identified with certainty. The general economic effects on south-of-Delta areas of alternatives that would reduce water to the Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects*, Section 30.3.2.3. A summary of the environmental justice effects associated with ongoing plans, policies, and programs in the Delta is provided below.

Ongoing Plans, Policies, and Programs

A number of the programs, plans and policies that would be implemented in or near the study area under the No Action Alternative are summarized in Table 28-1. Environmental review for these projects provides an indication of the kinds of environmental justice effects that would result in the absence of the project, where such project-level review has been performed. For a full description of conditions under the No Action Alternative, see Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*.

Environmental review for some programs that would be implemented under the No-Action Alternative, summarized in Table 28-1, has identified the potential for disproportionate effects on minority and low-income groups. For example, the San Joaquin River Restoration Program may have disproportionate effects on minority and low-income populations under action alternatives and the no action conditions (Bureau of Reclamation 2011a:9-26). These effects would be associated with reduced traffic circulation and roadway capacity, emissions of toxic air contaminants, construction noise, and loss of agricultural sector jobs.

Table 28-1. Plans, Policies, and Programs for the No Action Alternative that May Affect Minority and Low-income Populations

Agency	Program/ Project	Status	Description of Program/ Project	Potential Effects on Minority and Low-Income Populations
Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Water Resources and California Department of Fish and Wildlife	San Joaquin River Restoration Program	Ongoing	The program would implement a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river. There are many physical improvements within and near the San Joaquin River that will be undertaken to fully achieve the river restoration goal.	The program will include numerous individual projects such as levee repairs or upgrades to accommodate channel restoration and enhancement along the San Joaquin River. Landside irrigation and drainage facilities may also have to be moved. Collectively these new facilities and improvement may displace adjacent residences and have localized construction effects such as congestion associated with truck traffic, localized air quality effects, and construction noise. Minority and low-income populations may be disproportionately affected if they constitute the majority of the population in the vicinity.
Sacramento Area Flood Control Agency	Natomas Levee Improvement Program, Landside Improvements Project	Ongoing	The program addresses levee vulnerabilities for the Sacramento River East Levee along the west side of the Natomas Basin.	Project-level analysis demonstrates that levee repairs may affect prehistoric cultural resources resulting in a potentially disproportionate effect on environmental justice populations.
Bureau of Reclamation and Contra Costa Water District	Los Vaqueros Reservoir Expansion Project	Environmental review complete.	The proposed expansion project would increase the reservoir capacity, add a connection to South Bay water agencies, Alameda County Flood Control and Water Conservation District, Zone 7, Alameda County Water District, and Santa Clara Valley Water District, and result in construction of a new diversion on Old River.	No disproportionate effect because no meaningfully greater minority or low-income populations occur near the proposed expansion project activities.

Agency	Program/ Project	Status	Description of Program/ Project	Potential Effects on Minority and Low-Income Populations
Bureau of Reclamation	Suisun Marsh Habitat Management Preservation and Restoration Plan	Ongoing	The Suisun Marsh Plan would result in tidal marsh restoration, creation of managed marshes, and levee repairs.	No disproportionate effect because no meaningfully greater minority or low-income populations occur near the proposed restoration activities.
National Marine Fisheries Service and U.S. Fish and Wildlife Service	2008 and 2009 Biological Opinion	Ongoing	The Biological Opinions establish reasonable and prudent alternatives to be implemented. Some of the reasonable and prudent alternatives require habitat restoration, which may require changes to existing levees and channel improvements.	No disproportionate effect because no meaningfully greater minority or low-income populations occur near the proposed restoration activities

The Sacramento Area Flood Control Agency (SAFCA) has identified a potentially disproportionate effect on Native American populations resulting from adverse effects on prehistoric cultural resources, because these resources have cultural significance for these populations and levee repairs would disturb these resources (EDAW/AECOM 2009:4.21-2). SAFCA concludes that this effect would be avoided with mitigation that increases benefits to Native Americans (EDAW/AECOM 2009:4.21-3).

By contrast, environmental review for restoration projects often identifies no effect on environmental justice populations. The Suisun Marsh Habitat Management, Preservation and Restoration Plan would not result in any adverse effects on environmental justice populations because no meaningfully greater minority or low-income populations occur near proposed activities (Bureau of Reclamation 2011b:7.9-1).

Environmental review for water resources management projects that would be implemented in the absence of the action alternatives often identify no disproportionate effect on environmental justice populations. This is because affected communities do not contain meaningfully greater minority or low-income groups. For example, the construction of the Los Vaqueros Reservoir expansion and associated new conveyance facilities would not result in disproportionate effects on environmental justice populations because meaningfully greater populations do not occur in the relevant affected environment (Bureau of Reclamation 2009:4.18-15, 4.18-16).

Large regional programs that result in numerous construction projects are likely to result in the most significant contribution to environmental justice effects, because of the scale and duration of such programs. Many of these programs are currently in the planning stage and have not been carried forward for environmental review. For example, the Central Valley Flood Protection Plan consists of a planning framework that will guide necessary levee repairs and associated improvements throughout the Sacramento and San Joaquin Valleys (Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*). The presence of numerous meaningfully greater minority and low-income populations in the study area indicates that the region is sensitive for environmental justice effects. Similarly, implementation of the USFWS 2008 Biological Opinion requiring restoration of 8,000 acres of tidal habitat, could result in adverse effects related to losses in agricultural employment, with a disproportional effect on minority or low-income populations. Depending on the location of such restoration, increased noise,

traffic, or emissions related to construction activities necessary for implementing tidal habitat restoration could disproportionally affect minority or low-income populations. However, because these populations occur in discrete locations, absent specific project-level plans for these programs, it is not possible to calculate the contribution these larger plans would make to effects on minority and low-income groups.

In the absence of environmental review for these large programs, the No Action analysis for other environmental resources covered in this document provides some indication of the environmental effects that may contribute to disproportionate effects on minority and low-income populations. For example, even in the absence of the action alternatives, existing and approved projects would result in the conversion of farmland in the study area (see Chapter 14, *Agricultural Resources*, Section 14.3.3.1, Table 14-7). These projects would permanently convert approximately 230 acres of farmland and temporarily affect an additional 500 acres of farmland. Because a very high proportion of California farm laborers are Hispanic (approximately 99%), the conversion of agricultural land would result in a disproportionate loss of jobs among Hispanic laborers working in the agricultural sector (Aguirre International 2005:10). While construction labor demands associated with some of these projects may result in a net benefit to local economies, agricultural laborers may not be able to transition directly to these jobs. For these reasons, conversion of agricultural land may result in a disproportionate effect on minorities.

Chapter 18, *Cultural Resources*, Section 18.3.5.2, Table 18-1, identifies the potential for adverse effects on prehistoric cultural resources under the No Action alternative because the set of plans and projects that would be implemented in the absence of the project will disturb such resources. Because prehistoric cultural resources have special significance for Native American populations, these effects would contribute to a disproportionate effect on minority groups.

As concluded in the environmental review for some of the projects that would be implemented under the No Action Alternative, these projects would contribute to a disproportionate effect on minority and low-income populations. In addition, environmental effects identified in this EIR/EIS that would result under the No Action conditions would also contribute to disproportionate effects. For example, conversion of agricultural land within the study area may affect minority populations that provide farm labor, and loss of cultural resources may affect minority populations that attach significance to these resources. Collectively, these conditions result in an adverse effect.

Climate Change and Catastrophic Seismic Risks

The Delta and vicinity are within a highly active seismic area, with a generally high potential for major future earthquake events along nearby and/or regional faults, and with the probability for such events increasing over time. Based on the location, extent and non-engineered nature of many existing levee structures in the Delta area, the potential for significant damage to, or failure of, these structures during a major local seismic event is generally moderate to high. For major earthquakes along larger faults, ground rupture can extend for considerable distances (hundreds or thousands of feet). (See Appendix 3E, *Potential Seismic and Climate Change Risks to SWP/CVP Water Supplies,* for more detailed discussion) In instances of a catastrophic event due to climate change or a seismic event, there would also be a potential for adverse effect to a range of resource areas, some of which could result in a disproportionally adverse effect on minority or low-income populations, depending on the location or nature of such effects. Effects on agricultural employment following a catastrophic event would likely fall disproportionally on minority and low-income populations. Reclaiming land or rebuilding levees after a catastrophic event due to climate change or a seismic event would

potentially occur near minority or low-income populations, potentially introducing adverse effects related to noise, traffic, or emissions. Such construction activities, along with the potential inundation caused by flooding as a result of a catastrophic event, could also disturb historic or prehistoric cultural resources that would affect minority populations that attach significance to these resources.

28.5.3.3 Alternative 1A—Dual Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario A)

This section analyzes the environmental justice effects of the resource topics that are carried forward for detailed analysis for Alternative 1A. Relevant environmental justice effects associated with adverse effects identified in these resource chapters are analyzed to determine if they would result in a disproportionate effect on minority or low-income populations. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the pipeline/tunnel alignment, which includes Alternative 1A.

Land Use

Chapter 13, *Land Use*, Section 13.3.3.2, identifies effects caused by incompatibility with land use policies, incompatibility with local land uses, and potential for physical division of established communities. By itself, incompatibility with land use policies is not a physical effect on the environment, and, therefore, does not have the potential to result in a disproportionate effect on a minority or low-income population. Chapter 13, *Land Use*, Section 13.3.3.2, also addresses the potential for a BDCP alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis.

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Under Alternative 1A, approximately 204 permanent structures would be removed or relocated within the water conveyance facilities footprint, including an estimated 59 residential buildings. The analysis of physical effects on structures in Chapter 13, *Land Use*, Section 13.3.3.2, indicates that the physical footprints of the intake facilities and their associated conveyance pipelines would be anticipated to create the largest disruption to structures. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4, summarizes the estimated number of structures affected across structure type and alternative, and Mapbook Figure M13-1 in Chapter 13 shows the distribution of these effects across the pipeline/tunnel conveyance alignment.

As shown in Figures 28-1 and 28-2, there are census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations throughout the study area, and specifically along the pipeline/tunnel alignment. Because construction of Intakes 1–5 would result in the displacement of approximately 59 residential structures, which would affect census blocks where the minority population is greater than 50%, this would represent a disproportionate effect on minority populations. When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative. This compensation

would reduce the severity of economic effects related to this physical effect but would not reduce the severity of the physical effect itself. For these reasons, conflicts with existing land uses as a result of constructing the proposed water conveyance facility (CM1) would be an adverse effect.

In addition, Chapter 13, *Land Use,* Section 13.3.3.2, examines the potential to divide existing communities. During the construction of the conveyance pipeline between Intake 3 and the intermediate forebay (about 0.5 mile north and south of Hood, respectively), construction activities would bisect the community of Hood, separating some of the community's easternmost structures from the main section of the community. Even though access to and from the community would be maintained over the long-term, the placement of Intake 4 and its associated facilities, as well as the nearby construction of Intake 3 and the intermediate forebay, would create lasting physical barriers between Hood and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Mitigation Measures TRANS-1a and TRANS-1b, which would require the development and implementation of a site-specific traffic management plan, and limit construction activity on congested roadway segments, are available to address this effect. However, these divisions and physical barriers between the community of Hood and its surroundings constitute an adverse effect.

As shown in Figures 28-1 and 28-2, the community of Hood is composed of both census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations. Consequently, the division of the community of Hood would have disproportionately adverse effects on minority and low-income populations in Hood because this division would occur in a community with a meaningfully greater minority population. This would be an adverse effect.

Socioeconomics

Chapter 16, *Socioeconomics*, Section 16.3.3.2, identifies effects on regional economics and local employment conditions associated with construction, operations, and conservation measures. These impacts have the potential to disproportionately affect environmental justice populations. Other effects in Chapter 16, *Socioeconomics*, Section 16.3.3.2 are not analyzed in this section because they either relate to program-level conservation measures that do not have sufficient project-level detail to identify environmental justice consequences, or because they do not have the potential to disproportionately affect environmental justice populations. The following effects are analyzed in this section:

Impact ECON-1: Temporary Effects on Regional Economics in the Delta Region during Construction of the Proposed Water Conveyance Facilities

Impact ECON-7: Permanent Regional Economic Effects in the Delta Region during Operation and Maintenance of the Proposed Water Conveyance Facilities

The general economic effects on south-of-Delta areas of alternatives that would reduce water to Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. As described in Chapter 16, *Socioeconomics*, Section 16.3.3.2, Impact ECON-1, construction of the water conveyance facilities would increase total employment and income in the study area. The change would result from expenditures on construction and from changes in agricultural production. Changes in jobs in the study area as a result of Alternative 1A construction are reported in Chapter 16, *Socioeconomics,* Section 16.3.3.2,

Table 16-19. During the peak construction years, it is estimated that 4,390 jobs (direct) and 12,716 jobs total (direct, indirect, and induced effects) would be gained in the study area.

However construction of conveyance and related facilities, such as roads and utilities, would cause temporary and permanent conversion of agricultural land. Because construction would reduce agricultural land under cultivation, construction would result in the direct loss of 27 agricultural jobs and a total loss of 100 agricultural jobs (direct, indirect, and induced effects) (Chapter 16, *Socioeconomics,* Section 16.3.3.2, Table 16-20).

As described in Chapter 16, *Socioeconomics*, Section 16.3.3.2, Impact ECON-7, operation of conveyance facilities constructed under Alternative 1A would result in the direct creation of 187 jobs and the creation of 269 jobs total (Chapter 16, *Socioeconomics*, Section 16.3.3.2, Table 16-22). However, because operations would reduce agricultural cultivation, operations would result in the direct loss of 31 agricultural jobs and a total of 86 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics*, Section 16.3.3.2, Table 16-23).

Because of a combination of historical and recent settlement trends, many of the agricultural areas in the interior Delta contain high proportions of minority residents, including Hispanics, Asians, and African-Americans. According to the report *The California Farm Labor Force Overview and Trends from the National Agricultural Workers Survey*, commissioned by the EPA Region 9 Pesticide Program, which provides the most current demographic information collected through the National Agriculture Worker Survey (NAWS), approximately 99% of California farm laborers are Hispanic (Aguirre International 2005:10), and approximately 22% of farm labor falls below the poverty threshold (Aguirre International 2005:27).

Because the majority of farm labor in the study area is minority, including those of Hispanic origin, and potentially low-income, the loss of up to 100 agricultural jobs in the study area associated with construction of the conveyance facilities is considered to be a disproportionate effect on an environmental justice population. While a net increase in employment would result during construction because of new construction jobs, these jobs would not likely be filled by displaced agricultural workers because the skills required are not comparable. This effect would, therefore, remain adverse because job losses would disproportionately accrue to minority populations.

Aesthetics and Visual Resources

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, addresses visual resources in the study area, where proposed intake and water conveyance facilities and related structures and operations would be located. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, identifies the following adverse effects.

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of CM2–CM21

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, Impact AES-6, analyzes the effect of the implementation of CM2–CM21 on aesthetic and visual resources. This impact would be adverse. However because the precise location of where future conservation measures will be implemented is unknown, this impact is not carried forward for further analysis of environmental justice effects for this alternative or other alternatives.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, also identifies the following mitigation measures that would reduce the identified effects on aesthetics and visual resources.

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 0.5 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, Impacts AES-1 through AES-4, describe the aesthetics and visual resources effects associated with water conveyance facilities construction and operations. Impact AES-3 describes the effects on local scenic highways, such as SR 160. Because degradation of a scenic highway would result in loss of scenic qualities for all highway users, it is not carried forward for environmental justice analysis.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, Impact AES-1, addresses the potential for construction activities to substantially alter the visual quality or character in the vicinity of project elements that can be viewed from local sensitive receptors and public viewing areas. The primary features that would affect the existing visual character under Alternative 1A once the facilities have been constructed would be Intakes 1–5, the intermediate forebay and Byron Tract Forebay, resulting landscape scars effects left behind from spoil/borrow and reusable tunnel material (RTM) areas, transmission lines, and concrete batch plants and fuel stations. Construction-related visual changes would be most evident in the northern portion of the study area, which would undergo extensive construction to build large industrial facilities and supporting infrastructure along and surrounding the 8.5-mile segment of the Sacramento River where the intakes would be situated. The overall construction period would be 9 years, and the intensity of the activities in contrast to the current rural/agricultural nature of the area would be substantial. The intermediate forebay, Byron Tract Forebay and several of the work areas adjacent to the southern portion of the conveyance alignment also would generate adverse visual effects for adjacent viewers, including residents in the communities of Clarksburg, Walnut Grove, and Hood.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, Impact AES-2, describes the permanent alteration of scenic resources resulting from construction. As described in this impact, the primary features that would affect scenic vistas subsequent to completion of construction of Alternative 1A are Intakes 1–5, the intermediate forebay and Byron Tract Forebay, landscape scars remaining from spoil/borrow and RTM areas, and transmission lines. The communities of Clarksburg, Walnut Grove, and Hood would be affected.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.2, Impact AES-4, describes the potential for new sources of light and glare that would be introduced during construction or as part of permanent features that would remain after the conveyance facilities are complete. Intakes 1–5 and their associated pumping stations, surge towers, and facilities and the pumping plant at the intermediate forebay would introduce new surfaces that may increase glare. In addition, the water surfaces of the new forebays would reflect sunlight, introducing glare. Evening and nighttime construction activities would require use of bright lights and generate increased nighttime headlights flashing into nearby residents' homes; these light sources would affect adjacent populations. New facilities would also require the use of safety lighting once built. Lighting equipment associated with project facilities would increase the amount of nighttime lighting along the alignment above ambient light levels. In particular, security lighting for Intakes 1–5 and their associated pumping stations and facilities would create very noticeable effects relating to increasing nighttime light at those locations. The communities of Hood and Clarksburg would be affected.

While mitigation is available to reduce the effects of Impacts AES-1, AES-2, and AES-4, these effects would remain adverse. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area, including along the pipeline/tunnel alignment.

Specifically, a concentration of minority and low-income populations are located in the communities of Clarksburg, Walnut Grove, and Hood, where residential viewers in these communities would be affected by adverse visual effects of this alternative.

Because adverse visual effects are largely associated with the northern portion of the alignment where permanent features would remain and along the southern portion of the alignment where the Byron Tract Forebay and borrow and spoil areas would be constructed, where minority and low-income populations occur, these effects would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse because the geographic location of the effect contains meaningfully greater minority and low-income populations.

Cultural Resources

Construction of conveyance facilities under this alternative would have adverse effects on prehistoric archaeological resources, unidentified human remains, historic archaeological sites, traditional cultural properties, and built environment resources, as described in Chapter 18, *Cultural Resources*, Section 18.3.5.2, Impact CUL-1 through Impact CUL-7.

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

Chapter 18, *Cultural Resources*, Section 18.3.5.2, Impact CUL-8, addresses the compatibility of the BDCP with the adopted cultural resource management policies of agencies with land use authority in the Delta. Because this effect is not a physical environmental effect that could result in impacts on environmental justice populations, it is not relevant to this analysis.

Ground-disturbing construction has the potential to damage both identified and previously unrecorded examples of each of these resources. Mitigation measures are available to reduce these effects.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of inaccessible Properties to Assess Eligibility, Determine If These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

Prehistoric resources, especially sites containing human remains, are of special significance to the Native American community. The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources*, Section 18.3.5.2. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. These resources represent a tangible link to the past, and, if they contain human remains, a resting place for interred ancestors. While cultural resources and buried human remains also contain significance for the general public (including low-income populations), the significance to the general public is typically limited to the scientific value of the resources. Because these resources are especially significant to Native American populations and potentially other minority populations, adverse effects identified in Chapter 18, *Cultural Resources*, Section 18.3.5.2, Impacts CUL-1 through CUL-7, would result in a disproportionate effect on minorities. The affected population cannot always be identified with specificity because members of tribes that attach significance to the resources in the Delta may reside in relatively remote locations rather than in adjacent census blocks or even counties. Nonetheless, this alternative would result in a disproportionate effect on Native American populations and potentially other minorities.

In addition to the mitigation measures proposed in this EIS/EIR, federal agencies that have a significant role in implementing the BDCP are required to comply with Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code [USC] 470f). Section 106 and the Section 106 regulations require that the agencies identify effects on historic properties and consult with the public (including relevant minority groups) and Native American tribes during the management process. Section 106 thus adds another mechanism for identifying resources, and developing mitigation that would reduce or avoid adverse effects. Despite these mitigation measures and consultation processes, this alternative is likely to result in adverse effects on prehistoric archaeological resources and human remains because the scale of the alternative makes avoidance of all eligible resources infeasible. In addition, because there is no feasible way to identify buried resources that may occur in deep subterranean sections of the tunnel in advance of construction, effects on these resources cannot be accurately identified or avoided. The effect on minority populations that may ascribe significance to cultural resources in the Delta would remain

disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse.

Public Services and Utilities

Chapter 20, *Public Services and Utilities*, Section 20.3.3.2, addresses the potential effects of the alternative on utility infrastructure and public service providers, such as fire stations and police facilities. Chapter 20, *Public Services and Utilities*, Section 20.3.3.2, identifies three adverse effects under this alternative.

Impact UT-2: Displacement of Public Service Facilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-6: Effects on Regional or Local Utilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-8: Effects on Public Services and Utilities as a Result of Implementing the Proposed CM2–CM11

Chapter 20, *Public Services and Utilities*, Section 20.3.3.2, Impact UT-2, addresses the potential for the displacement of a public facility as a result of construction of the proposed conveyance facilities. As described in this impact, construction of the proposed water conveyance pipeline between Intake 3 and the intermediate forebay would conflict with the Hood Fire Station, at 1125 Hood-Franklin Road in Hood. The Hood Fire Station is one of two fire stations within the Courtland Fire District. The other fire station, the Courtland Fire Station, is approximately 5 miles southwest of the Hood Fire Station at 154 Magnolia Avenue in Courtland, along SR 160, which is substantially older than the Hood Fire Station. The two Courtland Fire District fire stations serve a 33-square-mile area of Sacramento County in the study area, including the communities of Hood and Courtland. Implementation of Alternative 1A, depending on final design of the alignment, could require relocation of the Hood Fire Station and result in environmental effects associated with construction of a replacement facility. Implementation of Mitigation Measure UT-2 would require the construction of a replacement facility, if the existing fire station cannot be avoided, and would lessen the severity of the potential effect by ensuring continuation of fire protection services in the Courtland Fire Protection District service area. However, because the effects of constructing a new fire station are unknown, this would be considered an adverse effect. The affected communities of Hood and Courtland are comprised of a meaningfully greater minority population, as shown on Figure 28-1, which would be potentially affected by both the disruption of fire protection or emergency medical services associated with removal of the Hood Fire Station, and the potential adverse effects of constructing a new fire station. Consequently, this represents a potentially disproportionate effect on minority populations because the affected community is disproportionately minority. This is considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.2, Impact UT-6 describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 1A would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation

Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.2, Impact UT-8 describes the potential consequences of implementation of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the impacts on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to the analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.3.3.2 addresses the potential effects for a BDCP alternative to generate criteria pollutants that exceed local air quality management district thresholds from construction of the proposed water conveyance facilities and the implementation of CM2-CM11. The following adverse effects are relevant to this analysis.

Impact AQ-2: Generation of Criteria Pollutants in Excess of the SMAQMD Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-18: Generation of Criteria Pollutants from Implementation of CM2–CM11

As described in Impact AQ-2, construction of Alternative 1A would generate fugitive dust emissions exceeding Sacramento Metropolitan Air Quality Management District (SMAQMD) thresholds. The impact of generating emissions in excess of local air district thresholds would therefore violate applicable air quality standards in the study area and could contribute to or worsen an existing air quality conditions. No feasible mitigation is available to reduce fugitive dust emissions; therefore, the effect would remain adverse.

As described in Impact AQ-18, implementation of CM2-CM11 under Alternative 1A could generate additional traffic on roads and highways in and around Suisun Marsh and the Yolo Bypass related to restoration or monitoring activities. These activities require physical changes or heavy-duty equipment that would generate construction emissions through earth-moving activities and heavy-

duty diesel-powered equipment. This would result in an adverse effect if the incremental difference, or increase, of criteria pollutants relative to Existing Conditions exceeds applicable local air district thresholds. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. These effects are expected to be further evaluated and identified in the subsequent project-level environmental analysis conducted for the CM2–CM11 restoration and enhancement actions. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects. Mitigation Measure AQ-18 would be available to reduce this effect.

Mitigation Measure AQ-18: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities

However, it may not be sufficient to reduce emissions below applicable air quality management district thresholds. Consequently, this impact would be adverse.

Given that the construction and restoration and conservation areas along this alignment are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that generation of criteria pollutants in excess of local air district thresholds would result in a potentially disproportionate effect on minority and low-income populations. See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect effects on export service areas.

Noise

Chapter 23, *Noise,* Section 23.3.3.2, identifies the following adverse effects associated with new sources of noise and vibration that would be introduced into the study area under Alternative 1A.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Conservation Measures

Chapter 23, *Noise,* Section 23.3.3.2, Impacts NOI-1 and NOI-2, describe vibration and noise effects associated with construction of this alternative that would occur at discrete locations along the conveyance facility, and would affect adjacent residents or other sensitive receptors. Specifically, as described in Chapter 23, Section 23.3.3.2, Impact NOI-1, noise from construction of intakes; construction of conveyance, forebays, barge unloading facilities, and intermediate pumping plants; truck trips and worker commutes; construction of power transmission lines; and earth-moving at offsite borrow/spoil areas is predicted to exceed daytime and nighttime noise standards in areas zoned for sensitive land uses including residential, natural/recreational, agricultural residential, and schools.

Groundborne vibration from impact pile driving, discussed in Chapter 23, *Noise,* Section 23.3.3.2, Impact NOI-2, is predicted to exceed vibration thresholds in areas zoned for residential, including agricultural residential, land uses in areas listed below.

- Sacramento County – including River Road near the community of Hood, neighborhoods in the community of Hood.
- Yolo County – including County Road E9 near the community of Clarksburg.
- San Joaquin County.

As shown in Figures 28-1 and 28-2, there are census blocks and block groups with meaningfully greater proportions of minority and low-income populations in the vicinity of heavy construction work areas (e.g., intake locations, the pipeline/tunnel alignment, and the forebays) where vibration and noise effects are predicted to exceed noise standards for nearby residents. Construction of intakes and the tunnel would result in groundborne vibration and groundborne noise levels that exceed noise thresholds at nearby receptors, including residential structures. The effect of exposing sensitive receptors to vibration or groundborne noise would be adverse.

Chapter 23, *Noise,* Section 23.3.3.2, Impact NOI-4, describes the noise effects of conservation measures. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects.

Chapter 23, *Noise,* Section 23.3.3.2, identifies mitigation measures that would reduce noise and vibration effects.

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

In addition, the environmental commitment to develop and implement a Noise Abatement Plan would reduce these effects (Appendix 3B, *Environmental Commitments, AMMs and CMs*). Although these mitigation measures and the environmental commitment would be available to reduce these effects, it is not anticipated that feasible measures would be available in all situations to reduce construction noise to levels below the applicable thresholds. The effect of exposing noise-sensitive land uses to noise increases above thresholds is considered adverse. Although mitigation measures are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse.

Public Health

Chapter 25, *Public Health*, Section 25.3.3.2, identifies the potential for the operation of this alternative to increase concentrations of bromide and associated disinfectant byproducts (DPBs) at Barker Slough, a source of water for the North Bay Aqueduct. Although Impacts PH-3 and 7 are not

considered adverse or significant in Chapter 25, they are discussed in this section because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population.

Impact PH-2: Exceedances of Water Quality Criteria for Constituents of Concern Such That There Is an Adverse Effect on Public Health as a Result of Operation of the Water Conveyance Facilities

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10

Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4.Impact PH-2 would result in an adverse effect because these chemicals are associated with adverse health effects. In addition, the contribution of this alternative would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. Mitigation Measure WQ-5 is available to reduce this effect:

Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough

While Mitigation Measure WQ-5 may reduce this impact, the feasibility and effectiveness of this mitigation measure is uncertain based on currently available information. Therefore, the available mitigation would not necessarily reduce the impact to a level that would not be adverse.

The North Bay Aqueduct serves Napa and Solano Counties. This analysis assumes the decrease in water quality for waters conveyed in this aqueduct would affect the entire service population using water from the North Bay Aqueduct, which is approximately the same as the demographic profile for each county as a whole. Napa County as a whole does not have a meaningfully greater minority population (the total minority population is approximately 44%, U.S. Census Bureau 2012a). Solano County however has a total minority population of approximately 59% (U.S. Census Bureau 2012b). Neither county has a meaningfully greater low-income population. Because the increase in bromide and DPBs would decrease water quality for Solano County service population, this would disproportionately affect minorities. This is an adverse effect.

As described in Chapter 25, Impact PH-3, five intakes would be constructed and operated under Alternative 1A. Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. Changes in dilution and mixing of sources of water could result in a change in constituents known to bioaccumulate.

Modeling showed small, insignificant changes in total mercury and methylmercury levels in water and fish tissues resulting from Alternative 1A water operations. Upstream mercury contributions

and methylmercury production in Delta waters would not be altered by the operation of Alternative 1A, as it would not change existing mercury sources and would not substantially alter methylmercury concentrations in the Sacramento River or San Joaquin River; therefore, the potential for Alternative 1A to create a public health effect is minimal, and effects would not be adverse. Modeling results indicate that percentage change in assimilative capacity of waterborne total mercury relative to the 25 ng/L Ecological Risk Benchmark for this alternative showed the greatest decrease (1.1%) at Franks Tract relative to the No Action Alternative. Fish tissue estimates showed small or no increase in exceedance quotients based on long-term annual average concentrations for mercury at the nine Delta locations modeled (See Chapter 8, *Water Quality*, Section 8.3.3.2, *Alternative 1A–Dual Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario A)*, for a detailed discussion). The greatest increase was at Mokelumne River (South Fork) at Staten Island (10% relative to the No Action Alternative). Currently, mercury concentrations in fish tissues exceed Delta total maximum daily load (TMDL) guidance targets, which are set for human health rather than effects on fish, and Alternative 1A is not expected to substantially alter this condition through water operations. Large sport fish throughout the Delta are currently uniformly in exceedance of consumption guidelines for mercury, and Alternative 1A is not expected to substantially alter that condition. Although methylmercury currently exceeds the TMDL, little to no change in mercury or methylmercury concentrations in water is expected under Alternative 1A water operations.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, and mercury concentrations in fish tissues already exceed Delta TMDL targets, any additional increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 micrograms (µg) per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Impact WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 1A would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species; therefore, the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 1A. This effect would be adverse.

As described in Impact PH-7, Alternative 1A restoration actions are likely to result in increased production, mobilization, and bioavailability of methylmercury in the aquatic system. Methylmercury would be generated by inundation of restoration areas, with highest concentrations expected in the Yolo Bypass, Cosumnes River and Mokelumne River, and at ROAs closest to these source areas as a result of the BDCP actions. An increase in bioavailability in the aquatic system

could result in a corresponding increase in bioaccumulation in fish tissue, biomagnification through the food chain, and human exposure. Because the increase in bioavailability in the food chain cannot be quantified, the increase in human exposure also cannot be quantified. OEHHA standards would continue to be implemented for the consumption of study area fish and thus would serve to protect people against the overconsumption of fish with increased body burdens of mercury. Furthermore, implementation of *CM12 Methylmercury Management*, would minimize effects because it provides for project-specific mercury management plans including a quality assurance/quality control program, and specific tidal habitat restoration design elements to reduce the potential for methylation of mercury and its bioavailability in tidal habitats.

However, as described above for Impact PH-3, because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic, and Lao subsistence fishers pursuing fish in the Delta would be most affected because they already consume fish in quantities that exceed the EPA reference dose. Increased mercury was modeled based upon increases modeled for one species: largemouth bass. The associated increase in human consumption of mercury caused by implementation of Alternative 1A would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large, this effect would be disproportionate on those populations for Alternative 1A. This effect would be adverse.

As described in Chapter 25, Impact PH-8, *Microcystis* blooms in the Export Service Areas could increase due to increased water temperatures resulting from climate change, but not due to water conveyance facility operations. Similarly, hydraulic residence times in the Export Service Area would not be affected by operations of CM1. Accordingly, conditions would not be more conducive to *Microcystis* bloom formation. Water diverted from the Sacramento River in the north Delta is expected to be unaffected by *Microcystis,* but the fraction of water flowing through the Delta that reaches the existing south Delta intakes is expected to be influenced by an increase in *Microcystis* blooms. Therefore, relative to the No Action Alternative, the addition of Sacramento River water from the north Delta under Alternative 1A would dilute *Microcystis* and microcystins in water diverted from the south Delta. Because the degree to which *Microcystis* blooms, and thus microcystins concentrations, will increase in source water from the south Delta is unknown, it cannot be determined whether Alternative 1A will result in increased or decreased levels of microcystins in the mixture of source waters exported from Banks and Jones pumping plants.

Ambient meteorological conditions are the primary driver of Delta water temperatures, and therefore climate warming, and not water operations, would determine future water temperatures in the Delta. Increasing water temperatures due to climate change could lead to earlier attainment of the water temperature threshold of 19°C required to initiate *Microcystis* bloom formation, and therefore earlier occurrences of *Microcystis* blooms in the Delta, as well as increases in the duration and magnitude. However, these temperature-related changes under Alternative 1A would not be

different from what would occur under the No Action Alternative. Siting and design of restoration areas would have a substantial influence on the magnitude of hydraulic residence time increases under Alternative 1A. The modeled increase in residence time in the Delta could result in an increase in the frequency, magnitude, and geographic extent of *Microcystis* blooms, and thus microcystin levels, throughout the Delta. Therefore, impacts on beneficial uses, including drinking water and recreational waters, could occur and, as such, public health could be affected. Accordingly, this would be considered an adverse effect. Mitigation Measure WQ-32a and WQ-32b are available to reduce the effects of degraded water quality, and therefore potential public health effects, in the Delta due to *Microcystis*. Mitigation Measure WQ-32a has been included here because the DSM2 modeling that was done for this alternative and utilized for the CM1 assessment included both operations and restoration. Because the effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain, the effect would still be considered adverse.

Mitigation Measure WQ-32a: Design Restoration Sites to Reduce Potential for Increased *Microcystis* Blooms

It remains to be determined whether, or to what degree, *Microcystis* production will increase in Delta areas as a result of increased residence times associated with the implementation of the project alternative. Mitigation actions shall be focused on those incremental effects attributable to implementation of operations under the project alternative only. Development of mitigation actions for the incremental increase in *Microcystis* effects attributable to water temperature and residence time increases driven by climate change and sea level rise is not required because these changed conditions would occur with or without implementation of the project alternative. The goal of specific actions would be to reduce/avoid additional degradation of Delta water quality conditions with respect to occurrences of *Microcystis* blooms.

Additional evaluation will be conducted as part of the development of tidal habitat restoration areas to determine the feasibility of using site placement and design criteria to reduce or eliminate local conditions conducive to *Microcystis* production. Design criteria would be developed to provide guidelines for developing restoration areas to discourage *Microcystis* growth by maintaining adequate flushing, while maintaining the benefits of habitat restoration in terms of zooplankton production, fish food quality, and fish feeding success. For example, a target range of typical summer/fall hydraulic residence time that is long enough to promote phytoplankton growth, but not so long as to promote growth of *Microcystis*, could be used to aid restoration site design. However, currently there is not sufficient scientific certainty to evaluate whether or not longer residence times would result in greater *Microcystis* production, and also whether longer residence times might produce greater benefits to fish and other aquatic life than shorter residence times. This mitigation measure requires that residence time considerations be incorporated into restoration area site design for CM2 and CM4 using best available science at the time of design. It is possible that through these efforts, increases in *Microcystis* under CM1 attributable to the project alternative, relative to Existing Conditions, could be mitigated. However, there may be instances where this design consideration may not be feasible, and thus, achieving *Microcystis* reduction pursuant to this mitigation measure would not be feasible.

Mitigation Measure WQ-32b: Investigate and Implement Operational Measures to Manage Water Residence Time

Because it is not known where, when, and to what extent *Microcystis* will be more abundant under CM1 than under Existing Conditions, specific mitigation measures cannot be described. However, this mitigation measure requires the project proponents to monitor for *Microcystis* abundance in the Delta and use appropriate statistical methods to determine whether increases in abundance are adverse. This mitigation measure also requires that if *Microcystis* abundance increases, relative to Existing Conditions, the project proponents will investigate and evaluate measures that could be taken to reduce residence time in the affected areas of the Delta. Operational actions could include timing of temporary or operable barrier openings and closings, reservoir releases, and location of Delta exports (i.e., North Delta vs. South Delta pumping facilities). Depending on the location and severity of the increases, one or more of these actions may be feasible for reducing residence times. If so, these actions could mitigate increases in *Microcystis* under CM1 attributable to the project alternative, relative to Existing Conditions. However, it is possible that these actions would not be feasible because they would conflict with other project commitments, would cause their own environmental impacts, or would not be expected to reduce or mitigate increases in *Microcystis*. In this case, achieving *Microcystis* reduction pursuant to this mitigation measure would not be feasible.

Summary of Environmental Justice Effects under Alternative 1A

Alternative 1A would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

28.5.3.4 Alternative 1B—Dual Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario A)

This section analyzes the environmental justice effects of the resource topics that are carried forward for detailed analysis for Alternative 1B. Relevant environmental justice effects associated with adverse effects identified in these chapters are analyzed to determine if they would result in a disproportionate effect on minority or low-income populations. Generally, impact mechanisms and effects are similar to those described for Alternative 1A. This section focuses on the differences from Alternative 1A. While the same impact mechanisms have the potential to disproportionately affect minority and low-income populations, these effects would result from the construction of a canal through the eastern portion of the study area rather than the central pipeline/tunnel option. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the east alignment, which includes Alternative 1B.

Land Use

Chapter 13, *Land Use,* Section 13.3.3.3, addresses the potential effects for a BDCP alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effect is relevant to this analysis.

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Under Alternative 1B, approximately 400 permanent structures would be removed or relocated within the water conveyance facility footprint, including approximately 109 residential buildings. As with Alternative 1A, the physical footprints of the intake facilities and their associated conveyance pipelines are anticipated to create the largest disruption to residential structures.

As shown in Figure 28-1, there are census blocks with a meaningfully greater minority population (more than 50%) throughout the study area, and specifically along the east alignment. Because the construction of Intakes 1–5 would result in the displacement of approximately 109 residences, which would affect census blocks where the minority population is over 50%, this would represent a disproportionate effect on minority populations. When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative, which would reduce the severity of economic effects related to this physical effect, but would not reduce the severity of the physical effect itself. For these reasons, this effect would be adverse.

In addition, Chapter 13, *Land Use,* Section 13.3.3.3, examines the potential to divide existing communities. Under Alternative 1B, construction activities associated with Intake 4 and its associated facilities, the canal, and a bridge over the canal would separate the community of Hood from surrounding areas. Even though access to and from the community would be maintained over the long-term, the placement of Intake 4 and the canal, as well as the nearby construction of Intake 3, would create lasting physical barriers between Hood and the surrounding lands.

Additionally, construction and the long-term placement of Intake 3 (about 0.5 mile north of Hood) and the canal (running north to south) would create further divisions between Hood and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Additionally, the lasting placement of the intake facilities and the canal would establish physical barriers between the community and its surroundings, constituting an adverse effect. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect.

As shown in Figures 28-1 and 28-2, the community of Hood is composed of both census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations. Consequently, the division of the community of Hood would have a disproportionately adverse effect on minority and low-income populations in Hood, because of the higher proportion of minority populations in the vicinity. This would be an adverse effect.

Socioeconomics

The same impact mechanisms identified for Alternative 1A would result in effects on local employment conditions under Alternative 1B (Impacts ECON-1 and ECON-7). The general economic effects on south-of-Delta areas of alternatives that would reduce water to Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. The impacts analyzed below have the potential to disproportionately affect environmental justice populations. Other effects in Chapter 16, *Socioeconomics,* Section 16.3.3.3, are not analyzed in this section because they either relate to program-level conservation

measures that do not have sufficient project-level detail to identify environmental justice consequences, or because they do not have the potential to disproportionately affect environmental justice populations.

Construction of the proposed water conveyance facilities would increase total employment and income in the study area. The change would result from expenditures on construction and from changes in agricultural production. Changes in jobs in the study area as a result of construction are reported in Chapter 16, Section 16.3.3.3, *Socioeconomics,* Table 16-25. During the peak construction year, it is estimated that 6,279 jobs (direct) and 12,985 jobs total (direct, indirect, and induced effects) would be gained in the study area.

However, construction of conveyance and related facilities, such as roads and utilities, would cause temporary and permanent conversion of agricultural land. Because construction would reduce agricultural land under cultivation, construction would result in the direct loss of 90 agricultural jobs and a total loss of 340 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics,* Section 16.3.3.3, Table 16-26).

As described for Chapter 16, *Socioeconomics,* Section 16.3.3.3, Impact ECON-7, operation of conveyance facilities constructed under Alternative 1B would result in the direct creation of 204 jobs and the creation of 294 jobs total (Chapter 16, *Socioeconomics,* Section 16.3.3.3, Table 16-28). However, because operations would reduce agricultural cultivation, operations would result in the direct loss of 117 agricultural jobs and a total of 321 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics,* Section 16.3.3.3, Table 16-29).

Because the majority of farm labor in the study area is minority, including those of Hispanic origin and potentially low-income, loss of up to 340 agricultural jobs in the study area associated with construction of the conveyance facility is considered to be a disproportionate effect on an environmental justice population. However, the overall employment effect in the study area related to construction and operation of the conveyance facility would be an increase in construction and facility operation employment, which may have some unknown positive effect on the environmental justice population in the study area. Despite the potential for a beneficial employment effect in the study area under Alternative 1B, the disproportionate effect on agricultural workers is considered an adverse effect because this effect would disproportionately accrue to a minority population.

Aesthetics and Visual Resources

Similar impact mechanisms described for Alternative 1A would generate effects on visual resources for Alternative 1B. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.3, identifies the following adverse effects.

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of CM2–CM21

Impact AES-6 analyzes the effect of the implementation of CM2–CM21 on aesthetics and visual resources. This effect would be adverse. However because the precise location of where future conservation measures will be implemented is unknown, this impact is not carried forward for further analysis of environmental justice effects for this alternative or other alternatives.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.3, also identifies the following mitigation measures that would reduce the identified effects on aesthetics and visual resources.

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 0.5 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.3, Impacts AES-1 through AES-4, describe the aesthetics and visual resources effects associated with water conveyance facilities construction and operations. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.3, Impact AES-3 describes the effects on local scenic highways, such as SR 160. Because degradation of a scenic highway would result in loss of scenic qualities for all highway users, it is not carried forward for environmental justice analysis.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.3, Impact AES-1 describes the effect of construction activities on the visual quality and character of the study area. Construction of Intakes 1–5 and the accompanying pump stations, surge towers, canals, borrow/spoil areas, RTM areas, forebay, access roads, transmission lines, and concrete batch plants and fuel stations would introduce visually discordant features into foreground and middleground views with low to high landscape sensitivity level. These elements would introduce visually dominant features that would be very noticeable to all viewer groups and would segment the visual landscape of the study area, reduce the amount of open space lands available to viewers, and eliminate valued visual resources. Accordingly, because of the long-term nature of construction, proximity to sensitive receptors, razing of residences and agricultural buildings, removal of vegetation, and changes to topography through grading, this effect would be adverse. Effects on the existing visual character under Alternative 1B would be greater than under Alternative 1A because of the extent of the canals visible on the landscape surface, landscape scars left behind by spoil/borrow areas, and introduction of bridges. Overall, effects on the existing visual character associated with construction of Alternative 1B would be adverse. Mitigation Measures AES-1a through AES-1g are available to address these adverse effects.

Impact AES-2 describes the permanent alteration of scenic resources resulting from construction. Intakes 1–5 and landscape scars remaining from spoil/borrow areas, and transmission lines would be similar to the effects described for Alternative 1A. However, spoil/borrow areas would take up a much greater area between Intake 1 and Dierssen Road than under Alternative 1A. These changes would have a much greater effect on available views from SR 160 and near the towns of Clarksburg and Hood, which have a higher concentration of residential, recreational, and roadway viewers. Permanent effects on scenic vistas associated with Alternative 1B may be adverse. Effects on scenic vistas under Alternative 1B would be greater than under Alternative 1A because of the extent of the canals visible on the landscape surface, landscape scars left behind by spoil/borrow areas, and introduction of bridges. Mitigation Measures AES-1a, AES-1c, and AES-1e are available to address these effects.

Impact AES-4 describes the potential for new sources of light and glare that would be introduced during construction or as part of permanent features that would remain after the conveyance facilities are complete. Intakes 1–5 would generate construction-phase and permanent sources of light. Evening and nighttime construction activities would require use of extremely bright lights and generate increased nighttime headlights flashing into nearby residents' homes; these light sources would affect adjacent populations. The intermediate forebay would not be constructed, but the presence of canals would introduce a linear feature that would require nighttime lighting at for safety. Transmission lines would require safety lighting at night so the facility would be visible to aircraft. Because the study area has low levels of ambient daytime glare and nighttime light, light and glare effects related to the presence of bridges, canals, and transmission lines during operation under this alternative and would adversely affect daytime and nighttime views.

While mitigation is available to reduce the effects of Impacts AES-1, AES-2, and AES-4, these effects would remain adverse. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area, including along the east alignment alternative. Specifically, a concentration of minority and low-income populations are located in the communities of Clarksburg, Walnut Grove, Hood, and Courtland, where residential viewers in these communities would be affected by adverse visual effects of this alternative.

Because adverse visual effects are largely associated with the northern portion of the alignment where permanent features would remain and along the southern portion of the alignment where the Byron Tract Forebay and borrow and spoil areas would be constructed, where minority and low-income populations, these effects would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse because it occur in a geographic location with meaningfully greater minority and low-income communities.

Cultural Resources

Construction of conveyance facilities under this alternative would have adverse effects on prehistoric archaeological resources, unidentified human remains, historic archaeological sites, traditional cultural properties, and built environment resources, as described in Impacts CUL-1 through Impact CUL-7.

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

Impact CUL-8 addresses the compatibility of the BDCP with the adopted cultural resource management policies of agencies with land use authority in the Delta. Because this effect is not a physical environmental effect that could result in impacts on environmental justice populations, it is not relevant to this analysis. Ground-disturbing construction has the potential to damage both identified and previously unrecorded examples of each of these resources. Mitigation is available to reduce these effects.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of inaccessible Properties to Assess Eligibility, Determine If These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

Prehistoric resources, especially sites containing human remains, are of special significance to the Native American community. In addition, historic-era resources located in the footprint of this alternative may be significant for minority populations. While these impact mechanisms are the same as described for Alternative 1A, the resources that contribute to these effects are slightly different. The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources,* Section 18.3.5.3. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*.

These resources represent a tangible link to the past, and, if they contain human remains, a resting place for interred ancestors. While prehistoric resources and buried human remains also contain significance for the general public (including low-income populations), the significance to the general public is typically limited to the scientific value of the resources. Because these resources are especially significant to Native American populations and potentially other minority populations, adverse effects identified in Chapter 18, *Cultural Resources,* Section 18.3.5.3, Impacts CUL-1 through CUL-7 would result in a disproportionate effect on minorities. The affected population cannot be identified with specificity because members of tribes that attach significance to the resources in the Delta may reside in relatively remote locations rather than in adjacent census blocks or even counties. Nonetheless, this alternative would result in a disproportionate effect on Native American populations and potentially other minorities.

Identification and treatment of cultural resources would be completed under relevant mitigation measures described in Chapter 18, *Cultural Resources*, Section 18.3.5.3, such as Mitigation Measures CUL-2 and CUL-7. Construction monitoring and discovery protocols would be performed during construction under Mitigation Measure CUL-3. State and federal law governing discoveries of human remains would be enforced through Mitigation Measure CUL-4*.* In addition to the mitigation

measures developed in this EIR/EIS, federal agencies that have a significant role in implementing the BDCP are required to comply with Section 106 of the NHPA (16 USC 470f). Section 106 and the Section 106 regulations require that the agencies identify effects on historic properties and consult with the public (including relevant minority groups) and Native American tribes during the management process. Section 106 thus adds another mechanism for identifying resources, and developing mitigation that would reduce or avoid adverse effects. Despite these mitigation measures, this alternative is likely to result in adverse effects on prehistoric archaeological resources, human remains, historic-era resources, and traditional cultural properties because the scale of the project makes avoidance of all eligible resources infeasible. In addition, because there is no feasible way to identify buried resources that may occur in deep subterranean sections of the tunnel in advance of construction, effects on these resources cannot be accurately identified or avoided. The effect on Native American populations and other minority populations would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because the effects would disproportionately accrue to minority and low-income populations.

Public Services and Utilities

The same impact mechanisms described under Alternative 1A would also result in effects on utility infrastructure and public service providers such as fire stations and police facilities under Alternative 1B. Chapter 20, *Public Services and Utilities*, Section 20.3.3.3, identifies three adverse effects under this alternative.

As described in Chapter 20, *Public Services and Utilities*, Section 20.3.3.3, Impact UT-2, construction of the canal segment and bridge would conflict with the Hood Fire Station, at 1125 Hood-Franklin Road in Hood. Implementation of Mitigation Measure UT-2 would require the construction of a replacement facility, if the existing fire station cannot be avoided and would lessen the severity of the potential effect by ensuring continuation of fire protection services in the Courtland Fire Protection District service area. While Mitigation Measure UT-2 would ensure that fire protection services are not interrupted, the potential relocation is considered an adverse effect. The affected communities of Hood and Courtland are comprised of a meaningfully greater minority population, as shown on Figure 28-1, which would be potentially affected by both the disruption of fire protection or emergency medical services associated with removal of the Hood Fire Station, and potential adverse effects of constructing a new fire station. Consequently, this represents a potentially disproportionate effect on a minority population, because the effect would occur in a geographic location with a meaningfully greater minority population. This is considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.3, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 1B would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption

associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility, this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income population because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.3, Impact UT-8, describes the potential consequences of conservation measures on public services at a programmatic level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.3.3.3, addresses the potential effects for a BDCP alternative to generate criteria pollutants that exceed air quality district and federal *de minimis* thresholds from construction of the proposed water conveyance facilities or the implementation of CM2–CM11. The following adverse effects are relevant to this analysis.

Impact AQ-2: Generation of Criteria Pollutants in Excess of the SMAQMD Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-9: Generation of Criteria Pollutants in the Excess of Federal *De Minimis* Thresholds from Construction and Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-18: Generation of Criteria Pollutants from Implementation of CM2–CM11

As described in Impact AQ-2, construction of Alternative 1B would generate fugitive dust emissions exceeding SMAQMD thresholds. The impact of generating emissions in excess of local air district thresholds would therefore violate applicable air quality standards in the study area and could contribute to or worsen an existing air quality conditions. No feasible mitigation is available to reduce fugitive dust emissions; therefore, the effect would remain adverse.

As described in Impact AQ-9, construction of the water conveyance facilities under this alignment would exceed San Joaquin Valley Air Pollution Control District (SJVAPCD) federal *de minimis* thresholds for (carbon monoxide) CO. DWR has identified several environmental commitments to reduce construction-related criteria pollutants. However, because the current emissions estimates exceed the San Joaquin Valley Air Basin (SJVAB) federal *de minimis* threshold for CO, a positive

conformity determination for CO cannot be satisfied through the purchase of offsets within the SJVAB. This impact would remain adverse. In the event that Alternative 1B is selected, Reclamation, USFWS, and NMFS would need to demonstrate that conformity is met for CO through a local air quality modeling analysis (i.e., dispersion modeling) to ensure project emissions do not cause or contribute to any new violation of the CO national ambient air quality standards (NAAQS) or increase the frequency or severity of any existing violation of the CO NAAQS.

As described in Impact AQ-18, implementation of CM2–CM11 under Alternative 1B could generate additional traffic on roads and highways in and around Suisun Marsh and the Yolo Bypass related to restoration or monitoring activities. These activities require physical changes or heavy-duty equipment that would generate construction emissions through earth-moving activities and heavy-duty diesel-powered equipment. This would result in an adverse effect if the incremental difference, or increase, of criteria pollutants relative to Existing Conditions exceeds applicable local air district thresholds. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. These effects are expected to be further evaluated and identified in the subsequent project-level environmental analysis conducted for the CM2–CM11 restoration and enhancement actions. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects. Mitigation Measure AQ-18 would be available to reduce this effect.

Mitigation Measure AQ-18: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities

However, it may not be sufficient to reduce emissions below applicable air quality management district thresholds. Consequently, this impact would be adverse.

Given that the proposed water conveyance facilities and the restoration and conservation areas along this alignment are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that generation of criteria pollutants in excess of local air district and federal *de minimis* thresholds would result in a potentially disproportionate effect on minority and low-income populations. See Chapter 30, *Growth Inducement and Other Indirect Effects*, for discussion on any indirect impacts on export service areas.

Noise

The same impact mechanisms described under Alternative 1A would result in adverse noise effects under Alternative 1B. Effects under Alternative 1B would differ from Alternative 1A primarily in location because an eastern canal would be constructed rather than tunnels. The following adverse effects would be associated with new sources of noise and vibration introduced into the study area under Alternative 1B.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Conservation Measures

Chapter 23, *Noise,* Section 23.3.3.3, Impacts NOI-1 and NOI-2, describe vibration and noise effects associated with the construction of this alternative that would occur at discrete locations along the conveyance facility, and would affect adjacent residents or other sensitive receptors. Specifically, as described in Chapter 23, *Noise,* Section 23.3.3.3, Impact NOI-1, noise from construction of intakes; construction of conveyance, a forebay, barge unloading facilities, and intermediate pumping plants; truck trips and worker commutes; construction of power transmission lines; and earth-moving at offsite borrow/spoil areas is predicted to exceed daytime and nighttime noise standards in areas zoned for sensitive land uses including residential, natural/recreational, agricultural residential, and schools. Groundborne vibration from impact pile driving, discussed in Chapter 23, Section 23.3.3.3, Impact NOI-2, is predicted to exceed vibration thresholds in areas zoned for residential, including agricultural residential, land uses in areas listed below.

- Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood
- Yolo County – including County Road E9 near the community of Clarksburg
- San Joaquin County

As shown in Figures 28-1 and 28-2, there are census blocks and block groups with meaningfully greater proportions of minority and low-income populations in the vicinity of areas of heavy construction work areas (e.g., intake locations, the canal alignment, and the forebays) where vibration and noise effects are predicted to exceed noise standards for nearby residents. Overall, under Alternative 1B, pile driving activities during construction of the intakes and conveyances could result in substantial increases in noise levels affecting nearby communities and residences. The effect of exposing noise-sensitive land uses to noise increases above thresholds would be adverse.

Chapter 23, *Noise,* Section 23.3.3.3, Impact NOI-4 describes the noise effects of conservation measures. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects.

Mitigation Measures are available to address these effects. Chapter 23, *Noise,* Section 23.3.3.3, identifies mitigation measures that would reduce noise and vibration effects.

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

In addition, the environmental commitment to develop and implement a Noise Abatement Plan would reduce these effects (Appendix 3B, *Environmental Commitments, AMMs and CMs*). Although these mitigation measures and the environmental commitment would be available to reduce these

effects, it is not anticipated that feasible measures would be available in all situations to reduce construction noise to levels below the applicable thresholds. The effect of exposing noise-sensitive land uses to noise increases above thresholds is considered adverse. Although mitigation measures are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse.

Public Health

Chapter 25, *Public Health*, Section 25.3.3.3, identifies the potential for the operation of this alternative to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. Although Impacts PH-3 and 7 are not considered adverse or significant in Chapter 25, they are discussed in this section because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population.

Impact PH-2: Exceedances of Water Quality Criteria for Constituents of Concern Such That There Is an Adverse Effect on Public Health as a Result of Operation of the Water Conveyance Facilities

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10

Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4

Impact PH-2 would result in an adverse effect because these chemicals are associated with adverse health effects. Mitigation Measure WQ-5 is available to reduce this effect:

> **Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough**

In addition, the contribution of this alternative would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. While Mitigation Measure WQ-5 may reduce this effect, the feasibility and effectiveness of this mitigation measure is uncertain based on currently available information. Therefore, the available mitigation would not necessarily reduce the effect.

The North Bay Aqueduct serves Napa and Solano Counties. This analysis assumes the decrease in water quality for waters conveyed in this aqueduct would affect the entire service population using water from the North Bay Aqueduct, which is approximately the same as the demographic profile for each county as a whole. Napa County as a whole does not have a meaningfully greater minority population (the total minority population is approximately 44%, U.S. Census Bureau 2012a). Solano

County however has a total minority population of approximately 59% (U.S. Census Bureau 2012b). Neither county has a meaningfully greater low-income population. Because the increase in bromide and DPBs would decrease water quality for Solano County service population, this would disproportionately affect minorities. This is an adverse effect.

As described in Chapter 25, Impact PH-3, five intakes would be constructed and operated under Alternative 1B. Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. Changes in dilution and mixing of sources of water could result in a change in constituents known to bioaccumulate, similar to Alternative 1A. Although methylmercury currently exceeds the TMDL, little to no change in mercury or methylmercury concentrations in water is expected under Alternative 1B water operations.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, and mercury concentrations in fish tissues already exceed Delta TMDL targets, any additional increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Impact WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 1B would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species; therefore, the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large, this effect would be disproportionate on those populations for Alternative 1B. This effect would be adverse.

As described in Impact PH-7, Alternative 1B restoration actions are likely to result in increased production, mobilization, and bioavailability of methylmercury in the aquatic system. Methylmercury would be generated by inundation of restoration areas, with highest concentrations expected in the Yolo Bypass, Cosumnes River and Mokelumne River, and at ROAs closest to these source areas as a result of the BDCP actions. An increase in bioavailability in the aquatic system could result in a corresponding increase in bioaccumulation in fish tissue, biomagnification through the food chain, and human exposure. Because the increase in bioavailability in the food chain cannot be quantified, the increase in human exposure also cannot be quantified. OEHHA standards would continue to be implemented for the consumption of study area fish and thus would serve to protect people against the overconsumption of fish with increased body burdens of mercury. Furthermore, implementation of *CM12 Methylmercury Management*, would minimize effects because it provides

for project-specific mercury management plans including a quality assurance/quality control program, and specific tidal habitat restoration design elements to reduce the potential for methylation of mercury and its bioavailability in tidal habitats.

However, as described above for Impact PH-3, because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic, and Lao subsistence fishers pursuing fish in the Delta would be most affected because they already consume fish in quantities that exceed the EPA reference dose. Increased mercury was modeled based upon increases modeled for one species: largemouth bass. The associated increase in human consumption of mercury caused by implementation of Alternative 1B would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 1B. This effect would be adverse.

Water operations under Alternative 1B would be the same as under Alternative 1A. Therefore, potential effects on public health due to changes in water quality and beneficial uses as a result of *Microcystis* blooms and microcystin levels would be the same. Any modified reservoir operations under Alternative 1B are not expected to promote *Microcystis* production upstream of the Delta or in the rivers and streams of the Sacramento River watershed, watersheds of the eastern tributaries (Cosumnes, Mokelumne, and Calaveras Rivers), and the San Joaquin River upstream of the Delta.

As described in Chapter 8, *Water Quality*, *Microcystis* blooms in the Export Service Areas could increase due to increased water temperatures resulting from climate change, but not due to water conveyance facility operations. Similarly, hydraulic residence times in the Export Service Area would not be affected by operations of CM1. Accordingly, conditions would not be more conducive to *Microcystis* bloom formation. Water diverted from the Sacramento River in the north Delta is expected to be unaffected by *Microcystis*. However, the fraction of water flowing through the Delta that reaches the existing south Delta intakes is expected to be influenced by an increase in *Microcystis* blooms, as discussed below. Therefore, relative to the No Action Alternative, the addition of Sacramento River water from the north Delta under Alternative 1B would dilute *Microcystis* and microcystins in water diverted from the south Delta. Because the degree to which *Microcystis* blooms, and thus microcystins concentrations, would increase in source water from the south Delta is unknown, it cannot be determined whether Alternative 1B would result in increased or decreased levels of microcystins in the mixture of source waters exported from Banks and Jones pumping plants.

Ambient meteorological conditions would be the primary driver of Delta water temperatures, and climate warming, not water operations, would determine future water temperatures in the Delta. Increasing water temperatures due to climate change could lead to earlier attainment of the water temperature threshold required to initiate Microcystis bloom formation, and therefore earlier

occurrences of Microcystis blooms in the Delta, as well as increases in the duration and magnitude. However, these temperature-related changes would not be different from what would occur under the No Action Alternative. Modeled hydraulic residence times in the Delta are projected to increase in the summer and fall periods in the north and west Delta and in the summer in Cache Slough, the east Delta, and south Delta relative to the No Action Alternative. Siting and design of restoration areas would have a substantial influence on the magnitude of residence time increases under Alternative 1B. The modeled increase in hydraulic residence time in the Delta could result in an increase in the frequency, magnitude, and geographic extent of Microcystis blooms, and thus microcystin levels. Therefore, impacts on beneficial uses, including drinking water and recreational waters, could occur and public health could be affected. Accordingly, this would be considered an adverse effect.

Mitigation Measure WQ-32a and WQ-32b are available to reduce the effects of degraded water quality, and therefore potential public health effects, in the Delta due to Microcystis. However, because the effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain, the effect would still be considered adverse.

The amount and location of habitat restoration and enhancement that would occur under Alternative 1B would be the same as that described under Alternative 1A. Restoration activities implemented under CM2 and CM4 that would create shallow backwater areas could result in local increases in water temperature that may encourage Microcystis growth during the summer bloom season. This would result in further degradation of water quality beyond the hydrodynamic effects of CM2 and CM4 on Microcystis blooms identified in Impact PH-8. An increase in Microcystis blooms with implementation of CM2 and CM4 could potentially result in adverse effects on public health through exposure via drinking water quality and recreational waters. Mitigation Measures WQ-32a and WQ-32b may reduce the combined effect on Microcystis from increased local water temperatures and water residence time. The effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain. This would be an adverse effect.

Mitigation Measure WQ-32a: Design Restoration Sites to Reduce Potential for Increased *Microcystis* Blooms

Please see Mitigation Measure WQ-32a under Impact WQ-32 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Mitigation Measure WQ-32b: Investigate and Implement Operational Measures to Manage Water Residence Time

Please see Mitigation Measure WQ-32b under Impact WQ-32 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Summary of Environmental Justice Effects under Alternative 1B

Alternative 1B would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural, air quality and greenhouse gas emissions, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For

these reasons effects on minority and low-income populations would be disproportionate and adverse.

28.5.3.5 Alternative 1C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario A)

This section analyzes the environmental justice effects of the resource topics that are carried forward for detailed analysis for Alternative 1C. Relevant environmental justice effects associated with adverse effects identified in these resource chapters are analyzed to determine if they would result in a disproportionate effect on minority or low-income populations. Generally, impact mechanisms and effects are similar to those described for Alternative 1A. While the same impact mechanisms have the potential to disproportionately affect minority and low-income populations, these effects would result from the construction of conveyance facilities through the western portion of the study area rather than the central pipeline/tunnel alignment. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the west alignment, which includes Alternative 1C.

Land Use

Chapter 13, *Land Use*, Section 13.3.3.4, addresses the potential effects for a BDCP alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis.

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Under Alternative 1C, approximately 726 permanent structures would be removed or relocated within the water conveyance facilities footprint, including approximately 194 residential buildings. The physical footprints of the intake facilities, their associated conveyance pipelines, and canal segments are anticipated to conflict with the most structures under this alternative.

As shown in the Figure 28-1, there are census blocks with a meaningfully greater minority population (these census blocks contain more than 50% minority population) throughout the study area, and specifically along the west alignment. Because the construction of Intakes W1–W5 and the canal segments would result in the displacement of approximately 194 residential buildings, which would affect census blocks where the minority population is greater than 50%, this would represent a disproportionate effect on minority populations. DWR would provide compensation to property owners for the property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect, but would not reduce the severity of the physical effect itself. For these reasons, this effect would be adverse, because it would disproportionately accrue to minority and low-income populations.

In addition, Chapter 13, *Land Use,* Section 13.3.3.4, examines the potential to divide existing communities. Construction activities associated with Intakes W1 and W2, their associated facilities, and segments of conveyance pipeline would separate the community of Clarksburg from surrounding areas. Even though access to and from the community would be maintained over the

long-term, the placement of Intake W2, as well as the nearby construction of Intake W1, would create lasting physical barriers between Clarksburg and the surrounding lands. The long-term placement of Intake W2 (adjacent to the south) and Intake W1 (approximately 1 mile north) would create further divisions between Clarksburg and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Additionally, the lasting placement of the intake facilities and the canal would establish physical barriers between the community and its surroundings, constituting an adverse effect. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect.

As shown in Figures 28-1 and 28-2, the community of Clarksburg is composed of both census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations. Consequently, the division of the community of Clarksburg would have a disproportionately adverse effect on minority and low-income populations in Clarksburg. This would be an adverse effect, because it would disproportionately accrue to minority and low-income populations.

Socioeconomics

The same impact mechanisms identified for Alternative 1A would result in effects on local employment conditions under Alternative 1C (Impacts ECON-1 and ECON-7). The general economic effects on south-of-Delta areas of alternatives that would reduce water to Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. These impacts have the potential to disproportionately affect environmental justice populations. Other effects in Chapter 16, *Socioeconomics,* Section 16.3.3.4, are not analyzed in this section because they either relate to program-level conservation measures that do not have sufficient project-level detail to identify environmental justice consequences, or because they do not have the potential to disproportionately affect environmental justice populations.

As described in Chapter 16, *Socioeconomics,* Section 16.3.3.4, Impact ECON-1, construction of the water conveyance facilities would increase total employment and income in the study area. The change would result from expenditures on construction and from changes in agricultural production. Changes in jobs in the study area as a result of construction are reported in Chapter 16, *Socioeconomics,* Section 16.3.3.4, Table 16-31. During the peak construction years, it is estimated that 5,300 jobs (direct) and 11,698 jobs total (direct, indirect, and induced effects) would be gained in the study area, for an unlined canal. For a lined canal, peak employment would be slightly higher, with 5,443 direct jobs during the highest year, and 11,931 total jobs (direct, indirect, and induced effects) during the highest year.

However, construction of conveyance and related facilities, such as roads and utilities, would cause temporary and permanent conversion of agricultural land. Because construction would reduce agricultural land under cultivation, construction would result in the direct loss of 64 agricultural jobs and a total loss of 240 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics,* Section 16.3.3.4, Table 16-32).

As described in Chapter 16, *Socioeconomics,* Section 16.3.3.4, Impact ECON-7, operation of conveyance facilities constructed under Alternative 1C would result in the direct creation of 187 jobs and the creation of 269 jobs total (Chapter 16, *Socioeconomics,* Section 16.3.3.4, Table 16-34). However, because operations would reduce agricultural cultivation, operations would result in the

direct loss of 75 agricultural jobs and a total of 216 agricultural jobs (including direct, indirect, and induced effects) (Chapter 16, *Socioeconomics,* Section 16.3.3.4, Table 16-35).

Because the majority of farm labor in the study area is minority, including those of Hispanic origin and potentially low-income, loss of up to 240 agricultural jobs in the study area associated with construction of the conveyance facilities is considered to be a disproportionate effect on an environmental justice population. However, the overall employment effect in the study area related to construction and operation of the conveyance facilities would be an increase in construction and facilities operation employment, which may have some unknown positive effect on the environmental justice population in the study area. Despite the potential for a beneficial employment effect in the study area under Alternative 1C, the disproportionate effect on agricultural workers is considered an adverse effect because this effect would be predominately borne by a minority population currently employed by the agriculture industry in the study area.

Aesthetics and Visual Resources

Similar impact mechanisms described for Alternative 1A would generate effects on visual resources for Alternative 1C. Alternative 1C would result in the construction of a western canal, which would introduce both temporary and permanent features that would adversely alter the visual environment. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, identifies the following adverse effects.

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of CM2–CM21

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impact AES-6, analyzes the effect of the implementation of CM2–CM21 on aesthetics and visual resources. This effect would be adverse. However because the precise location of where future conservation measures will be implemented is unknown, this impact is not carried forward for further analysis of environmental justice effects for this alternative or other alternatives.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, also identifies the following mitigation measures that would reduce the identified effects on aesthetics and visual resources.

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 0.5 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-Intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impacts AES-1 through AES-4, describe the aesthetics and visual resources effects associated with water conveyance facilities construction and operations. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impact AES-3, describes the effects on local scenic highways, such as SR 160. Because degradation of a scenic highway would result in loss of scenic qualities for all highway users, it is not carried forward for environmental justice analysis.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impact AES-1, describes the effect of construction activities on the visual quality and character of the study area. The construction of Intakes W1–W5 and accompanying pump stations, surge towers, canals, borrow/spoil areas, RTM areas, forebay, access roads, transmission lines, and concrete batch plants and fuel stations would introduce visually discordant features in the foreground and middleground views of scenic vistas and from scenic roadways, and these elements would be visible to all viewer groups. The existing visual character would be greatly altered by the presence of a large-scale intakes and concrete-lined

and water-filled channels traversing the landscape. In addition, construction of all these features has the potential to adversely affect wildlife viewing and the overall enjoyment, segment the visual landscape of the study area, reduce the amount of open space lands available to viewers, and eliminate valued visual resources within scenic views in the study area. Because of the long-term nature of construction, proximity to sensitive receptors, razing of residences and agricultural buildings, removal of vegetation, and changes to topography through grading, this effect would be adverse. Effects on the existing visual character under Alternative 1C would be greater than those under Alternatives 1A and 1B because of the extent of the canals visible on the landscape surface, landscape scars left behind by spoil/borrow areas, introduction of bridges, and closer proximity to a greater number of sensitive viewers. Mitigation Measures AES-1a through AES-1g are available to reduce these effects.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impact AES-2 describes the permanent alteration of scenic resources resulting from construction. Intakes W1–W5, landscape scars remaining from spoil/borrow areas, and transmission lines would have effects similar to those described for Alternative 1A but would be located west of the Sacramento River. Bridges would be constructed to cross the canal segments of Alternative 1C, which would create opportunities for vista views, but would also introduce elevated structures and raised visual masses that would disrupt the continuity of vista views by preventing free-flowing access from lands on either side of the bridges. The community of Clarksburg would be surrounded by the canal and Intake W2. Overall, permanent effects on scenic vistas associated with the presence of Alternative 1C facilities may be adverse. Effects on scenic vistas under Alternative 1C would be greater than those under Alternatives 1A and 1B because of the extent of the canals visible on the landscape, landscape scars left behind by spoil/borrow areas, introduction of bridges, and closer proximity to a greater number of sensitive viewers. Mitigation Measures AES-1a, AES-1c, and AES-1e are available to address these effects.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.4, Impact AES-4, describes the potential for new sources of light and glare that would be introduced during construction or as part of permanent features that would remain after the conveyance facilities are complete. Intakes W1–W5 would generate construction-phase and permanent sources of light. Evening and nighttime construction activities would require use of extremely bright lights and generate increased nighttime headlights flashing into nearby residents' homes; these light sources would affect adjacent populations. Light and glare effects related to operation of Intakes W1–W5, canals, spoils/borrow areas, RTM areas, shaft sites, Byron Tract Forebay, permanent access roads, and transmission lines would introduce the same light and glare effects across the same landscape types as Alternative 1B and would have the same or very similar effects on visual resources and viewer groups. The presence of canals and the Byron Tract Forebay would require nighttime lighting for safety, and introduce glare over a large area. Transmission lines would require safety lighting at night so the facility would be visible to aircraft. Because the study area has low levels of ambient daytime glare and nighttime light, light and glare effects related to the presence of bridges, canals, and transmission lines during operation under this alternative and would adversely affect daytime and nighttime views.

While mitigation is available to reduce the effects of Impacts AES-1, AES-2, and AES-4, these effects would remain adverse. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area, including along the west alignment alternative. Specifically, a concentration of minority and low-income populations are located in the communities

of Clarksburg, Hood, and Courtland, where residential viewers would be affected by adverse visual effects of this alternative.

Because adverse visual effects are largely associated with the northern portion of the alignment where permanent features would remain and along the southern portion of the alignment where the Byron Tract Forebay and borrow and spoil areas would be constructed, where minority and low-income populations occur, these effects would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, these effects would be adverse, because they would disproportionately accrue to minority and low-income populations.

Cultural Resources

Construction of conveyance facilities under this alternative would have adverse effects on prehistoric archaeological resources, unidentified human remains, historic archaeological sites, traditional cultural properties, and built environment resources, as described in Chapter 18, *Cultural Resources*, Section 18.3.5.4, Impacts CUL-1 through CUL-7.

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

Chapter 18, *Cultural Resources*, Section 18.3.5.4, Impacts CUL-1 through CUL-3, describe potential effects on archaeological resources that are known and likely to occur in the study area. Because of the scale of the project and because there is no feasible means of ensuring identification of all resources in advance of construction, effects on archaeological resources are adverse. In addition, the project has the potential to inadvertently unearth and damage buried human remains before they can be protected; effects on buried human remains are therefore adverse. Chapter 18, *Cultural Resources*, Section 18.3.5.4, Impacts CUL-5 and CUL-6, described effects on built environment resources. Because many significant built environment resources occur in the footprint and relocation of new facilities is not always feasible, effects on these resources are adverse. Chapter 18, *Cultural Resources*, Section 18.3.5.4, Impact CUL-7, describes the effects of conservation measures, which are generally similar to effects that would occur at the project level. Chapter 18, *Cultural Resources*, Section 18.3.5.4, Impact CUL-8, addresses the compatibility of the BDCP with the adopted cultural resource management policies of agencies with land use authority in the Delta. Because this

effect is not a physical environmental effect that could result in impacts on environmental justice populations, it is not relevant to this analysis.

Ground-disturbing construction has the potential to damage both identified and previously unrecorded examples of each of these resources. Mitigation is available to reduce these effects.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of inaccessible Properties to Assess Eligibility, Determine If These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

Prehistoric resources, especially sites containing human remains, are of special significance to the Native American community. The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources,* Section 18.3.5.4. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. While these impact mechanisms are the same as described for Alternative 1A, the resources that contribute to these effects are different. These resources occur in the footprint of the canal, intakes, and other features that would require ground-disturbing construction.

Identification and treatment of cultural resources would be completed under relevant mitigation measures described in Chapter 18, *Cultural Resources*, Section 18.3.5.4, such as Mitigation Measures CUL-2 and CUL-7. Construction monitoring and discovery protocols would be performed during construction under Mitigation Measure CUL-3. State and federal law governing discoveries of human remains would be enforced through Mitigation Measure CUL-4*.* Mitigation Measures CUL-5 and CUL-6 provide for management of effects on built environment resources. Mitigation Measure CUL-7 provides for management of effects associated with conservation measures. Implementation of the mitigation measures and Section 106 consultation (see discussion under Alternative 1A, Cultural Resources) do not guarantee these effects could be reduced or avoided. The effect on Native American populations and other minority populations would remain disproportionate even after

mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because it would disproportionately accrue to minority and low-income populations.

Public Services and Utilities

Two of the same impact mechanisms described under Alternative 1A would also result in effects on utility infrastructure under Alternative 1C. Chapter 20, *Public Services and Utilities,* Section 20.3.3.4, identifies two adverse effects under this alternative.

Chapter 20, *Public Services and Utilities,* Section 20.3.3.4, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 1C would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities,* Section 20.3.3.4, Impact UT-8, describes the potential consequences of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.3.3.4, addresses the potential effects for a BDCP alternative to generate criteria pollutants that exceed local air district and federal *de minimis* thresholds and criteria pollutants from construction of the proposed water conveyance facilities and the implementation of CM2-CM11. The following adverse effects are relevant to this analysis.

Impact AQ-2: Generation of Criteria Pollutants in Excess of the SMAQMD Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-9: Generation of Criteria Pollutants in the Excess of Federal *De Minimis* Thresholds from Construction and Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-18: Generation of Criteria Pollutants from Implementation of CM2–CM11

As described in Impact AQ-2, construction of Alternative 1C would generate fugitive dust emissions exceeding SMAQMD thresholds. The impact of generating emissions in excess of local air district thresholds would therefore violate applicable air quality standards in the study area and could contribute to or worsen an existing air quality conditions. No feasible mitigation is available to reduce fugitive dust emissions; therefore, the impact would remain adverse.

As described in Impact AQ-9, construction of the water conveyance facilities under this alignment would exceed Sacramento Federal Nonattainment Area (SFNA) and San Francisco Bay Area Air Basin (SFBAAB) federal *de minimis* thresholds for CO. DWR has identified several environmental commitments to reduce construction-related criteria pollutants. However, because the current emissions estimates exceed the SFNA federal *de minimis* threshold for CO, a positive conformity determination for CO cannot be satisfied through the purchase of offsets within the SFNA and SFBAAB. This impact would remain adverse. In the event that Alternative 1C is selected, Reclamation, USFWS, and NMFS would need to demonstrate that conformity is met for CO through a local air quality modeling analysis (i.e., dispersion modeling) or other acceptable methods to ensure project emissions do not cause or contribute to any new violations of the NAAQS or increase the frequency or severity of any existing violations.

As described in Impact AQ-18, implementation of CM2-CM11 under Alternative 1C could generate additional traffic on roads and highways in and around Suisun Marsh and the Yolo Bypass related to restoration or monitoring activities. These activities require physical changes or heavy-duty equipment that would generate construction emissions through earth-moving activities and heavy-duty diesel-powered equipment. This would result in an adverse effect if the incremental difference, or increase, of criteria pollutants relative to Existing Conditions exceeds applicable local air district thresholds. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. These effects are expected to be further evaluated and identified in the subsequent project-level environmental analysis conducted for the CM2–CM11 restoration and enhancement actions. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects. Mitigation Measure AQ-18 would be available to reduce this effect.

Mitigation Measure AQ-18: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities

However, it may not be sufficient to reduce emissions below applicable air quality management district thresholds. Consequently, this effect would be adverse.

Given that the proposed water conveyance facilities and the restoration and conservation areas along this alignment are proximate to census blocks and block groups where meaningfully greater

minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that generation of criteria pollutants in excess of local air district and federal *de minimis* thresholds would result in a potentially disproportionate effect on minority and low-income populations. See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect impacts on export service areas.

Noise

The same impact mechanisms described under Alternative 1A would result in adverse noise effects under Alternative 1C. These effects would differ primarily in location because a western canal would be constructed rather than a pipeline and tunnel. The following adverse effects would be associated with new sources of noise and vibration introduced into the study area under Alternative 1C.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Conservation Measures

Chapter 23, *Noise,* Section 23.3.3.4, Impacts NOI-1 and NOI-2, describe vibration and noise effects associated with the construction of this alternative that would occur at discrete locations along the conveyance facility, and would affect adjacent residents or other sensitive receptors. Specifically, as described in Chapter 23, Section 23.3.3.4, Impact NOI-1, noise from construction of intakes; construction of conveyance, forebays, barge unloading facilities, and intermediate pumping plants; truck trips and worker commutes; construction of power transmission lines; and earth-moving at offsite borrow/spoil areas is predicted to exceed daytime and nighttime noise standards in areas zoned for sensitive land uses including residential, natural/recreational, agricultural residential, and schools.

Groundborne vibration from pile driving, discussed in Chapter 23, *Noise,* Section 23.3.3.4, Impact NOI-2, is predicted to exceed vibration thresholds in areas zoned for residential, including agricultural residential, land uses in the areas listed below.

- Sacramento County – including River Road near the community of Hood; Neighborhoods in the community of Hood.
- Yolo County – including County Road E9 near the community of Clarksburg.
- Solano County.

As shown in Figures 28-1 and 28-2, there are census blocks and block groups with meaningfully greater proportions of minority and low-income populations in the vicinity of areas of heavy construction work areas (e.g., intake locations, the canal alignment, and the forebays) where vibration and noise effects are predicted to exceed noise standards for nearby residents. Overall, under Alternative 1C, pile driving activities during construction of the intakes and conveyances could result in substantial increases in noise levels affecting nearby communities and residences. The effect of exposing noise-sensitive land uses to noise increases above thresholds would be adverse.

Chapter 23, *Noise,* Section 23.3.3.4, Impact NOI-4, describes the noise effects of conservation measures. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects.

Mitigation Measures are available to address these effects. Chapter 23, *Noise,* Section 23.3.3.4, identifies mitigation measures that would reduce noise and vibration effects.

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

In addition, the environmental commitment to develop and implement a Noise Abatement Plan would reduce these effects (Appendix 3B, *Environmental Commitments, AMMs and CMs*). Although these mitigation measures and the environmental commitment would be available to reduce these effects, it is not anticipated that feasible measures would be available in all situations to reduce construction noise to levels below the applicable thresholds. The effect of exposing noise-sensitive land uses to noise increases above thresholds is considered adverse. Although mitigation measures are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse, because it would disproportionately accrue to minority and low-income populations.

Public Health

Chapter 25, *Public Health*, Section 25.3.3.4, identifies the potential for the operation of this alternative to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. Although Impacts PH-3 and 7 are not considered adverse or significant in Chapter 25, because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population, they are discussed in this section.

Impact PH-2: Exceedances of Water Quality Criteria for Constituents of Concern Such That There Is an Adverse Effect on Public Health as a Result of Operation of the Water Conveyance Facilities

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10

Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4Impact PH-2 would result in an adverse effect because these chemicals are associated with adverse health effects. Mitigation Measure WQ-5 is available to reduce this effect:

Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough

In addition, the contribution of this alternative would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. While Mitigation Measure WQ-5 may reduce this impact, the feasibility and effectiveness of this mitigation measure is uncertain based on currently available information. Therefore, the available mitigation would not necessarily reduce the effect.

The North Bay Aqueduct serves Napa and Solano Counties. This analysis assumes the decrease in water quality for waters conveyed in this aqueduct would affect the entire service population using water from the North Bay Aqueduct, which is approximately the same as the demographic profile for each county as a whole. Napa County as a whole does not have a meaningfully greater minority population (the total minority population is approximately 44%, U.S. Census Bureau 2012a). Solano County however has a total minority population of approximately 59% (U.S. Census Bureau 2012b). Neither county has a meaningfully greater low-income population. Because the increase in bromide and DPBs would decrease water quality for Solano County service population, this would disproportionately affect minorities. This is an adverse effect.

As described in Chapter 25, Impact PH-3, five intakes would be constructed and operated under Alternative 1C. Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. Changes in dilution and mixing of sources of water could result in a change in constituents known to bioaccumulate, similar to Alternative 1A. Although methylmercury currently exceeds the TMDL, little to no change in mercury or methylmercury concentrations in water is expected under Alternative 1C water operations.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, and mercury concentrations in fish tissues already exceed Delta TMDL targets, any additional increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Impact WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 1C would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species; therefore, the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise

impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 1C. This effect would be adverse.

As described in Impact PH-7, Alternative 1C restoration actions are likely to result in increased production, mobilization, and bioavailability of methylmercury in the aquatic system. Methylmercury would be generated by inundation of restoration areas, with highest concentrations expected in the Yolo Bypass, Cosumnes River and Mokelumne River, and at ROAs closest to these source areas as a result of the BDCP actions. An increase in bioavailability in the aquatic system could result in a corresponding increase in bioaccumulation in fish tissue, biomagnification through the food chain, and human exposure. Because the increase in bioavailability in the food chain cannot be quantified, the increase in human exposure also cannot be quantified. OEHHA standards would continue to be implemented for the consumption of study area fish and thus would serve to protect people against the overconsumption of fish with increased body burdens of mercury. Furthermore, implementation of *CM12 Methylmercury Management*, would minimize effects because it provides for project-specific mercury management plans including a quality assurance/quality control program, and specific tidal habitat restoration design elements to reduce the potential for methylation of mercury and its bioavailability in tidal habitats.

However, as described above for Impact PH-3, because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic, and Lao subsistence fishers pursuing fish in the Delta would be most affected because they already consume fish in quantities that exceed the EPA reference dose. Increased mercury was modeled based upon increases modeled for one species: largemouth bass. The associated increase in human consumption of mercury caused by implementation of Alternative 1C would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 1C. This effect would be adverse.

Water operations under Alternative 1C would be the same as under Alternative 1A. Therefore, potential effects on public health due to changes in water quality and beneficial uses as a result of *Microcystis* blooms and microcystin levels would be the same. Any modified reservoir operations under Alternative 1C are not expected to promote *Microcystis* production upstream of the Delta or in the rivers and streams of the Sacramento River watershed, watersheds of the eastern tributaries (Cosumnes, Mokelumne, and Calaveras Rivers), and the San Joaquin River upstream of the Delta.

As described in Chapter 8, *Water Quality*, *Microcystis* blooms in the Export Service Areas could increase due to increased water temperatures resulting from climate change, but not due to water conveyance facility operations. Similarly, hydraulic residence times in the Export Service Area would not be affected by operations of CM1. Accordingly, conditions would not be more conducive to *Microcystis* bloom formation. Water diverted from the Sacramento River in the north Delta is expected to be unaffected by *Microcystis*. However, the fraction of water flowing through the Delta that reaches the existing south Delta intakes is expected to be influenced by an increase in *Microcystis* blooms, as discussed below. Therefore, relative to the No Action Alternative, the addition of Sacramento River water from the north Delta under Alternative 1C would dilute *Microcystis* and microcystins in water diverted from the south Delta. Because the degree to which *Microcystis* blooms, and thus microcystins concentrations, would increase in source water from the south Delta is unknown, it cannot be determined whether Alternative 1C would result in increased or decreased levels of microcystins in the mixture of source waters exported from Banks and Jones pumping plants.

Ambient meteorological conditions would be the primary driver of Delta water temperatures, and climate warming, not water operations, would determine future water temperatures in the Delta. Increasing water temperatures due to climate change could lead to earlier attainment of the water temperature threshold required to initiate Microcystis bloom formation, and therefore earlier occurrences of Microcystis blooms in the Delta, as well as increases in the duration and magnitude. However, these temperature-related changes would not be different from what would occur under the No Action Alternative. Modeled hydraulic residence times in the Delta are projected to increase in the summer and fall periods in the north and west Delta and in the summer in Cache Slough, the east Delta, and south Delta relative to the No Action Alternative. Siting and design of restoration areas would have a substantial influence on the magnitude of residence time increases under Alternative 1C. The modeled increase in hydraulic residence time in the Delta could result in an increase in the frequency, magnitude, and geographic extent of Microcystis blooms, and thus microcystin levels. Therefore, impacts on beneficial uses, including drinking water and recreational waters, could occur and public health could be affected. Accordingly, this would be considered an adverse effect.

Mitigation Measure WQ-32a and WQ-32b are available to reduce the effects of degraded water quality, and therefore potential public health effects, in the Delta due to Microcystis. However, because the effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain, the effect would still be considered adverse.

The amount and location of habitat restoration and enhancement that would occur under Alternative 1C would be the same as that described under Alternative 1A. Restoration activities implemented under CM2 and CM4 that would create shallow backwater areas could result in local increases in water temperature that may encourage Microcystis growth during the summer bloom season. This would result in further degradation of water quality beyond the hydrodynamic effects of CM2 and CM4 on Microcystis blooms identified in Impact PH-8. An increase in Microcystis blooms with implementation of CM2 and CM4 could potentially result in adverse effects on public health through exposure via drinking water quality and recreational waters. Mitigation Measures WQ-32a and WQ-32b may reduce the combined effect on Microcystis from increased local water temperatures and water residence time. The effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain. This would be an adverse effect.

Mitigation Measure WQ-32a: Design Restoration Sites to Reduce Potential for Increased *Microcystis* Blooms

Please see Mitigation Measure WQ-32a under Impact WQ-32 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Mitigation Measure WQ-32b: Investigate and Implement Operational Measures to Manage Water Residence Time

Please see Mitigation Measure WQ-32b under Impact WQ-32 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Summary of Environmental Justice Effects under Alternative 1C

Alternative 1C would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons effects on minority and low-income populations would be disproportionate and adverse.

28.5.3.6 Alternative 4—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, And 5 (9,000 Cfs; Operational Scenario H)

This section analyzes the environmental justice effects of the resource topics that are carried forward for detailed analysis for Alternative 4. Relevant environmental justice effects associated with adverse effects identified in these resource chapters are analyzed to determine if they would result in a disproportionate effect on minority or low-income populations. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to this alternative.

Land Use

Chapter 13, *Land Use*, Section 13.3.3.9, identifies effects caused by incompatibility with land use policies, incompatibility with local land uses, and potential for physical division of established communities. By itself, incompatibility with land use policies is not a physical effect on the environment, and, therefore, does not have the potential to result in a disproportionate effect on a minority or low-income population. Chapter 13, Section 13.3.3.9, also addresses the potential for a BDCP alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis.

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility (CM1)

Under Alternative 4, approximately 76 permanent structures would be removed or relocated within the water conveyance facilities footprint, including an estimated 17 residential buildings. The analysis of physical effects on structures in Chapter 13, *Land Use*, Section 13.3.3.9, indicates that the physical footprints of the intake facilities and their associated conveyance pipelines would be

anticipated to create the largest disruption to structures. Chapter 13, Section 13.3.3.2, Table 13-4, summarizes the estimated number of structures affected across structure type and alternative, and Mapbook Figure M13-4 in Chapter 13 shows the distribution of these effects across the modified pipeline/tunnel conveyance alignment.

As shown in Figures 28-1 and 28-2, there are census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations throughout the study area, and specifically along the modified pipeline/tunnel alignment. Because construction of Intakes 2, 3, and 5 would result in the displacement of approximately 17 residential structures, which would affect census blocks where the minority population is greater than 50%, this would represent a disproportionate effect on minority populations. When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect but would not reduce the severity of the physical effect itself. For these reasons, this would be an adverse effect.

In addition, Chapter 13, *Land Use,* Section 13.3.3.9, examines the potential to divide existing communities. During the construction of the conveyance pipelines and tunnel between Intake 3 and 5 and the intermediate forebay (about 0.5 mile north and south of Hood, respectively for the intakes, and about 5 miles south of Hood for the forebay), construction activities would occur to the north and south of the community of Hood. A temporary power line would also be constructed through the eastern section of the community. Even though access to and from the community would be maintained over the long-term, the nearby construction of a temporary work area adjacent to Hood on the southern side of the community would substantially alter the setting of the community in the near term. Similarly, the nearby construction of Intakes 3 and 5, although not adjacent to Hood, would create permanent physical structures approximately one-quarter mile north and one-half mile south of Hood that would substantially alter the community's surroundings. While permanent physical structures adjacent to or through Hood are not anticipated to result from this alternative, activities associated with their construction could make it difficult to travel within and around Hood in certain areas for a limited period of time. Mitigation Measures TRANS-1a and TRANS-1b, which would require the development and implementation of a site-specific traffic management plan, and establishment of alternative access routes, are available to address this effect. However, permanent structures in the community's vicinity constitute an adverse effect.

Socioeconomics

As shown in Figures 28-1 and 28-2, the community of Hood is composed of both census blocks with a meaningfully greater minority population (more than 50%) and block groups with low-income populations. Chapter 16, *Socioeconomics*, Section 13.3.3.9, identified effects on regional economics and local employment conditions associated with construction, operations, and conservation measures. These impacts have the potential to disproportionately affect environmental justice populations. Other effects in Chapter 16, Section 13.3.3.9, are not analyzed in this section because they either relate to program-level conservation measures that do not have sufficient project-level detail to identify environmental justice consequences, or because they do not have the potential to disproportionately affect environmental justice populations. The following effects are analyzed in this section:

Impact ECON-1: Temporary Effects on Regional Economics in the Delta Region during Construction of the Proposed Water Conveyance Facilities

Impact ECON-7: Permanent Regional Economic Effects in the Delta Region during Operation and Maintenance of the Proposed Water Conveyance Facilities

The general economic effects on south-of-Delta areas of alternatives that would result in reduced water for Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. As described in Chapter 16, *Socioeconomics*, Section 16.3.3.9, Impact ECON-1, construction of the water conveyance facilities would increase total employment and income in the study area. The change would result from expenditures on construction and from changes in agricultural production. Changes in jobs in the study area as a result of Alternative 4 construction are reported in Chapter 16, Section 16.3.3.9, Table 16-41. During construction, it is estimated that jobs would peak at 2,427 jobs (direct) in year 3 and 8,673 jobs (total) in year 12. However construction of conveyance and related facilities, such as roads and utilities, would cause temporary and permanent conversion of agricultural land. Because construction would reduce agricultural land under cultivation, construction would result in the direct loss of 13 agricultural jobs and a total loss of 47 agricultural jobs (direct, indirect, and induced effects) (Chapter 16, *Socioeconomics*, Section 16.3.3.9, Table 16-42).

As described in Chapter 16, *Socioeconomics*, Section 16.3.3.9, Impact ECON-7, operation of conveyance facilities constructed under Alternative 4 would result in the direct creation of 129 jobs and the creation of 183 jobs total (Chapter 16, Section 16.3.3.9, Table 16-44, the same effect as Alternative 1A). However, because operations would reduce agricultural cultivation, operations would result in the direct loss of 11 agricultural jobs and a total of 39 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, Section 16.3.3.9, Table 16-45).

Based on the crop production value changes described in Impact ECON-6 in Chapter 16, the direct agricultural job losses would more likely be concentrated in the vegetable, truck, orchard, and vineyard crops sectors, which are relatively labor intensive, than in the grain, field, and forage crop sectors, where more jobs are mechanized. Direct agricultural job losses could be higher than the 13 full-time equivalent (FTE) jobs shown in Table 16-42, or the 12 FTE jobs shown in Table 16-45, because many agricultural jobs are seasonal rather than year-round FTE jobs, suggesting that more than one seasonal job could be lost per every FTE job lost as a result of construction of conveyance facilities construction.

Because of a combination of historical and recent settlement trends, many of the agricultural areas in the interior Delta contain high proportions of minority residents, including Hispanics, Asians, and African-Americans. According to the report *The California Farm Labor Force Overview and Trends from the National Agricultural Workers Survey*, commissioned by the EPA Region 9 Pesticide Program, which provides the most current demographic information collected through the NAWS, approximately 99% of California farm laborers are Hispanic (Aguirre International 2005:10), and approximately 22% of farm labor falls below the poverty threshold (Aguirre International 2005:27).

Because the majority of farm labor in the study area is minority, including those of Hispanic origin, and potentially low-income, loss of up to 57 agricultural jobs in the study area associated with construction of the conveyance facilities is considered to be a disproportionate effect on an environmental justice population. While a net increase in employment would result during construction because of new construction jobs, these jobs would not likely be filled by displaced

agricultural workers because the skills required are not comparable. This effect would, therefore, remain adverse because job losses would disproportionately accrue to a minority population.

Aesthetics and Visual Resources

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, addresses visual resources in the study area, where proposed intake and water conveyance facilities and related structures and operations would be located. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, identifies the following adverse effects.

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of CM2–CM21

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impact AES-6, analyzes the effect of the implementation of CM2–CM21 on aesthetic and visual resources. This effect would be adverse. However because the precise location of where future conservation measures will be implemented is unknown, this impact is not carried forward for further analysis of environmental justice effects for this alternative or other alternatives.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, also identifies the following mitigation measures that would reduce the identified effects on aesthetics and visual resources.

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 0.5 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impacts AES-1 through AES-4, describe the aesthetics and visual resources effects associated with water conveyance facilities construction and operations. Impact AES-3 describes the effects on local scenic highways, such as SR 160. Because degradation of a scenic highway would result in loss of scenic qualities for all highway users, it is not carried forward for environmental justice analysis.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impact AES-1, addresses the potential for construction activities to substantially alter the visual quality or character in the vicinity of project elements that can be viewed from local sensitive receptors and public viewing areas. The primary features that would affect the existing visual character under Alternative 4 once the facilities have been constructed would be Intakes 2, 3 and 5, the intermediate forebay, the expanded Clifton Court Forebay, and combined pumping plants, resulting landscape scars effects left behind from spoil/borrow and RTM areas, transmission lines, concrete batch plants and fuel stations, and launching, retrieval, and ventilation shafts sites. Construction-related visual changes would be most evident in the northern portion of the study area, which would undergo extensive construction to build large industrial facilities and supporting infrastructure along and surrounding the Sacramento River between Clarksburg and Walnut Grove where the intakes would be situated. The intermediate forebay, expanded Clifton Court Forebay and several of the work areas adjacent to the southern portion of the conveyance alignment also would generate adverse visual effects for adjacent viewers, including residents in the communities of Clarksburg, Hood, and Walnut Grove. Clarksburg and Hood would be affected the most because they are in closer proximity to the intakes. Walnut Grove would also be affected, to a lesser degree, due to its proximity to the intermediate forebay along Twin Cities Road and ventilation/access shaft site along Walnut Grove Road. Both Twin Cities and Walnut Grove Roads serve as primary access routes to Walnut Grove from I-5.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impact AES-2, describes the permanent alteration of scenic vistas resulting from construction. As described in this impact, the primary

features that would affect scenic vistas subsequent to completion of construction of Alternative 4 are Intakes 2, 3 and 5, the intermediate forebay, expanded Clifton Court Forebay, the combined pumping plants, landscape scars remaining from spoil/borrow and RTM areas, and transmission lines. The communities of Clarksburg and Hood would be affected the most because they are in closer proximity to the intakes. Walnut Grove would also be affected, to a lesser degree, due to its proximity to the intermediate forebay along Twin Cities Road and ventilation/access shaft site along Walnut Grove Road. Rural residences, located south of Twin Cities Road and the intermediate forebay, would have construction occurring near their homes through construction of the intermediate forebay. The Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impact AES-4, describes the potential for new sources of light and glare that would be introduced during construction or as part of permanent features that would remain after the conveyance facilities are complete. Intakes 2, 3, and 5 and their associated facilities would introduce new surfaces that may increase glare as described in Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9. In addition, the water surfaces of the new forebays would reflect sunlight, introducing glare. Evening and nighttime construction activities would require use of extremely bright lights and generate increased nighttime headlights flashing into nearby residents' homes; these light sources would affect adjacent populations. New facilities would also require the use of safety lighting once built. Lighting equipment associated with BDCP facilities would increase the amount of nighttime lighting along the alignment above ambient light levels. In particular, security lighting for Intakes 2, 3, and 5 and their associated facilities would create very noticeable effects relating to increasing nighttime light at those locations. The community of Hood would be affected.

While mitigation is available to reduce the effects of Impacts AES-1, AES-2, and AES-4, these effects would remain adverse. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area, including along the modified pipeline/tunnel alignment alternative. Specifically, a concentration of minority and low-income populations are located in the communities of Clarksburg, Walnut Grove, and Hood, where residential viewers in these communities would be affected by adverse visual effects of this alternative.

Because adverse visual effects are largely associated with the northern portion of the alignment where permanent features would remain and along the southern portion of the alignment where the expanded Clifton Court Forebay and borrow and spoil areas would be constructed, where minority and low-income populations occur, these effects would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse.

Cultural Resources

Construction of conveyance facilities under this alternative would have adverse effects on prehistoric archaeological resources, unidentified human remains, historic archaeological sites, traditional cultural properties, and built environment resources, as described in Impact CUL-1 through Impact CUL-7.

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

Chapter 18, *Cultural Resources*, Section 18.3.5.9, Impact CUL-8, addresses the compatibility of the BDCP with the adopted cultural resource management policies of agencies with land use authority in the Delta. Because this effect is not a physical environmental effect that could result in impacts on environmental justice populations, it is not relevant to this analysis.

Ground-disturbing construction has the potential to damage both identified and previously unrecorded examples of each of these resources. Mitigation measures are available to reduce these effects.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

Prehistoric resources, especially sites containing human remains, are of special significance to the Native American community. The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources*, Section 18.3.5.9. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially*

Affected by the BDCP Alternatives. These resources represent a tangible link to the past, and, if they contain human remains, a resting place for interred ancestors. While cultural resources and buried human remains also contain significance for the general public (including low-income populations), the significance to the general public is typically limited to the scientific value of the resources. Because these resources are especially significant to Native American populations and potentially other minority populations, adverse effects identified in Chapter 18, Section 18.3.5.9, Impacts CUL-1 through CUL-7, would result in a disproportionate effect on minorities. The affected population cannot always be identified with specificity because members of tribes that attach significance to the resources in the Delta may reside in relatively remote locations rather than in adjacent census blocks or even counties. Nonetheless, this alternative would result in a disproportionate effect on Native American populations and potentially other minorities.

Identification and treatment of cultural resources would be completed under relevant mitigation measures described in Chapter 18, *Cultural Resources*, Section 18.3.5.9 (CUL-1 through CUL-7). Construction monitoring and discovery protocols would be performed during construction under Mitigation Measure CUL-3. State and federal law governing discoveries of human remains would be enforced through Mitigation Measure CUL-4. In addition to the mitigation measures proposed in this EIS/EIR, federal agencies that have a significant role in implementing the BDCP are required to comply with Section 106 of the NHPA (16 USC 470f). Section 106 and the Section 106 regulations require that the agencies identify effects on historic properties and consult with the public (including relevant minority groups) and Native American tribes during the management process. Section 106 thus adds another mechanism for identifying resources, and developing mitigation that would reduce or avoid adverse effects. Despite these mitigation measures and consultation processes, this alternative is likely to result in adverse effects on prehistoric archaeological resources and human remains because the scale of the alternative makes avoidance of all eligible resources infeasible. In addition, because there is no feasible way to identify buried resources that may occur in deep subterranean sections of the tunnel in advance of construction, effects on these resources cannot be accurately identified or avoided. The effect on minority populations that may ascribe significance to cultural resources in the Delta would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse because the effect would disproportionately accrue to a minority population.

Public Services and Utilities

Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, addresses the potential effects of the alternative on utility infrastructure and public service providers, such as fire stations and police facilities. Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, identifies two adverse effects under this alternative.

Impact UT-6: Effects on Regional or Local Utilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-8: Effects on Public Services and Utilities as a Result of Implementing the Proposed CM2–CM11

Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 4 would require relocation of regional power transmission lines and natural

gas pipelines. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility, this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-8, describes the potential consequences of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Noise

Chapter 23, *Noise,* Section 23.3.3.9, identifies the following adverse effects associated with new sources of noise and vibration that would be introduced into the study area under Alternative 4.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed CM2–CM21

Chapter 23, *Noise,* Section 23.3.3.9, Impacts NOI-1 and NOI-2, describe vibration and noise effects associated with construction of this alternative that would occur at discrete locations along the conveyance facility, and would affect adjacent residents or other sensitive receptors. Specifically, as described in Chapter 23, *Noise,* Section 23.3.3.9, Impact NOI-1, noise from construction of intakes; construction of conveyance, forebays, barge unloading facilities, truck trips and worker commutes; construction of power transmission lines; and earth-moving at offsite borrow/spoil areas is

predicted to exceed daytime and nighttime noise standards in areas zoned for sensitive land uses including residential, natural/recreational, agricultural residential, and schools.

Groundborne vibration from impact pile driving, discussed in Chapter 23, *Noise,* Section 23.3.3.9, Impact NOI-2, is predicted to exceed vibration thresholds in areas zoned for residential, including agricultural residential, land uses in areas listed below.

- Sacramento County – including River Road near the community of Hood, neighborhoods in the community of Hood.
- San Joaquin County.

As shown in Figures 28-1 and 28-2, there are census blocks and block groups with meaningfully greater proportions of minority and low-income populations in the vicinity of heavy construction work areas (e.g., intake locations, the modified pipeline/tunnel alignment, and the forebays) where vibration and noise effects are predicted to exceed noise standards for nearby residents. Construction of intakes and the tunnel would result in groundborne vibration and groundborne noise levels that exceed noise thresholds at nearby receptors, including residential structures. The effect of exposing sensitive receptors to vibration or groundborne noise would be adverse.

Chapter 23, *Noise,* Section 23.3.3.9, Impact NOI-4, describes the noise effects of conservation measures 2-22. Because these conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects.

Chapter 23, *Noise,* identifies mitigation measures that would reduce noise and vibration effects.

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

In addition, the environmental commitment to develop and implement a Noise Abatement Plan would reduce these effects (Appendix 3B, *Environmental Commitments, AMMs and CMs*). Although these mitigation measures and the environmental commitment would be available to reduce these effects, it is not anticipated that feasible measures would be available in all situations to reduce construction noise to levels below the applicable thresholds. The effect of exposing noise-sensitive land uses to noise increases above thresholds is considered adverse. Although mitigation measures are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse.

Public Health

Chapter 25, *Public Health*, Section 25.3.3.9, identifies the potential for the operation of this alternative to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. Although Impacts PH-3 and 7 are not considered adverse or significant in Chapter 25, because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population, they are discussed in this section.

Impact PH-2: Exceedances of Water Quality Criteria for Constituents of Concern Such That There Is an Adverse Effect on Public Health as a Result of Operation of the Water Conveyance Facilities

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10

Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4.

Impact PH-2 would result in an adverse effect because these chemicals are associated with adverse health effects. Mitigation Measure WQ-5 is available to reduce this effect:

> **Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough**

In addition, the contribution of this alternative would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. While Mitigation Measure WQ-5 may reduce this impact, the feasibility and effectiveness of this mitigation measure is uncertain based on currently available information. Therefore, the available mitigation would not fully reduce the impact.

The North Bay Aqueduct serves Napa and Solano Counties. This analysis assumes the decrease in water quality for waters conveyed in this aqueduct would affect the entire service population using water from the North Bay Aqueduct, which is approximately the same as the demographic profile for each county as a whole. Napa County as a whole does not have a meaningfully greater minority population (the total minority population is approximately 44%, U.S. Census Bureau 2012a). Solano County however has a total minority population of approximately 59% (U.S. Census Bureau 2012b). Neither county has a meaningfully greater low-income population. Because the increase in bromide and DPBs would decrease water quality for Solano County service population, this would disproportionately affect minorities. This is an adverse effect.

Because the BDCP proponents cannot ensure that the results of coordinated actions with water treatment entities will be fully funded or implemented successfully prior to the project's

contribution to the impact, the ability to fully mitigate this impact is uncertain. If a solution that is identified by the BDCP proponents and an affected water purveyor is not fully funded, constructed, or implemented before the project's contribution to the impact is made, an adverse effect in the form of increased DBP in drinking water sources could occur. If, however, all financial contributions, technical contributions, or partnerships required to avoid adverse effects prove to be feasible and any necessary agreements are completed before the project's contribution to the effect is made, the impacts would not be adverse.

As described in Chapter 25, Impact PH-3, three intakes would be constructed and operated under Alternative 4. Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. Under the various Alternative 4 operational scenarios (H1–H4), changes in dilution and mixing of sources of water could result in a change in constituents known to bioaccumulate.

Water quality and fish tissue modeling results showed small, insignificant changes in total mercury and methylmercury levels in water and fish tissues resulting from Alternative 4 water operations (see Chapter 8, *Water Quality*, Section 8.3.3.9, for a detailed discussion). Upstream mercury contributions and methylmercury production in Delta waters would not be altered by the operation of Alternative 4, as it would not change existing mercury sources and would not substantially alter methylmercury concentrations in the Sacramento River or San Joaquin River. Water quality modeling results indicate that the percentage change in assimilative capacity of waterborne total mercury relative to the 25 ng/L Ecological Risk Benchmark was greatest for Scenario H4 relative to the No Action Alternative. These changes ranged, from 5.0% at the Jones Pumping Plant to -2.3% at Old River at Rock Slough. These same sites show the smallest range of effects on assimilative capacity for Alternative 4 H1, with 4.3% and -1.4% for these same two stations, respectively. Operational Scenarios H2 and H3 fall between these two extremes. The changes are not expected to result in adverse effects on beneficial uses. Similarly, changes in methylmercury concentration are expected to be very small as predicted by modeling.

Fish tissue estimates showed small or no increase in exceedance quotient based on long-term annual average mercury concentrations at the nine Delta locations modeled. The greatest increases in exceedance quotients relative to the No Action Alternative were estimated to be 12% for both Old River at Rock Slough, and for Franks Tract. The lowest percentage change in modeled bass mercury concentrations is predicted to occur under Operational Scenario H1 relative to the No Action Alternative for these locations.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Impact WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 4 would depend upon the selection of the fishing location (and associated local fish body burdens),

and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 4. This effect would be adverse.

As described in Chapter 25, Impact PH-7, the primary concern with habitat restoration regarding constituents known to bioaccumulate is the potential for mobilizing contaminants sequestered in sediments of the newly inundated floodplains and marshes. The mobilization depends on the presence of the constituent and the biogeochemical behavior of the constituent to determine whether it could re-enter the water column or be reintroduced into the food chain.

The Sacramento River watershed, and specifically the Yolo Bypass, is the primary source of mercury in the study area. The highest concentrations of mercury and methylmercury are in the Cache Creek area and the Yolo Bypass. The amount of methylmercury produced in the Yolo Bypass has been estimated to represent 40% of the total methylmercury production for the entire Sacramento River watershed (Foe et al. 2008). Water discharging from the Yolo Bypass at Prospect Slough has a reported average annual methylmercury concentration of 0.27 ng/L, more than four times greater than the 0.06 ng/L TMDL.

The highest levels of methylmercury generation, mobilization, and bioavailability are expected in the Yolo Bypass with implementation of CM2 under Alternative 4. Implementation of CM2 would subject Yolo Bypass to more frequent and wider areas of inundation. The concentrations of methylmercury in water exiting the Yolo Bypass would depend on many variables. However, implementation of CM2 has the potential to significantly increase the loading, concentrations, and bioavailability of methylmercury in the aquatic system.

As part of the implementation of conservation measures under Alternative 4, measures would be developed to reduce the production of methylmercury in ROAs, and these measures would be implemented as part of *CM12 Methylmercury Management*. These measures may include construction and grading in a way that minimizes exposure of mercury-containing soils to the water column; designing areas to support/enhance photodegradation; and pre-design field studies to identify depositional areas where mercury accumulation is most likely and characterization and/or design that avoids these areas. CM12 provides for consideration of new information related to methylmercury degradation that could effectively mitigate methylmercury production and mobilization.

In summary, Alternative 4 restoration actions are likely to result in increased production, mobilization, and bioavailability of methylmercury in the aquatic system. Methylmercury would be generated by inundation of restoration areas, with highest concentrations expected in the Yolo Bypass, Cosumnes River and Mokelumne River, and at ROAs closest to these source areas as a result of the BDCP actions. An increase in bioavailability in the aquatic system could result in a corresponding increase in bioaccumulation in fish tissue, biomagnification through the food chain, and human exposure. Because the increase in bioavailability in the food chain cannot be quantified,

the increase in human exposure also cannot be quantified. OEHHA standards would continue to be implemented for the consumption of study area fish and thus would serve to protect people against the overconsumption of fish with increased body burdens of mercury. Furthermore, implementation of *CM12 Methylmercury Management*, would minimize effects because it provides for project-specific mercury management plans including a quality assurance/quality control program, and specific tidal habitat restoration design elements to reduce the potential for methylation of mercury and its bioavailability in tidal habitats.

However, as described above for Impact PH-3, because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic, and Lao subsistence fishers pursuing fish in the Delta would be most affected because they already consume fish in quantities that exceed the EPA reference dose. Increased mercury was modeled based upon increases modeled for one species: largemouth bass. The associated increase in human consumption of mercury caused by implementation of Alternative 4 would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 4. This effect would be adverse.

As described in Chapter 25, Impact PH-8, water temperatures and hydraulic residence times in the Delta are expected to increase, which would result in an increase in the frequency, magnitude and geographic extent of *Microcystis*, and therefore microcystin levels. However, the potential water quality effects due to temperature increases would be due to climate change, not effects resulting from operation of the water conveyance facilities. Increases in Delta residence times under all Alternative 4 operational scenarios (i.e., H1-H4) would be due in small part to climate change and sea level rise, but due to a greater degree to operation of the water conveyance facilities and hydrodynamic impacts of restoration included in CM2 and CM4. Consequently, it is possible that increases in the frequency, magnitude, and geographic extent of *Microcystis* blooms in the Delta would occur due to the operations and maintenance of the water conveyance facilities and the hydrodynamic impacts of restoration under CM2 and CM4. Accordingly, beneficial uses including drinking water and recreational waters would potentially be impacted and therefore, so would public health. There are many reports of a variety of health effects in addition to liver damage (e.g., diarrhea, vomiting, blistering at the mouth, headache) following human exposure to blue-green algae toxins (cyanobacteria) in drinking water or from swimming in water in which cyanotoxins are present. Water treatment can effectively remove cyanotoxins in drinking water supplies. However, some treatment options are effective for some cyanotoxins, but not for others. Thus, operators of drinking water treatment systems must remain informed about the growth patterns and species of blue-green algae blooming in their surface water supplies and monitor treated water for cyanotoxins. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area. These effects would disproportionately affect these

populations. Implementation of Mitigation Measures WQ-32a and WQ-32b may reduce degradation of Delta water quality due to Microcystis. However, because the effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain, this impact would be adverse.

As described in Chapter 25, Impact PH-9, restoration activities implemented under Alternative 4 for CM2 and CM4 that create shallow backwater areas could result in local increases in water temperature conducive to Microcystis growth during summer bloom season. This could compound the water quality degradation that may result from the hydrodynamic impacts from CM2 and CM4 discussed in Impact PH-8 and result in additional water quality degradation such that beneficial uses are affected. An increase in Microcystis blooms could potentially result in impacts on public health through exposure via drinking water quality and recreational waters. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur throughout the study area. These effects would disproportionately affect these populations. Implementation of Mitigation Measures WQ-32a and WQ-32b may reduce degradation of Delta water quality due to Microcystis. However, the effectiveness of these mitigation measures to result in feasible measures for reducing water quality effects, and therefore potential public health effects, is uncertain. Therefore, this impact would be adverse.

Mitigation Measure WQ-32a: Design Restoration Sites to Reduce Potential for Increased *Microcystis* Blooms

It remains to be determined whether, or to what degree, *Microcystis* production will increase in Delta areas as a result of increased residence times associated with the implementation of the project alternative. Mitigation actions shall be focused on those incremental effects attributable to implementation of operations under the project alternative only. Development of mitigation actions for the incremental increase in *Microcystis* effects attributable to water temperature and residence time increases driven by climate change and sea level rise is not required because these changed conditions would occur with or without implementation of the project alternative. The goal of specific actions would be to reduce/avoid additional degradation of Delta water quality conditions with respect to occurrences of *Microcystis* blooms.

Additional evaluation will be conducted as part of the development of tidal habitat restoration areas to determine the feasibility of using site placement and design criteria to reduce or eliminate local conditions conducive to *Microcystis* production. Design criteria would be developed to provide guidelines for developing restoration areas to discourage *Microcystis* growth by maintaining adequate flushing, while maintaining the benefits of habitat restoration in terms of zooplankton production, fish food quality, and fish feeding success. For example, a target range of typical summer/fall hydraulic residence time that is long enough to promote phytoplankton growth, but not so long as to promote growth of *Microcystis*, could be used to aid restoration site design. However, currently there is not sufficient scientific certainty to evaluate whether or not longer residence times would result in greater *Microcystis* production, and also whether longer residence times might produce greater benefits to fish and other aquatic life than shorter residence times. This mitigation measure requires that residence time considerations be incorporated into restoration area site design for CM2 and CM4 using best available science at the time of design. It is possible that through these efforts, increases in *Microcystis* under CM1 attributable to the project alternative, relative to Existing Conditions, could be mitigated. However, there may be instances where this design consideration may not be feasible, and thus, achieving *Microcystis* reduction pursuant to this mitigation measure would not be feasible.

Mitigation Measure WQ-32b: Investigate and Implement Operational Measures to Manage Water Residence Time

Because it is not known where, when, and to what extent *Microcystis* will be more abundant under CM1 than under Existing Conditions, specific mitigation measures cannot be described. However, this mitigation measure requires the project proponents to monitor for *Microcystis* abundance in the Delta and use appropriate statistical methods to determine whether increases in abundance are adverse. This mitigation measure also requires that if *Microcystis* abundance increases, relative to Existing Conditions, the project proponents will investigate and evaluate measures that could be taken to reduce residence time in the affected areas of the Delta. Operational actions could include timing of temporary or operable barrier openings and closings, reservoir releases, and location of Delta exports (i.e., North Delta vs. South Delta pumping facilities). Depending on the location and severity of the increases, one or more of these actions may be feasible for reducing residence times. If so, these actions could mitigate increases in *Microcystis* under CM1 attributable to the project alternative, relative to Existing Conditions. However, it is possible that these actions would not be feasible because they would conflict with other project commitments, would cause their own environmental impacts, or would not be expected to reduce or mitigate increases in *Microcystis*. In this case, achieving *Microcystis* reduction pursuant to this mitigation measure would not be feasible.

Summary of Environmental Justice Effects under Alternative 4

Alternative 4 would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

28.5.3.7 Other Pipeline/Tunnel Alignment Alternatives Compared with Alternative 1A

Generally, the different pipeline/tunnel alignment alternatives, including Alternatives 2A, 3, 5, 6A, 7, and 8, would have the same impact mechanisms with the associated potential for a disproportionate effect on minority populations as described under Alternative 1A. The differences in these alternatives for the purposes of environmental justice analysis are the locations of the physical features and/or operational guidelines that would result in effects that contribute to a disproportionate effect on minority and low-income populations. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the pipeline/tunnel alignment, which includes Alternatives 2A, 3, 5, 6A, 7, and 8.

Land Use

Alternatives 2A, 3, 5, 6A, 7, and 8 would have the potential to result in the relocation of residents (Chapter 13, *Land Use*, Impact LU-2). Alternatives 2A, 6A, and 7 have the potential to divide existing communities (LU-3). As with Alternative 1A, the physical footprints of the intake facilities and their associated conveyance pipelines for each of the pipeline/tunnel alignment alternatives are anticipated to conflict with structures, including residences. The variation in number of residential structures affected is related to the number of intakes and associated conveyance pipelines, as well as the intake locations. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4 summarizes the estimated number of structures affected across structure type and alternative and Mapbook Figure M13-1 in

Chapter 13 shows the distribution of these effects across the pipeline/tunnel conveyance alignment. Of all of the pipeline/tunnel alignment alternatives, Alternative 5 would affect the fewest residential structures (28) because only one intake would be constructed under this alternative (Intake 1). As shown in the Figure 28-1, there are census blocks with a meaningfully greater minority population (over 50%) throughout the study area, and specifically along the pipeline/tunnel alignment. Although construction of some alternatives would affect fewer residential structures, all of the pipeline/tunnel alignment alternatives would result in displacement of residences associated with the intakes and associated conveyance pipelines, which would affect census blocks where the minority population is over 50%. This represents a disproportionate effect on minority populations because the effect would occur in a geographic location with meaningfully greater minority populations. When required, DWR would provide compensation to property owners for the property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect, but would not reduce the severity of the physical effect itself. For these reasons, this effect would be adverse.

With the exception of Alternatives 3 and 5, which would not cause the community of Hood to be bisected or isolated due to the location of the intakes and the smaller number of intakes associated with alternatives, construction of the other pipeline/tunnel alignment alternatives have the potential to divide the community of Hood. During the construction of the conveyance pipeline between Intake 3 and the intermediate forebay (about 0.5 mile north and south of Hood, respectively), construction activities would bisect the community of Hood, separating some of the community's easternmost structures from the main section of the community. Even though access to and from the community would be maintained over the long-term, the placement of Intake 4 and its associated facilities, as well as the nearby construction of Intake 3 and the intermediate forebay, would create lasting physical barriers between Hood and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect. However, these divisions and physical barriers between the community of Hood and its surroundings constitute an adverse effect. As shown in Figures 28-1 and 28-2, the community of Hood is comprised of census blocks with both a meaningfully greater minority population (over 50%) and block groups with low-income populations. As such, the division of the community of Hood would have a disproportionately adverse effects on minority and low-income populations in Hood. This would be an adverse effect, because it would disproportionately accrue to minority and low-income populations.

Socioeconomics

The same impact mechanisms identified for Alternative 1A would also contribute to a disproportionate effect associated with loss of agricultural jobs under Alternatives 2A, 3, 5, 6A, 7, and 8. Table 28-2 compares the effect on employment gains and losses across the pipeline/tunnel alignment alternatives for construction and operations phases. This table provides relevant employment data from Chapter 16, *Socioeconomics*.

Table 28-2. Comparison of Pipeline/Tunnel Alignment Alternatives and Effects on Employment

Alternative[a]	Construction phase, jobs gained (peak)	Construction phase, agricultural jobs lost	Operation phase, jobs gained (peak)	Operation phase, agricultural jobs lost
2A	4,390/12,716 (direct/total, same as 1A)	27/100 (direct/total, same as 1A)	187/269 (direct/total, same as 1A)	31/86 (direct/total, same as 1A)
3	2,849/10,297 (direct/total)	23/88 (direct/total)	Same as 1A	Same as 1A
5	1,372/5,073 (direct/total)	22/83 (direct/total)	Same as 1A	Same as 1A
6A	Same as 1A	Same as 1A	Same as 1A	Same as 1A
7	3,360/11,018 (direct/total)	25/94 (direct/total)	Same as 1A	Same as 1A
8	Same as 7	Same as 7	Same as 1A	Same as 1A

[a] Data compiled from Chapter 16, *Socioeconomics.*

Because the majority of farm labor in the study area is minority, including those of Hispanic origin and potentially low-income, loss of agricultural jobs as projected for the study area (Table 28-2) associated with construction of the conveyance facility is considered to be a disproportionate effect on an environmental justice population. However, the overall employment effect in the study area related to construction and operation of the conveyance facility would be an increase in construction and facility operation employment which may have some unknown positive effect on the environmental justice population in the study area. Despite the potential for a beneficial employment effect in the study area under these alternatives, the disproportionate effect on agricultural workers is considered an adverse effect because this effect would be predominately borne by a minority population currently employed by the agricultural industry in the study area.

Aesthetics and Visual Resources

Alternatives 2A, 3, 5, 6A, 7, and 8 would result in adverse effects on aesthetics and visual resources in the vicinity of each alignment. While the exact footprint of each alternative, and thus the affected population varies slightly for each alternative, the same impact mechanisms and mitigation measures as those described under Alternative 1A would be applicable to the other pipeline/tunnel alignment alternatives. Because minority and low-income populations are distributed along all of these alternatives (see Figures 28-1 and 28-2), intermittently, from north to south, the primary distinction between alternatives is the location and number of intake facilities. The contribution of aesthetic effects on disproportionate effects on minorities therefore varies primarily based upon the location and number of intakes. The number of intakes associated with each alternative is summarized in Table 28-3.

Table 28-3. Intake Locations by BDCP Alternative

BDCP Alternative	Intakes
Pipeline/Tunnel Alignment Alternatives	
1A	1, 2, 3, 4, 5
2A	1, 2, 3, 4, 5 (or 1, 2, 3, 6, 7)
3	1, 2
5	1
6A	1, 2, 3, 4, 5
7	2, 3, 5
8	2, 3, 5
East Alignment Alternatives	
1B	1, 2, 3, 4, 5
2B	1, 2, 3, 4, 5 (or 1, 2, 3, 6, 7)
6B	1, 2, 3, 4, 5
West Alignment Alternatives	
1C	West side intakes 1, 2, 3, 4, 5
2C	West side intakes 1, 2, 3, 4, 5
6C	West side intakes 1, 2, 3, 4, 5

While mitigation is available to reduce these effects, these effects would remain adverse despite implementation of mitigation. Because these impact mechanisms would affect geographic units with meaningfully greater minority and low-income populations, where these effects overlap with meaningfully greater minority and low-income populations (Figures 28-1 and 28-2) these effects would contribute to a disproportionate effect on the same populations. For these reasons, although mitigation is available to reduce the severity of these effects, these effects would be adverse, because they would disproportionately accrue to minority and low-income populations.

Cultural Resources

Construction under Alternatives 2A, 3, 5, 6A, 7, and 8 have the potential to result in effects on identified and previously unidentified archaeological resources, built environment resources, and traditional cultural properties. The impact mechanisms and mitigation measures for cultural resources described under Alternative 1A would also be applicable to these pipeline/tunnel alignment alternatives.

The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources*. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. The pipeline/tunnel alignment alternatives are generally similar in the number of identified resources that would be affected, as well as anticipated effects on resources that have not been identified. Implementation of the mitigation measures and Section 106 consultation (see discussion under Alternative 1A, Cultural Resources) do not guarantee these effects could be reduced or avoided. The effect on Native American and other minority populations would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because it would disproportionately accrue to minority populations.

Public Services and Utilities

Construction under the pipeline/tunnel alignment alternatives that include construction of the conveyance pipeline between Intake 3 and the intermediate forebay (Alternatives 2A, 6A, 7, and 8) would have the potential to conflict with the Hood Fire Station in Hood. The same mitigation measure as described under Alternative 1A, Mitigation Measure UT-2, would ensure that fire protection services are not interrupted. However, the potential effects of constructing a new fire station are unknown and would be considered adverse. The affected communities of Hood and Courtland are comprised of a meaningfully greater minority population, as shown on Figure 28-1, which would be potentially affected by both the disruption of fire protection or emergency medical services associated with removal of the Hood Fire Station, and the potential adverse effects of constructing a new fire station. As such, this represents a potentially disproportionate effect on minority populations. This is considered an adverse effect because it would occur in a geographic location with a meaningfully greater minority population.

The impact mechanisms and mitigation measures for construction of the proposed water conveyance facilities (Chapter 20, *Public Services and Utilities*, Impact UT-6) under the pipeline/tunnel alignment alternatives (Alternatives 2A, 3, 5, 7, and 8) would be the same as described for Alternative 1A. Chapter 20, *Public Services and Utilities*, Impact UT-6 describes the potential for construction conflict with existing utility facilities in some locations. These alternatives would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Impact UT-8 describes the potential consequences of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Construction of the proposed water conveyance facilities and implementation of the conservation measures under Alternatives 2A, 3, 5, 6A, 7, and 8 would generate the same criteria pollutant exceedances as Alternative 1A. Although mitigation measures are available to reduce these effects, they may not be able to reduce the emissions below applicable air quality management district thresholds. Given that the proposed water conveyance facilities and restoration and conservation areas along these alignments are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that generation of criteria pollutants in excess of local air district thresholds would result in a potentially disproportionate effect on minority and low-income populations. This effect is considered adverse. See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect impacts on export service areas.

Noise

Construction of the Alternatives 2A, 3, 5, 6A, 7, and 8 and conservation measures would generate the same noise effects as described under Alternative 1A. Where these noise effects would overlap with populations with meaningfully greater minority or low-income communities they would result in a disproportionate effect. Although mitigation measures and an environmental commitment are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse, because it would occur in a geographic location with a meaningfully greater minority population.

Public Health

Chapter 25, *Public Health*, identifies the potential for the operation of all pipeline/tunnel alignment alternatives to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. The following mitigation measure is available to reduce this effect:

Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough

Mitigation would reduce but not avoid this effect. Because the increase in bromide and DPBs would decrease water quality for Solano County service area, a service area with a meaningfully greater minority population, this would disproportionately affect minorities. This is an adverse effect.

In addition, the contribution of all pipeline/tunnel alignment alternatives would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4.

In addition, Chapter 25, *Public Health*, also analyzed the potential for operations under Alternatives 6A, 7, and 8 to increase the body burden of mercury in fish relative to Existing Conditions. Fish tissue mercury concentrations showed substantial increases in some Delta locations modeled. The greatest increase was at Franks Tract and Old River at Rock Slough relative to Existing Conditions. Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health

effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).

The associated increase in human consumption of mercury caused by these alternatives would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternatives 6A, 7, and 8. This effect would be adverse. This effect would not be adverse for other pipeline/tunnel alignment alternatives.

Impacts regarding *Microcystis* blooms from operations and implementation of conservation measures under other pipeline tunnel alignments would be similar to conditions described under Alternative 1A.

Summary of Environmental Justice Effects under Other Pipeline/Tunnel Alignment Alternatives

Implementation of Alternatives 2A, 3, 5, 6A, 7, and 8 would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, public services and utilities, noise, and public health effects. The same mitigation measures and environmental commitments described under Alternative 1A would reduce the severity of these effects, but would not entirely avoid these effects. Because these effects would result in disproportionate effects on minority and low-income populations, these effects would be adverse.

28.5.3.8 Other East Alignment Alternatives Compared with Alternative 1B

Generally, the different east alignment alternatives, specifically, Alternatives 2B and 6B, would have the same impact mechanisms with the associated potential for a disproportionate effect on minority populations as described under Alternative 1B. The differences in these alternatives for the purposes of environmental justice analysis are the locations of the physical features and/or operational guidelines that would result in effects that contribute to a disproportionate effect on minority and low-income populations. Because each alternative has a slightly different footprint, the contribution of each alternative to effects on adjacent environmental justice populations varies. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the east alignment, which includes Alternatives 2B and 6B.

Land Use

Alternatives 2B and 6B would also have the potential to result in the relocation of residents, or a physical effect on existing structures, resulting in adverse effects on the physical environment. As with Alternative 1B, the physical footprints of the intake facilities and their associated conveyance pipelines for each of the east alignment alternatives are anticipated to conflict with structures, including residences. Chapter 13, *Land Use,* Section 13.3.3.2, Table 13-4 summarizes the estimated number of structures affected across structure type and alternative and Mapbook Figure M13-2 in Chapter 13 shows the distribution of these effects across the east conveyance alignment. The variation in number of residential structures affected is related to the location of intakes and their associated conveyance pipelines (e.g., Alternative 2B involves construction of Intakes 1–5 or 1–3, 6 and 7—whereas Alternative 6B involves the same intake locations as Alternative 1B—Intakes 1–5). Whereas Alternative 6B would affect the same number of residential structures as Alternative 1B (i.e., approximately 106 residences), Alternative 2B would affect approximately 120 residential structures. As shown in the Figure 28-1, there are census blocks with a meaningfully greater minority population (over 50%) throughout the study area. Construction of east alignment alternatives would result in displacement of residences associated with the intakes and associated conveyance pipelines, which would affect census blocks where the minority population is over 50%. This represents a disproportionate effect on minority populations. DWR would provide compensation to property owners for the property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect, but would not reduce the severity of the physical effect itself. For these reasons, this effect would be adverse.

As with Alternative 1B, under Alternatives 2B and 6B, construction activities associated with Intake 4 (if built under Alternative 2B) and its associated facilities, the canal, and a bridge over the canal would separate the community of Hood from surrounding areas. Even though access to and from the community would be maintained over the long-term, the placement of Intake 4 and the canal, as well as the nearby construction of Intake 3, would create lasting physical barriers between Hood and the surrounding lands. Additionally, construction and the long-term placement of Intake 3 (about 0.5 mile north of Hood) and the canal (running north to south) would create further divisions between Hood and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Additionally, the lasting placement of the intake facilities and the canal would establish physical barriers between the community and its surroundings, constituting an adverse effect. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect. As shown in Figures 28-1 and 28-2, the community of Hood is composed of both census blocks with a meaningfully greater minority population (over 50%) and block groups with low-income populations. Consequently, the division of the community of Hood would have a disproportionately adverse effects on minority and low-income populations in Hood. This would be an adverse effect, because it would disproportionately accrue to minority and low-income populations.

Socioeconomics

The same impact mechanisms identified for Alternative 1B would also contribute to a disproportionate effect associated with loss of agricultural jobs under Alternatives 2B and 6B. Chapter 16, *Socioeconomics*, indicates that the same number of jobs would be gained for the construction sector and lost in the agricultural sector under these alternatives as described for 1B.

While each east canal alternative would result in a net increase in jobs during construction and operations, each would result in the loss of jobs in the agricultural sector. Despite the potential for a beneficial employment effect in the study area under these alternatives, the disproportionate effect on agricultural workers is considered an adverse effect because this effect would be predominately borne by a minority population currently employed by the agricultural industry in the study area.

Aesthetics and Visual Resources

Construction of the east alignments under Alternatives 2B and 6B would result in adverse effects on aesthetics and visual resources in the vicinity of each alignment similar to effects described for Alternative 1B. While Alternative 6B is substantially similar to Alternative 1B, Alternative 2B may substitute Intakes 6 and 7 for Intakes 4 and 5 and would include construction of an operable barrier at the head of Old River.

Because identified impact mechanisms would affect geographic units with meaningfully greater minority and low-income populations (see Figures 28-1 and 28-2), these effects would contribute to a disproportionate effect on the same populations. For these reasons, although mitigation is available to reduce the severity of these effects, these effects would be adverse, because they would occur in a geographic location with meaningfully greater minority and low-income populations.

Cultural Resources

All of the east alignment alternatives have the potential to result in effects on identified and previously unidentified archaeological resources, built environment resources, and traditional cultural properties. The impact mechanisms and mitigation measures for cultural resources described under Alternative 1B would also be applicable to the all of the east alignment alternatives.

The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources*. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. Effects on archaeological and historic-era built environment resources are very similar across east alignment options in terms of the number of affected resources. Implementation of the mitigation measures and Section 106 consultation (see discussion under Alternative 1A, Cultural Resources) do not guarantee these effects could be reduced or avoided. The effect on Native American populations and other minority groups would remain even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because it would disproportionately accrue to minority and low-income populations.

Public Services and Utilities

Construction under the east alignment alternatives that include construction of the canal segment and bridge (Alternatives 1B, 2B, and 6B) would have the potential to conflict with the Hood Fire Station in Hood. The same mitigation measure as described under Alternative 1A, Mitigation Measure UT-2, would ensure that fire protection services are not interrupted. However, the potential effects of constructing a new fire station are unknown and would be considered adverse. The affected communities of Hood and Courtland are composed of a meaningfully greater minority population, as shown on Figure 28-1, which would be potentially affected by both the disruption of fire protection or emergency medical services associated with removal of the Hood Fire Station, and the potential adverse effects of constructing a new fire station. Consequently, this would result in a

potentially disproportionate effect on a minority population because the affected community is predominantly minority. This is considered an adverse effect.

The impact mechanisms and mitigation measures for construction of the proposed water conveyance facilities (Chapter 20, *Public Services and Utilities*, Impact UT-6) under the east alignment alternatives (Alternatives 2B and 6B) would be the same as described for Alternative 1B. Chapter 20, *Public Services and Utilities*, Impact UT-6, describes the potential for construction conflict with existing utility facilities in some locations. These alternatives would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Impact UT-8, describes the potential consequences of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Construction of the proposed water conveyance facilities and implementation of the conservation measures under Alternatives 2B and 6B would generate the same criteria pollutant exceedances of air quality district and federal *de minimis* thresholds as Alternative 1B. Although mitigation measures are available to reduce these effects, they may not be sufficient to reduce the emissions below applicable air quality management district thresholds. Given that the proposed water conveyance facilities and restoration and conservation areas along these alignments are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that the generation of criteria pollutants in excess of local air district and federal *de minimis* thresholds would result in a potentially disproportionate effect on minority and low-income populations. This effect is considered adverse.

See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect effects on export service areas.

Noise

Construction of the Alternatives 2B and 6B water conveyance facilities and conservation measures would generate the same noise effects as described under Alternative 1B. Where these noise effects would overlap with census blocks or block groups with meaningfully greater minority or low-income communities they would result in a disproportionate effect on those populations. Although mitigation measures and an environmental commitment are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse because it would occur in a geographic location with a meaningfully greater minority population.

Public Health

Chapter 25, *Public Health*, identifies the potential for the operation of all east alignment alternatives to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. Mitigation would reduce but not avoid this effect (as described in Chapter 25, *Public Health*, Mitigation Measure WQ-5). In addition, the contribution of all east alignment alternatives would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health,* Section 25.4*.* Because the increase in bromide and DPBs would decrease water quality for Solano County service area, a service area with a meaningfully greater minority population, this would disproportionately affect minorities. This is an adverse effect.

In addition, Chapter 25, *Public Health,* Section 25.3.3.12, also analyzed the potential for operations and implementation of conservation measures to increase the body burden of mercury in fish relative to Existing Conditions:

Impact PH-3: Substantial Mobilization or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4

Fish tissue mercury concentrations showed substantial increases in some Delta locations modeled (Franks Tract and Rock Slough). Because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses (Shilling et al. 2010), any increase from construction, operation, maintenance, or implementation of restoration actions in the fish body burden of mercury may contribute to an existing adverse effect. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Section 8.3.3.12, Impact WQ-13).

Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 6B. This effect would be adverse. This effect would not be adverse for Alternative 2B.

Impacts on public health regarding *Microcystis* blooms from operations and implementation of conservation measures under Alternative 2B and 6B would be similar to impacts described under Alternative 1B.

Summary of Environmental Justice Effects under Other East Alignment Alternatives

Implementation of Alternatives 2B and 6B would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, public services and utilities, air quality and greenhouse gas emissions, noise, and public health effects. The same mitigation measures and environmental commitments described under Alternative 1B would reduce the severity of these effects, but not entirely avoid these effects. Because these effects would result in disproportionate effects on minority and low-income populations, these effects would be adverse.

28.5.3.9 Other West Alignment Alternatives Compared with Alternative 1C

Generally, the other west alignment alternatives, Alternatives 2C and 6C, would have the same impact mechanisms with the associated potential for a disproportionate effect on minority populations as described under Alternative 1C. The differences in these alternatives for the purposes of environmental justice analysis are the locations of the physical features and/or operational guidelines that would result in effects that contribute to a disproportionate effect on minority and low-income populations. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to the west alignment, which includes Alternatives 2C and 6C.

Land Use

Alternatives 2C and 6C would also have the potential to result in the relocation of residents, or a physical effect on existing structures, resulting in adverse effects on the physical environment. As with Alternative 1C, the physical footprints of the intake facilities, their associated conveyance pipelines, and canal segments for each of the west alignment alternatives are anticipated to conflict with structures, including residences. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4, summarizes the estimated number of structures affected across structure type and alternative and Mapbook Figure M13-3 in Chapter 13 shows the distribution of these effects across the west conveyance alignment. All of the west alignment alternatives are expected to affect a similar number of residential structures because there is no variation in intake locations (i.e., all west alignment alternatives involve construction of Intakes W1–W5). Therefore, Alternatives 2C and 6C would also affect approximately 194 residences. As shown in the Figures 28-1 and 28-2, there are census blocks with a meaningfully greater minority population (over 50%) and block groups with low-income populations throughout the study area, and specifically along the west alignment. Construction of west alignment alternatives would result in displacement of residences associated with the intakes, their associated conveyance pipelines, and canal segments, which would affect census blocks where the minority population is over 50%. This represents a disproportionate effect on minority populations. DWR would provide compensation to property owners for property losses due to implementation of the alternative, which would reduce the severity of economic effects related to

this physical effect, but would not reduce the severity of the physical effect itself. For these reasons, this effect would be adverse.

Under this alternative, construction activities associated with Intakes W1 and W2, their associated facilities, and segments of conveyance pipeline would separate the community of Clarksburg from surrounding areas. Even though access to and from the community would be maintained over the long-term, the placement of Intake W2, as well as the nearby construction of Intake W1, would create lasting physical barriers between Clarksburg and the surrounding lands. The long-term placement of Intake W2 (adjacent to the south) and Intake W1 (approximately 1 mile north) would create further divisions between Clarksburg and the surrounding lands. While a permanent physical division within the community itself is not anticipated to result from these features, activities associated with their construction would create divisions over a multiyear period. Additionally, the permanent placement of the intake facilities and the canal would establish physical barriers between the community and its surroundings, constituting an adverse effect. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect.

As shown in Figures 28-1 and 28-2, the community of Clarksburg is composed of census blocks with both a meaningfully greater minority population (over 50%) and block groups with low-income populations. As such, the division of the community of Clarksburg would have a disproportionately adverse effect on minority and low-income populations in the community. This would be an adverse effect, because it would disproportionately accrue to minority and low-income populations.

Socioeconomics

The same impact mechanisms identified for Alternative 1C would also contribute to a disproportionate effect associated with loss of agricultural jobs under Alternatives 2C and 6C. Chapter 16, *Socioeconomics*, indicates that the same number of jobs would be gained for the construction sector and lost in the agricultural sector under these alternatives as described for 1C.

While each west canal alternative would result in a net increase in jobs during construction and operations, each would result in the loss of jobs in the agricultural sector. Despite the potential for a beneficial employment effect in the study area under these alternatives, the disproportionate effect on agricultural workers is considered an adverse effect because this effect would be predominately borne by a minority population currently employed by the agricultural industry in the study area.

Aesthetics and Visual Resources

Construction of the west alignment under Alternatives 2C and 6C, would result in adverse effects on aesthetics and visual resources in the vicinity of each alignment. These effects would be substantially similar to effects described for Alternative 1C (for example the same intakes would be constructed across all alternatives). Alternative 2C would also involve construction and operation of an operable barrier at the head of Old River.

Because these impact mechanisms would affect geographic units with meaningfully greater minority and low-income populations (Figures 28-1 and 28-2), these effects would contribute to a disproportionate effect on the same populations. For these reasons, although mitigation is available to reduce the severity of these effects, these effects would be adverse, because the effects would occur in a geographic location with a meaningfully greater minority and low-income population.

Cultural Resources

All of the west alignment alternatives have the potential to result in effects on identified and previously unidentified archaeological resources and potentially buried human remains. The impact mechanisms and mitigation measures for cultural resources described under Alternative 1C would also be applicable to the all the west alignment alternatives.

The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources*. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. The west alignment alternatives are generally similar in terms of the number and distribution of affected cultural resources. Implementation of the mitigation measures and Section 106 consultation (see discussion under Alternative 1A, Cultural Resources) do not guarantee these effects could be reduced or avoided. The effect on Native American populations and other minority groups would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because it would disproportionately accrue to minority and low-income populations.

Public Services and Utilities

As with Alternative 1C, construction under the west alignment alternatives (2C and 6C) would not displace or affect any public facilities (Chapter 20, *Public Services and Utilities*, Impact UT-2).

The impact mechanisms and mitigation measures for construction of the proposed water conveyance facilities (Chapter 20, *Public Services and Utilities*, Impact UT-6) under the west alignment alternatives (Alternatives 2C and 6C) would be the same as described for Alternative 1C. Chapter 20, *Public Services and Utilities*, Impact UT-6, describes the potential for construction conflict with existing utility facilities in some locations. These alternatives would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Impact UT-8, describes the potential consequences of implementation of various conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed.

Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce adverse effect on utilities; however, because the effectiveness of these measures is unknown, this impact would remain adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Construction of the proposed water conveyance facilities and implementation of the conservation measures under Alternatives 2C and 6C would generate the same criteria pollutant exceedances of air quality district and federal *de minimis* thresholds as Alternative 1C. Although mitigation measures are available to reduce these effects, they may not be sufficient to reduce the emissions below applicable air quality management district thresholds. Given that the proposed water conveyance facilities and restoration and conservation areas along these alignments are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that the generation of criteria pollutants in excess of local air district and federal *de minimis* thresholds would result in a potentially disproportionate effect on minority and low-income populations. This effect is considered adverse. See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect effects on export service areas.

Noise

Construction of the Alternatives 2C and 6C water conveyance facilities and conservation measures would generate the same noise effects as described under Alternative 1C. Where these noise effects would overlap with census blocks or block groups with meaningfully greater minority or low-income communities they would result in a disproportionate effect on those populations. Although mitigation measures and an environmental commitment are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse because it would occur in a geographic location with a meaningfully greater minority population.

Public Health

Chapter 25, *Public Health*, identifies the potential for the operation of all west alignment alternatives to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct. (as described in Chapter 25, *Public Health*, Mitigation Measure WQ-5). In addition, the contribution of all west alignment alternatives would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. Because the increase in bromide and DPBs would decrease water quality for Solano County service area, a service area with a meaningfully greater minority population, this would disproportionately affect minorities. This is an adverse effect.

Impact PH-3: Substantial Mobilization or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

Impact PH-7: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Implementing CM2, CM4, CM5, and CM10Impact PH-8: Increase in *Microcystis* Bloom Formation as a Result of Operation of the Water Conveyance Facilities

Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4

In addition, Chapter 25, *Public Health*, also analyzed the potential for operations and implementation of conservation measures to increase the body burden of mercury in fish relative to Existing Conditions. The greatest increase was at Franks Tract and Old River at Rock Slough relative to Existing Conditions. Because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 6C. This effect would be adverse. This effect would not be adverse for other west alignment alternatives (1C and 2C).

Impacts to public health regarding *Microcystis* blooms from operations and implementation of conservation measures under Alternative 2C and 6C would be similar to conditions described under Alternative 1C.

Summary of Environmental Justice Effects under Other West Alignment Alternatives

Implementation of Alternatives 2C and 6C would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, and public health effects. The same mitigation measures and environmental commitments described under Alternative 1C would reduce the severity of these effects, but would not entirely avoid these effects. Because these effects would result in adverse disproportionate effects on minority and low-income populations, these effects are considered adverse and disproportionate.

28.5.3.10 Alternative 9—Through Delta/Separate Corridors (15,000 cfs; Operational Scenario G)

This section analyzes the environmental justice effects of the resource topics that are carried forward for detailed analysis for Alternative 9. Relevant environmental justice effects associated with adverse effects identified in these chapters are analyzed to determine if they would result in a disproportionate effect on minority or low-income populations. Figures 28-1 and 28-2 show the distribution of minority and low-income populations in relation to Alternative 9.

Land Use

Construction of this alternative, particularly the intake structures and new segment of canal extending south from Clifton Court Forebay, would require the disruption of approximately 255 structures throughout the alternative footprint, including an estimated 74 residential buildings. Construction of the intakes and canal, as well as channel dredging activities, would also conflict with private recreational structures. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4 summarizes the estimated number of structures affected across structure type and alternative and Mapbook Figure

M13-5 in Chapter 13 shows the distribution of these effects across the Through Delta/Separate Corridors conveyance alignment. There would likely be relocation or removal of residential structures associated with construction of new channel connections, permanent access roads, and borrow areas. As shown in Figures 28-1 and 28-2, there are census blocks with a meaningfully greater minority population and block groups with meaningfully greater low-income populations in the vicinity of Alternative 9 construction activities (e.g., construction associated with the new segment of canal extending south from Clifton Court Forebay). Therefore, displacement of residences as a result of Alternative 9 would have the potential to result in an adverse effect on minority and low-income populations.

When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect, but would not reduce the severity of the physical effect itself. This effect would remain adverse, because the affected residences occur in a geographic location with meaningfully greater minority and low-income populations.

Socioeconomics

The same impact mechanisms identified for Alternative 1A would result in effects on local employment conditions under Alternative 9 (Impacts ECON-1 and ECON-7). The general economic effects on south-of-Delta areas of alternatives that would reduce water for Export Service Areas (Alternatives 6A, 6B, 6C, 7, and 8) are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. Other effects in Chapter 16, *Socioeconomics*, Section 16.3.3.16, are not analyzed in this section because they either relate to program-level conservation measures that do not have sufficient project-level detail to identify environmental justice consequences, or because they do not have the potential to disproportionately affect environmental justice populations.

As described in Chapter 16, *Socioeconomics*, Section 16.3.3.16, Impact ECON-1, construction of the proposed water conveyance facilities would increase total employment and income in the study area. The change would result from expenditures on construction and from changes in agricultural production. Changes in jobs in the study area as a result of construction are reported in Chapter 16, *Socioeconomics*, Section 16.3.3.16, Table 16-55. During the peak construction years, it is estimated that 3,209 jobs (direct) and 6,371 jobs total (direct, indirect, and induced effects) would be gained in the study area.

However, construction of conveyance and related facilities such as roads and utilities would cause temporary and permanent conversion of agricultural land. Because construction would reduce agricultural land under cultivation, construction would result in the direct loss of 10 agricultural jobs and a total loss of 38 agricultural jobs (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics*, Section 16.3.3.16, Table 16-56).

Chapter 16, *Socioeconomics*, Section 16.3.3.16, Impact ECON-7, identifies employment effects associated with operation of conveyance facilities. Alternative 9 would result in the direct creation of 121 jobs and the creation of 177 jobs total (Chapter 16, *Socioeconomics*, Section 16.3.3.16, Table 16-58). However, because operations would reduce agricultural cultivation, operations would result in the direct loss of 14 agricultural jobs and a total of 36 agricultural jobs (direct, indirect and induced effects) (Chapter 16, *Socioeconomics*, Section 16.3.3.16, Table 16-59).

Because the majority of farm labor in the study area is minority, including those of Hispanic origin and potentially low-income, loss of up to 38 agricultural jobs in the study area associated with

construction of the conveyance facility is considered to be a disproportionate effect on an environmental justice population. However, the overall employment effect in the study area related to construction and operation of the conveyance facility would be an increase in construction and facility operation employment which may have some unknown positive effect on the environmental justice population in the study area. Despite the potential for a beneficial employment effect in the study area under Alternative 9 the adverse effect on agricultural workers is considered a disproportionate effect because this effect would be predominately borne by a minority population currently employed by the agriculture industry in the study area.

Aesthetics and Visual Resources

The construction of conveyance facilities for Alternative 9 has the potential to result in adverse effects on the visual environment. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, identifies the following adverse effects.

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impact AES-6, analyzes the effect of the implementation of CM2–CM21 on aesthetic and visual resources. This effect would be adverse. However because the precise location of where future conservation measures will be implemented is unknown, this impact is not carried forward for further analysis of environmental justice effects for this alternative or other alternatives.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, also identifies the following mitigation measures that would reduce the identified effects on aesthetics and visual resources.

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 025 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impacts AES-1 through AES-4, describe the aesthetics and visual resources effects associated with water conveyance facilities construction and operations. Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impact AES-3, describes the effects on local scenic highways, such as SR 160. Because degradation of a scenic highway would result in loss of scenic qualities for all highway users, it is not carried forward for environmental justice analysis.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impact AES-1, describes the effect of construction activities on the visual quality and character of the study area. Visual effects of Alternative 9 would be substantial—primarily in the areas surrounding the fish screens, operable barriers, pumping plants, channel modifications, spoil/borrow areas, transmission lines, and the on-channel levee at Hammer Island. These changes would be most evident near Locke and Walnut Grove, which would undergo extensive changes from the permanent establishment of large industrial facilities and the supporting infrastructure along and surrounding the 1.2-mile segment of the Sacramento River where the fish screen would be situated, in addition to the operable barriers, bridges, and transmission lines that would be introduced. In San Joaquin County, the operable barrier across Old River on the Middle River and dredging activities would be visible from Bacon Island Road. Alternative 9 would introduce visually dominant and discordant features in the foreground and middleground views that would be very noticeable to all viewer groups. These changes would occur in an area known for its open space, agricultural landscapes, and rural characteristics. Therefore, because of the long-term nature of construction; proximity to sensitive receptors; razing of the marina, docks, and landings; removal of vegetation; changes to topography through grading; transmission lines; and addition of large-scale industrial structures where none presently exist, this effect is considered adverse. Mitigation Measures AES-1a through AES-1e are

available to address visual effects. No concrete batch plants or fuel stations have been identified for Alternative 9.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impact AES-2, describes the permanent alteration of scenic resources resulting from construction. The greatest changes would occur in the vicinity of Locke and Walnut Grove, where scenic vistas exist along SR 160 and River Road, and waterways where operable barriers and pumping plants would be placed. Large scale spoil areas for dredge material would also cause permanent and adverse landscape changes. Because of the long-term nature of construction combined with the proximity to sensitive receptors; razing of the marina, docks, and landings; removal of vegetation; changes to topography through grading; transmission lines; and addition of large-scale industrial structures where none presently exist, this effect may be considered adverse. Mitigation Measures AES-1a, AES-1c, and AES-1e are available to address visual effects.

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.16, Impact AES-4, describes the potential for new sources of light and glare that would be introduced during construction or as part of permanent features that would remain after the conveyance facilities are complete. The short canal segment at the very southern end of this conveyance option would introduce a new reflective surface and thus a new source of glares. Nighttime lighting at fish screens and pumping plants would introduce ambient light into a visual landscape that generally has low levels of nighttime light. Night time safety lighting would be used at operable barriers and the canal segment, adding additional sources of light to the dark night landscape.

While mitigation is available to reduce the effects of AES-1, AES-2, and AES-4, these effects would remain adverse despite implementation of mitigation. As shown in Figures 28-1 and 28-2, meaningfully greater minority and low-income populations occur within the construction footprint of the Through Delta/Separate Corridors alternative. Specifically, a concentration of minority and low-income populations are located in the communities of Locke and Walnut Grove, where residential viewers in these communities would be affected by adverse visual effects of this alternative.

Because adverse visual effects are largely associated with effects near Lock and Walnut Grove, which would undergo extensive changes from the permanent establishment of large industrial facilities and the supporting infrastructure along and surrounding the 1.2-mile segment of the Sacramento River where the fish screen would be situated, in addition to the operable barriers, bridges, and transmission lines that would be introduced, and also in the southern portion of this conveyance alternative where dredge spoil areas and the canal would be constructed, where minority and low-income populations occur, these effects would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, they would be adverse because they would occur in a geographic location with meaningfully greater minority and low-income populations.

Cultural Resources

Construction of conveyance facilities under this alternative would have adverse effects on archaeological resources and built environment resources, through the impact mechanisms identified in Chapter 18, *Cultural Resources,* Section 18.3.5.16*.* Impacts would be associated with construction of fish screens, operable barriers, and spoil areas for dredged material, as described in Chapter 18, *Cultural Resources,* Section 18.3.5.16, Impacts CUL-1 through CUL-4. Additional,

previously unidentified prehistoric resources and human remains are expected to occur in the footprint of this alternative as well.

The following mitigation measures are available to reduce these effects.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of inaccessible Properties to Assess Eligibility, Determine If These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

The geographic distribution of the affected resources is described in Chapter 18, *Cultural Resources,* Section 18.3.5.16. The number of resources affected by each alternative is indicated in the tables provided in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*. Identification and treatment of cultural resources will be completed under relevant mitigation measures described in Chapter 18, *Cultural Resources,* such as Mitigation Measures CUL-1 through CUL-7. Construction monitoring and discovery protocols would be performed during construction under Mitigation Measure CUL-3. State and federal law governing discoveries of human remains would be enforced through Mitigation Measure CUL-4. Implementation of the mitigation measures and Section 106 consultation (see discussion under Alternative 1A, Cultural Resources) do not guarantee these effects could be reduced or avoided. The effect on Native American populations and other minority groups would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse, because it would disproportionately accrue to minority populations.

Public Services and Utilities

Under Alternative 9, construction of the proposed water conveyance facilities would not displace or affect any public facility, and therefore, would not require the construction or major alteration of such facilities (Chapter 20, *Public Services and Utilities*, Section 20.3.3.16, Impact UT-2).

Chapter 20, *Public Services and Utilities*, Section 20.3.3.16, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 9 would require relocation of regional power transmission lines and one natural gas pipeline. Additionally, active gas wells may need to be plugged and abandoned. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.16, Impact UT-7, discusses the potential effects of operation and maintenance of the proposed water conveyance facilities on existing public services and utilities. Under Alternative 9, operation of project facilities would conflict with existing utility facilities. Existing intakes would require decommissioning and potential relocation. Agricultural drainage ditches would need to relocate their discharge points. Because the relocation and potential disruption of utility infrastructure would be required this could create environmental effects that would be considered adverse. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce these effects, but they would still remain adverse. However, these effects on intakes and drainage ditches would not be expected to create disproportionate effects on any minority or low-income populations. This would not be adverse.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.16, Impact UT-8, describes the potential consequences of conservation measures on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with conservation measures) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce adverse effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of conservation measures.

Air Quality and Greenhouse Gas Emissions

Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.3.3.16 addresses the potential effects for Alternative 9 to generate criteria pollutants that exceed air quality district and federal *de minimis* thresholds, and to expose sensitive receptors to health risks in excess of local air quality

management district thresholds, from construction of the proposed water conveyance facilities or implementation of CM2-CM11. The following adverse effects are relevant to this analysis.

Impact AQ-2: Generation of Criteria Pollutants in Excess of the SMAQMD Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-9: Generation of Criteria Pollutants in the Excess of Federal *De Minimis* Thresholds from Construction and Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-11: Exposure of Sensitive Receptors to Health Risks in Excess of SMAQMD's Health-Risk Assessment Thresholds

Impact AQ-18: Generation of Criteria Pollutants from Implementation of CM2–CM11

As described in Impact AQ-2, construction of Alternative 1B would generate fugitive dust emissions exceeding SMAQMD thresholds. The effect of generating emissions in excess of local air district thresholds would therefore violate applicable air quality standards in the study area and could contribute to or worsen an existing air quality conditions. No feasible mitigation is available to reduce fugitive dust emissions; therefore, the effect would remain adverse.

As described in Impact AQ-9, construction of the water conveyance facilities under this alignment would exceed SJVAB federal *de minimis* thresholds for CO. DWR has identified several environmental commitments to reduce construction-related criteria pollutants. However, because the current emissions estimates exceed the SJVAB federal *de minimis* threshold for CO, a positive conformity determination for CO cannot be satisfied through the purchase of offsets within the SJVAB. This effect would remain adverse. In the event that Alternative 1B is selected, Reclamation, USFWS, and NMFS would need to demonstrate that conformity is met for CO through a local air quality modeling analysis (i.e., dispersion modeling) to ensure project emissions do not cause or contribute to any new violation of the CO NAAQS or increase the frequency or severity of any existing violation of the CO NAAQS.

As described in Impact AQ-11, construction of Alternative 9 would require the use of diesel-fueled engines. Potential sources of DPM include exhaust emissions from onroad vehicles; offroad vehicles (e.g., loaders, dozers, graders); and portable equipment (e.g., compressors, cranes, generators). Because of the intensity and scale of construction activities during which these diesel powered engines would be used in areas of heavy construction such as operable barriers, fish screens, dredge spoil areas and concrete batch plants, construction could expose nearby sensitive receptors to substantial pollutant concentrations, potentially resulting in adverse health effects. The maximally exposed sensitive receptor area associated with exceedances of carcinogenic thresholds is located in the Walnut Grove/Locke area adjacent to areas where operable barriers and fish screens would be installed. These health effects are deemed adverse because they would exceed the SMAQMD thresholds for cancer-risk associated with DPM emissions. Due to the large number of sensitive receptors that would be exposed to DPM emissions, it would be infeasible to relocate these residences.

As described in Impact AQ-18, implementation of CM2-CM11 under Alternative 1B would result in an adverse effect if the incremental difference, or increase, relative to Existing Conditions exceeds applicable local air district thresholds. These effects are expected to be further evaluated and identified in the subsequent project-level environmental analysis conducted for the CM2–CM11

restoration and enhancement actions. Mitigation Measure AQ-18 would be available to reduce this effect.

Mitigation Measure AQ-18: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities

However, it may not be sufficient to reduce emissions below applicable air quality management district thresholds. Consequently, this impact would be adverse.

Given that the proposed water conveyance facilities and the restoration and conservation areas along this alignment are proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur (Figures 28-1 and 28-2), it is expected that generation of criteria pollutants in excess of local air district and federal *de minimis* thresholds, as well as exposure of sensitive receptors to health risks in excess of local air district thresholds, would result in a potentially disproportionate effect on minority and low-income populations. See Chapter 30, *Growth Inducement and Other Indirect Effects,* for discussion on any indirect effects on export service areas.

Noise

Chapter 23, *Noise,* Section 23.3.3.16, identifies the following adverse effect associated with new sources of noise and vibration that would be introduced into the study area during construction and operations of Alternative 9.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Conservation Measures

Chapter 23, *Noise,* Section 23.3.3.16, Impact NOI-1, describes noise effects associated with the construction of this alternative that would occur at discrete locations at construction work sites, and would affect adjacent residents. Specifically, as described in Chapter 23, Section 23.3.3.16, Impact NOI-1, noise from construction of facilities and truck traffic and worker commutes is predicted to exceed daytime and nighttime noise standards in areas zoned for sensitive land uses including residential, natural/recreational, agricultural residential, and schools at the locations listed below.

- Sacramento County – including neighborhoods in the communities of Walnut Grove, Grand Island Estates, and Locke.
- San Joaquin County.
- Contra Costa County.
- Alameda County.

Construction of operable barriers and pumping plants under Alternative 9 would require the use of impact-driven sheet piles to construct cofferdams and barrier foundations. Potential reasonable worst-case equipment noise levels from construction work areas would be comparable to those listed for the intake sites for other alternatives. Pile driving and tunneling activities during

construction of the intakes and conveyances could result in substantial increases in noise levels affecting nearby communities and residences.

As shown in Figures 28-1 and 28-2, there are census blocks and block groups with meaningfully greater proportions of minority and low-income populations in the vicinity of areas of heavy construction work areas (i.e., operable barriers, fish screens, dredge spoil areas and concrete batch plants) where vibration and noise effects are predicted to exceed noise standards for nearby residents. Construction of intakes and the tunnel would result in excessive groundborne vibration and groundborne noise levels at nearby receptors, including residential structures. The effect of exposing sensitive receptors to vibration or groundborne noise would be adverse.

Chapter 23, *Noise,* Section 23.3.3.16, Impact NOI-4, describes the noise effects of conservation measures. Because the conservation measures are analyzed at a program-level of detail, and have not been refined to specific projects with discrete locations, it would be difficult to analyze potential disproportionate effects on environmental justice populations. However, because of the distribution of minority and low-income populations in the study area, there is a potential for such effects.

Although implementation of mitigation measures and the environmental commitment to develop and implement a Noise Abatement Plan would be available to reduce these effects, it is not anticipated that feasible measures would be available in all situations to reduce construction noise to levels below the applicable thresholds. The effect of exposing noise-sensitive land uses to noise increases above thresholds is considered adverse. Although mitigation measures are available to address this temporary effect, because the noise and vibration effects would occur in areas with meaningfully greater minority and low-income populations, this represents a disproportionate effect. This effect is considered adverse because it would occur in a geographic location with a meaningfully greater minority and low-income population.

Public Health

Chapter 25, *Public Health*, Section 25.3.3.16, identifies the potential for the operation of this alternative to increase concentrations of bromide and associated DPBs at Barker Slough, a source of water for the North Bay Aqueduct:

Impact PH-2: Exceedances of Water Quality Criteria for Constituents of Concern Such That There Is an Adverse Effect on Public Health as a Result of Operation of the Water Conveyance Facilities

In addition, the contribution of this alternative would add to the foreseeable future increase in DPBs that would happen in the absence of the project, as described in Chapter 25, *Public Health*, Section 25.4. This would be an adverse effect because these chemicals are associated with adverse health effects. Mitigation Measure WQ-5 is available to reduce this effect:

Mitigation Measure WQ-5: Avoid, Minimize, or Offset, as Feasible, Adverse Water Quality Conditions; Site and Design Restoration Sites to Reduce Bromide Increases in Barker Slough

While Mitigation Measure WQ-5 may reduce this effect, the feasibility and effectiveness of this mitigation measure is uncertain based on currently available information. Therefore, the available mitigation would not necessarily reduce the effect and it may remain adverse.

The North Bay Aqueduct serves Napa and Solano Counties. This analysis assumes the decrease in water quality for waters conveyed in this aqueduct would affect the entire service population using water from the North Bay Aqueduct, which is approximately the same as the demographic profile for each county as a whole. Napa County as a whole does not have a meaningfully greater minority population (the total minority population is approximately 44%, U.S. Census Bureau 2012a). Solano County however has a total minority population of approximately 59% (U.S. Census Bureau 2012b). Neither county has a meaningfully greater low-income population. Because the increase in bromide and DPBs would decrease water quality for Solano County service population, this would disproportionately affect minorities. This is an adverse effect.

In addition, Chapter 25, *Public Health*, Section 25.3.3.16, also analyzed the potential for operations and implementation of conservation measures under Alternative 9 to increase the body burden of mercury in fish relative to Existing Conditions. The greatest increase was at Franks Tract and Old River at Rock Slough relative to Existing Conditions. Because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13). Because subsistence fishing is specifically associated with minority populations in the Delta compared to population at large this effect would be disproportionate on those populations for Alternative 6C. This effect would be adverse.

Summary of Environmental Justice Effects under Alternative 9

Implementation of Alternative 9 would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, air quality and greenhouse gas emissions, noise, and public health effects. While mitigation measures and environmental commitments would reduce these effects, the effects would not be avoided entirely. The effects would remain adverse.

28.5.4 Effects and Mitigation Approaches—Alternatives 4A, 2D, and 5A

28.5.4.1 No Action Alternative Early Long-Term

The effects of the No Action Alternative Early Long-Term (ELT) on low-income and minority populations would be similar to the effects described for the No Action Alternative Late Long-Term (LLT) in Section 28.5.3.2. Activities occurring within the Plan Area under the No Action Alternative (ELT) that could result in a disproportionate effect on low-income and minority communities would be similar to those described under Existing Conditions. These activities include ongoing programs implemented by federal, state, and local agencies, and non-profit groups, as well as projects that are permitted or assumed to be completed during the early long-term period. This includes restoration actions occurring within the Yolo Bypass and the restoration of 8,000 acres of intertidal habitat in the Delta and Suisun Marsh being driven by the 2008 and 2009 USFWS and NMFS Biological Opinions.

Because the No Action Alternative (ELT) implementation period would be shorter, the magnitude of activities that could adversely affect low-income and minority populations would be less than those described for the No Action Alternative (LLT). Disproportionate adverse effects on these

populations could occur directly as result of constructing a facility within or adjacent to a community or indirectly by alternating land uses in such a fashion that the economic activity that benefits these communities (i.e., agricultural, recreation, etc.) is reduced or eliminated during the early long-term period.

28.5.4.2 Alternative 4A—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H)

Some of the resource topics were not considered in the assessment of disproportionate impacts on minority or low-income populations. For the reasons described in Section 28.5.3.1, *Issues Not Analyzed in Detail*, these resources were also not evaluated as part of the Alternative 4A environmental justice impact assessment. The resource topics not evaluated for a disproportionate impact on minority or low-income populations are geology and seismicity, hazards and hazardous materials, mineral resources, water supply, surface water, groundwater, water quality, soils, fish and aquatic resources, terrestrial biological resources, agricultural resources, recreation, transportation, energy, air quality, and paleontological resources.

Land Use

The potential impact on minority and low-income populations resulting from changes in land use for Alternative 4A would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 13, *Land Use*, Section 13.3.3.9, identifies effects caused by incompatibility with local land uses, potential for physical division of established communities, and incompatibility with land use policies, By itself, incompatibility with land use policies is not a physical effect on the environment, and, therefore, does not have the potential to result in a disproportionate effect on a minority or low-income populations. Chapter 13, Section 13.3.3.9 also addresses the potential for an alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis:

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility

The extent of land use changes attributable to construction of Alternative 4A that could affect minority and low-income populations would be the same as disclosed for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As discussed in detail under Alternative 4, a disproportionate effect on minority populations would occur because construction of Intakes 2, 3, and 5 would result in the displacement of residential structures and permanent structures within census blocks where the minority population is greater than 50%.

Socioeconomics

The potential impact on minority and low-income communities associated with changes in socioeconomic conditions for Alternative 4A would be the same as described for Alternative 4. The

discussion of Alternative 4 in Chapter 13, Section 13.3.3.9, identified effects on regional economics and local employment conditions associated with constructing and operating the water conveyance facility and implementing conservation measures (called Environmental Commitments under Alternative 4A). These impacts have the potential to disproportionately affect environmental justice populations. The following adverse effects are relevant to this analysis:

Impact ECON-1: Temporary Effects on Regional Economics in the Delta Region during Construction of the Proposed Water Conveyance Facilities

Impact ECON-7: Permanent Regional Economic Effects in the Delta Region during Operation and Maintenance of the Proposed Water Conveyance Facilities

Land use changes that could affect minority and low-income populations for Alternative 4A would be the same as indicated for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As discussed in greater detail under Alternative 4, because the majority of farm-related employment is represented by minority populations, including those of Hispanic origin, and potentially low-income, loss of agriculture land and losses of associated employment is expected to result in a disproportionate effect on minority populations. While a net increase in employment would occur during construction of the water conveyance facility, it is expected that most new construction jobs would not likely be filled by displaced agricultural workers because the skills required are not comparable. This effect would, therefore, remain adverse because job losses would disproportionately accrue to a minority population.

Aesthetics and Visual Resources

The potential impact on minority and low-income communities associated with changes in visual resources for Alternative 4A would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 17, Section 17.3.3.9, addresses impacts on aesthetics and visual resources in the study area. The impacts on aesthetics and visual resources have the potential to disproportionately affect environmental justice populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of CM2–CM21

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-4a: Limit Construction to Daylight Hours within 0.5 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

The changes in the visual character of the study area that could affect minority and low-income communities under Alternative 4A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As described in detail under Alternative 4, changes in the visual character of the study area would occur as a result of the following:

- Landscape scars left behind from spoil borrow and RTM areas, transmission lines, concrete batch plants and fuel stations, and launching, retrieval, ventilation shafts sites.
- Constructing industrial facilities (i.e., Sacramento River intakes, intermediate forebay, expanded Clifton Court Forebay and pumping plant) in the study area.

The change in visual character as a result of the construction of the water conveyance facilities would be evident from the communities of Walnut Grove, Clarksburg, and Hood as well as rural residences located along the entire alignment. Because of the concentration of minority and low-

income populations in these communities as well as along the entire alignment, a change in visual character of the study area would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse.

Similar to Alternative 4, implementing conservation and stressor reduction measures as part of Alternative 4A, would result in impacts on the study area's visual quality and character. However because the precise location of the conservation and stressor reduction measures are unknown, this impact is not carried forward for further analysis of environmental justice effects.

Cultural Resources

The potential impact on minority and low-income communities associated with changes to cultural resources Alternative 4A would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 18, Section 18.3.5.9, addresses cultural resources in the study area. The impacts on cultural resources have the potential to disproportionately affect minority or low-income populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Environmental Commitments on Cultural Resources

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

The impact that the loss of cultural resources from within the study area could have on minority and low-income populations under Alternative 4A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As discussed in greater detail under Alternative 4, the loss or damage to prehistoric cultural resources would result in a disproportionate effect on Native American populations and potentially other minorities. Despite the required mitigation measures and Native American consultation processes, construction of Alternative 4A is likely to result in adverse effects on prehistoric archaeological resources and human remains because the scale of the construction activities makes avoidance of all eligible resources infeasible. The effect on minority populations that may ascribe significance to cultural resources in the Delta would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse because the effect would disproportionately accrue to a minority population.

Public Services and Utilities

The potential impact on minority and low-income communities associated with changes to the availability of public services and utilities under Alternative 4A would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 20, Section 20.3.3.9, addresses potential effects on utility infrastructure and public service providers, such as fire stations and police facilities. The following adverse effects on public services and utilities are relevant to the analysis:

Impact UT-6: Effects on Regional or Local Utilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-8: Effects on Public Services and Utilities as a Result of Implementing the Proposed CM2–CM11

The impacts on public services and utilities located within the study area that could disproportionately affect minority and low-income populations under Alternative 4A would be the same as indicated disclosed under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As discussed in greater detail under Alternative 4, the impact of constructing the proposed water conveyance facilities on public services and utilities would not result in a disproportionate effect on minority or low-income populations because relocation of an existing known utility would affect the entire service area of that utility. This effect would not be anticipated to result in a disproportionate effect on a minority or low-income population.

Noise

The potential impact on minority and low-income communities associated with noise occurring under Alternative 4A would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 23, Section 23.3.3.9, identifies the following adverse effects associated with new sources of noise and vibration that would be introduced into the study area under Alternative 4. The following adverse effects and mitigation measure are relevant to this analysis.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed CM2–CM21

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

The impacts of noise and vibration generated during construction of the water conveyance facilities and resulting effects on minority and low-income communities occurring under Alternative 4A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be identical for the two alternatives. As discussed in greater detail under Alternative 4, constructing the water conveyance facilities would generate noise in exceedance of daytime and nighttime noise standards in areas zoned as sensitive land uses including residential, natural/recreational, agricultural residential, and schools. Similarly, groundborne vibration from impact pile driving would exceed vibration thresholds in areas zoned for residential, including agricultural residential. This effect of noise and vibration generated during construction would remain adverse after application of mitigation. Because the alignment of the water conveyance facility is proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur it is expected that generation of noise and vibration in exceedance of thresholds would result in a potentially disproportionate effect on minority and low-income populations.

Impacts of implementing conservation and stressor reduction components (Environmental Commitments 3, 4, 6–12, 15, and 16) under Alternative 4A would be expected to be similar to impacts of implementing CM2–CM11 under Alternative 4. However, because fewer acres would be restored under Alternative 4A, it is expected that noise and vibration generated would be less when compared to Alternative 4. Nevertheless, it would be difficult to analyze potential disproportionate effects on environmental justice population because similar to CM3–CM11, the location of the conservation and stressor reduction components are not known. However, because of the

distribution of minority and low-income populations in the study area, there is a potential for noise and vibration impacts to disproportionately affect these populations.

Public Health

Chapter 25, *Public Health*, identifies the potential for construction, operation, and maintenance of Alternative 4A to mobilize or increase constituents known to bioaccumulate. Although Impact PH-3 is not considered adverse or significant in Chapter 25, because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population, they are discussed in this section.

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

The amount of tidal habitat restoration completed under Alternative 4A (Environmental Commitment 4) would be substantially less than under Alternative 4 CM4. To the extent that restoration actions alter hydrodynamics within the Delta region, which affects mixing of source waters, these effects are included in this assessment of operations-related water quality changes due to operation of the water conveyance facilities. Three intakes would be constructed and operated under Alternative 4A, similar to Alternative 4. Sediment-disturbing activities during construction and maintenance of the intake and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. The effects of Alternative 4A on pesticide levels in surface waters upstream of the Delta, in the Delta, and in the SWP/CVP Export Service Areas relative to Existing Conditions and the No Action Alternative (ELT and LLT) would be similar to or slightly less than those described for the Alternative 4. Alternative 4A would not result in increased tributary flows that would mobilize organochlorine pesticides in sediments.

If mercury is sequestered in sediments at water facility construction sites, it could become suspended in the water column during construction activities, opening up a new pathway into the food chain. Construction activities (e.g., pile driving and cofferdam installation) at intake sites or barge landing locations would result in a localized, short-term resuspension of sediment and an increase in turbidity that may contain elemental or methylated forms of mercury. Please see Chapter 8, Section 8.1.3.9, *Mercury,* for a discussion of methylmercury concentrations in sediments.

Changes in methylmercury concentrations under Alternative 4A are expected to be small. The greatest annual average methylmercury concentration for drought conditions would be 0.166 ng/L for the San Joaquin River at Buckley Cove (all scenarios) which was slightly lower than the No Action Alternative (ELT) (0.168 ng/L). Fish tissue estimates show only small or no increases in mercury concentrations based on long-term annual average concentrations for mercury at the Delta locations, but they would be different relative to the No Action Alternative (ELT). Under Operational Scenario H3 (Equation 2—see Chapter 8, *Water Quality*) there would be 11% to 12% percent increases at Staten Island and Rock Slough relative to the No Action Alternative (ELT) in all modeled years. Under Operational Scenario H4 there would be an 11% decrease relative to the No Action Alternative (ELT) for drought years. These changes are expected to be within the uncertainty inherent in the modeling approach (see Chapter 8, *Water Quality*, for a discussion of the uncertainty associated with bioaccumulation models), and would likely not be measurable in the environment. In the LLT, the primary difference would be changes in the Delta source water fractions to hydrologic effects from climate change and higher water demands. These effects would occur

regardless of the implementation of Alternative 4A and, therefore, at the LLT the effects of the alternative on mercury are expected to be similar to those described above.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 4A would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large, this effect would be disproportionate on those populations for Alternative 4A. This effect would be adverse.

Summary of Environmental Justice Effects under Alternative 4A

Alternative 4A would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

28.5.4.3 Alternative 2D—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 1, 2, 3, 4, and 5 (15,000 cfs; Operational Scenario B)

Some of the resource topics were not considered in the assessment of disproportionate impacts on minority or low-income populations. For the reasons described in Section 28.5.3.1, *Issues Not Analyzed in Detail*, these resources were also not evaluated as part of the Alternative 2D environmental justice impact assessment. The resource topics not evaluated for a disproportionate impact on minority or low-income populations are geology and seismicity, hazards and hazardous materials, mineral resources, water supply, surface water, groundwater, water quality, soils, fish and aquatic resources, terrestrial biological resources, agricultural resources, recreation, transportation, energy, and paleontological resources.

Land Use

The potential impacts on minority and low-income populations resulting from changes in land use for Alternative 2D would similar to those described for Alternative 4, but of slightly greater magnitude due to construction of five intakes rather than three. The discussion of Alternative 4 in Chapter 13, *Land Use*, Section 13.3.3.9. identifies effects caused by incompatibility with local land uses, potential for physical division of established communities, and incompatibility with land use policies, By itself, incompatibility with land use policies is not a physical effect on the environment, and, therefore, does not have the potential to result in a disproportionate effect on a minority or low-income populations. Chapter 13, Section 13.3.3.9, also addresses the potential for an alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis:

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility

The extent of land use changes attributable to construction of Alternative 2D that could affect minority and low-income populations would be the same as disclosed for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. Alternative 2D would include the same physical/structural components as Alternative 4 and two additional intakes. Therefore, there would be a greater impact related to construction two additional intakes. As for Alternative 4, construction and operation of physical facilities for water conveyance would create temporary or permanent conflicts with existing land uses (including displacement of existing structures and residences) because of the construction of permanent features of the facility. Under Alternative 2D, approximately 114 permanent structures would be removed or relocated within the water conveyance facilities footprint, including an estimated 35 residential buildings. The analysis of physical effects on structures in Chapter 13, *Land Use*, Section 13.3.3.9, indicates that the physical footprints of the intake facilities and their associated conveyance pipelines would be anticipated to create the largest disruption to structures. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4, summarizes the estimated number of structures affected across structure type and alternative, and Mapbook Figure M13-4 in Chapter 13 shows the distribution of these effects across the modified pipeline/tunnel conveyance alignment.

As discussed in detail under Alternative 4, a disproportionate effect on minority populations would occur because construction of intakes would result in the displacement of residential structures and permanent structures within census blocks where the minority population is greater than 50%. When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect but would not reduce the severity of the physical effect itself. For these reasons, this would be an adverse effect.

In addition, Chapter 13, *Land Use,* Section 13.3.3.9, examines the potential to divide existing communities. During the construction of the conveyance pipelines and tunnel between Intake 3, 4 and 5 and the intermediate forebay (north and south of Hood for the intakes, and about 5 miles

south of Hood for the forebay), construction activities would occur to the north and south of the community of Hood. A temporary power line would also be constructed through the eastern section of the community. Even though access to and from the community would be maintained over the long-term, the nearby construction of a temporary work area adjacent to Hood on the southern side of the community would substantially alter the setting of the community in the near term. Similarly, the nearby construction of Intakes 3, 4 and 5 would create permanent physical structures approximately one-quarter mile north and one-half mile south of Hood that would substantially alter the community's surroundings. While permanent physical structures adjacent to or through Hood are not anticipated to result from this alternative, activities associated with their construction could make it difficult to travel within and around Hood in certain areas for a limited period of time. Mitigation Measures TRANS-1a and TRANS-1b, which would require the development and implementation of a site-specific traffic management plan, and establishment of alternative access routes, are available to address this effect. However, permanent structures in the community's vicinity constitute an adverse effect.

Socioeconomics

The potential impact on minority and low-income communities associated with changes in socioeconomic conditions for Alternative 2D would be the same as described for Alternative 4. The discussion of Alternative 4 in Chapter 13 Section 13.3.3.9, identified effects on regional economics and local employment conditions associated with constructing and operating the water conveyance facility and implementing conservation measures (called Environmental Commitments under Alternative 2D). These impacts have the potential to disproportionately affect environmental justice populations. The following adverse effects are relevant to this analysis:

Impact ECON-1: Temporary Effects on Regional Economics in the Delta Region during Construction of the Proposed Water Conveyance Facilities

Impact ECON-7: Permanent Regional Economic Effects in the Delta Region during Operation and Maintenance of the Proposed Water Conveyance Facilities

Land use changes that could affect minority and low-income populations for Alternative 2D would be the same as indicated for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. However, under Alternative 2D two additional intake facilities would be constructed. Construction employment is estimated to peak at 2,747 FTE jobs in year 3. Total employment (direct, indirect, and induced) would peak in year 12, at 9,818 FTE jobs. Conversely, adverse effects associated with agricultural employment would also be somewhat higher due to the additional acreages of agricultural land that would be affected by construction of five intake facilities. Alternative 2D would result in 12 direct and 44 total agricultural jobs lost during construction. Also, the two additional intake facilities that would be constructed would likely result in slightly higher effects on employment effects when compared to Alternative 4. Permanent effects on regional economics during operation and maintenance of the proposed water conveyance facilities would be similar to those described under Alternative 4A, Impact ECON 7, in Chapter 16, *Socioeconomics*. Increased expenditures related to operation and maintenance of water conveyance facilities would be expected to result in a permanent increase in regional employment and income, as presented in Table 16-22 in Chapter 16. The permanent removal of agricultural land following construction would have lasting negative effects on agricultural employment and income, as shown in Table 16-23. As discussed in greater detail under Alternative 4, because the majority of farm-related

employment is represented by minority populations, including those of Hispanic origin, and potentially low-income, loss of agriculture land and loses of associated employment is expected to result in a disproportionate effect on minority populations. While a net increase in employment would occur during construction of the water conveyance facility, it is expected that most new construction jobs would not likely be filled by displaced agricultural workers because the skills required are not comparable. This effect would, therefore, remain adverse because job losses would disproportionately accrue to a minority population.

Aesthetics and Visual Resources

The potential impact on minority and low-income communities associated with changes in visual resources for Alternative 2D would be the same as described for Alternative 4. However, the potential under Alternative 2D to create substantial alteration in visual quality or character during construction of conveyance facilities would be slightly greater than those impacts described under Alternative 4 and would constitute adverse effects on existing visual character, on scenic vistas, would create new light or glare, and would substantially alter existing visual character. The discussion of Alternative 4 in Chapter 17, Section 17.3.3.9, addresses impacts on aesthetics and visual resources in the study area. The impacts on aesthetics and visual resources have the potential to disproportionately affect environmental justice populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of Environmental Commitments 3, 4, 6–12, 15, and 16

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-2D: Limit Construction to Daylight Hours within 0.25 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

The changes in the visual character of the study area that could affect minority and low-income communities under Alternative 2D would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. As described in detail under Alternative 4, changes in the visual character of the study area would occur as a result of the following:

- Landscape scars left behind from spoil borrow and RTM areas, transmission lines, concrete batch plants and fuel stations, and launching, retrieval, ventilation shafts sites.
- Constructing industrial facilities (i.e., Sacramento River intakes, intermediate forebay, expanded Clifton Court Forebay and pumping plant) in the study area.

The change in visual character as a result of the construction of the water conveyance facilities would be evident from the communities of Walnut Grove, Clarksburg, and Hood as well as rural residences located along the entire alignment. Because of the concentration of minority and low-income populations in these communities as well as along the entire alignment, a change in visual character of the study area would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse.

Similar to Alternative 4, implementing conservation and stressor reduction measures as part of Alternative 2D, would result in impacts on the study area's visual quality and character. However because the precise location of the conservation and stressor reduction measures are unknown, this impact is not carried forward for further analysis of environmental justice effects.

Cultural Resources

The potential impact on minority and low-income communities associated with changes to cultural resources Alternative 2D would be the same as described for Alternative 4, but with slightly greater magnitude due to construction of two additional intakes. The discussion of Alternative 4 in Chapter 18, Section 18.3.5.9, addresses cultural resources in the study area. The impacts on cultural resources have the potential to disproportionately affect minority or low-income populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Environmental Commitments on Cultural Resources

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

The impact that the loss of cultural resources from within the study area could have on minority and low-income populations under Alternative 2D would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of greater magnitude due to construction of two additional intakes. As discussed in greater detail under Alternative 4 of Chapter 18, *Cultural Resources*, the loss or damage to prehistoric cultural resources would result in a disproportionate effect on Native American populations and potentially other minorities. Despite the required mitigation measures and Native American consultation processes, construction of Alternative 2D is likely to result in adverse effects on prehistoric archaeological resources and human remains because the scale of the construction activities makes avoidance of all eligible resources infeasible. The effect on minority populations that may ascribe significance to cultural resources in the Delta would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse because the effect would disproportionately accrue to a minority population.

Public Services and Utilities

The potential impact on minority and low-income communities associated with changes to the availability of public services and utilities under Alternative 2D would be the same as described for Alternative 4, but of greater magnitude due to construction of two additional intakes. The discussion of Alternative 4 in Chapter 20, Section 20.3.3.9, addresses potential effects on utility infrastructure and public service providers, such as fire stations and police facilities. The following adverse effects on public services and utilities are relevant to the analysis:

Impact UT-6: Effects on Regional or Local Utilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-8: Effects on Public Services and Utilities as a Result of Implementing the Proposed Environmental Commitments 3, 4, 6–12, 15, and 16

The impacts on public services and utilities located within the study area that could disproportionately affect minority and low-income populations under Alternative 2D would be the same as indicated disclosed under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of greater magnitude due to construction of two additional intakes under Alternative 2D. Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 2D would require relocation of regional power transmission lines and natural gas pipelines. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified,

and that some service disruption associated with inadvertent damage would occur, this impact would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility, this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-8, describes the potential consequences of conservation measures (called Environmental Commitments under Alternative 2D) on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with Environmental Commitments) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of Environmental Commitments.

Noise

The potential impact on minority and low-income communities associated with noise occurring under Alternative 2D would be the same as described for Alternative 4, but of greater magnitude due to construction of two additional intakes. The discussion of Alternative 4 in Chapter 23, Section 23.4.3.9, of the Draft EIR/EIS identifies the following adverse effects associated with new sources of noise and vibration that would be introduced into the study area under Alternative 4. The following adverse effects and mitigation measure are relevant to this analysis.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Environmental Commitments 3, 4, 6–12, 15, and 16

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

The impacts of noise and vibration generated during construction of the water conveyance facilities and resulting effects on minority and low-income communities occurring under Alternative 2D would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. However, impacts would be of greater magnitude under Alternative 2D because of construction of two additional intakes. As discussed in greater detail under Alternative 4, constructing the water conveyance facilities would generate noise in exceedance of daytime and nighttime noise standards in areas zoned as sensitive land uses including residential, natural/recreational, agricultural residential, and schools. Similarly, groundborne vibration from impact pile driving would exceed vibration thresholds in areas zoned for residential, including agricultural residential. This effect of noise and vibration generated during construction would remain adverse after application of mitigation. Because the alignment of the water conveyance facility is proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur it is expected that generation of noise and vibration in exceedance of thresholds would result in a potentially disproportionate effect on minority and low-income populations.

Impacts of implementing conservation and stressor reduction components (Environmental Commitments 3, 4, 6, 7, 9–12, 15, and 16) under Alternative 2D would be expected to be similar to impacts of implementing CM2–CM11 under Alternative 4. However, because fewer acres would be restored under Alternative 2D, it is expected that noise and vibration generated would be less when compared to Alternative 4. Nevertheless, it would be difficult to analyze potential disproportionate effects on environmental justice population because similar to CM3–CM11, the location of the conservation and stressor reduction components are not known. However, because of the distribution of minority and low-income populations in the study area, there is a potential for noise and vibration impacts to disproportionately affect these populations.

Public Health

Chapter 25, *Public Health*, identifies the potential for construction, operation, and maintenance of Alternative 2D to mobilize or increase constituents known to bioaccumulate. Although Impact PH-3 is not considered adverse or significant in Chapter 25, because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population, they are discussed in this section.

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

The amount of habitat restoration completed under Alternative 2D would be substantially less than under Alternative 4. Five intakes would be constructed and operated under Alternative 2D. Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. The effects of Alternative 2D on pesticide levels in surface waters upstream of the Delta, in the Delta, and in the SWP/CVP Export Service Areas relative to Existing Conditions and the No Action Alternative (ELT) would be similar to or slightly less than those described for the Alternative 4. Alternative 2D would not result in increased tributary flows that would mobilize organochlorine pesticides in sediments.

If mercury is sequestered in sediments at water facility construction sites, it could become suspended in the water column during construction activities, opening up a new pathway into the food chain. Construction activities (e.g., pile driving and cofferdam installation) at intake sites or barge landing locations would result in a localized, short-term resuspension of sediment and an increase in turbidity that may contain elemental or methylated forms of mercury. Please see Chapter 8, Section 8.1.3.9, *Mercury,* for a discussion of methylmercury concentrations in sediments.

Changes in methylmercury concentrations under Alternative 2D are expected to be small. As described in Chapter 8, *Water Quality,* the greatest annual average methylmercury concentration for drought conditions under Alternative 2D would be 0.166 ng/L for the San Joaquin River at Buckley Cove, which would be slightly lower than the No Action Alternative (ELT) (0.168 ng/L). Fish tissue estimates show only small or no increases for mercury concentrations relative to the No Action Alternative (ELT) based on long-term annual average concentrations in the Delta. Mercury concentrations in fish tissue expected for Alternative 2D (with Equation 1), show increases of 9 percent or less, relative to the No Action Alternative (ELT), in all modeled years. Mercury concentrations in fish tissue expected for Alternative 2D (with Equation 2), are estimated to 13 percent at Staten Island relative to the No Action Alternative (ELT), in all modeled years. See Appendix 8I, *Mercury*, for a discussion of the uncertainty associated with fish tissue estimates of mercury.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 2D would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large, this effect would be disproportionate on those populations for Alternative 2D. This effect would be adverse.

Summary of Environmental Justice Effects under Alternative 2D

Alternative 2D would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, air quality, and public health effects. Mitigation and environmental commitments are available to

reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

28.5.4.4 Alternative 5A—Dual Conveyance with Modified Pipeline/Tunnel and Intake 2 (3,000 cfs; Operational Scenario C)

Some of the resource topics were not considered in the assessment of disproportionate impacts on minority or low-income populations. For the reasons described in Section 28.5.3.1, *Issues Not Analyzed in Detail*, these resources were also not evaluated as part of the Alternative 5A environmental justice impact assessment. The resource topics not evaluated for a disproportionate impact on minority or low-income populations are geology and seismicity, hazards and hazardous materials, mineral resources, water supply, surface water, groundwater, water quality, soils, fish and aquatic resources, terrestrial biological resources, agricultural resources, recreation, transportation, energy, and paleontological resources.

Land Use

The potential impacts on minority and low-income populations resulting from changes in land use for Alternative 5A would be similar to those described for Alternative 4. The discussion of Alternative 4 in Chapter 13, *Land Use*, Section 13.3.3.9, identifies effects caused by incompatibility with local land uses, potential for physical division of established communities, and incompatibility with land use policies, By itself, incompatibility with land use policies is not a physical effect on the environment, and, therefore, does not have the potential to result in a disproportionate effect on a minority or low-income populations. Chapter 13, Section 13.3.3.9, also addresses the potential for an alternative to result in the relocation of residents, or a physical effect on existing structures, with the consequence that adverse effects on the physical environment would result. The following adverse effects are relevant to this analysis:

Impact LU-2: Conflicts with Existing Land Uses as a Result of Constructing the Proposed Water Conveyance Facility

Impact LU-3: Create Physical Structures Adjacent to and through a Portion of an Existing Community as a Result of Constructing the Proposed Water Conveyance Facility

The extent of land use changes attributable to construction of Alternative 5A that could affect minority and low-income populations would be the same as disclosed for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of slightly less magnitude due to construction of only one intake under Alternative 5A. As for Alternative 4, construction and operation of physical facilities for water conveyance would create temporary or permanent conflicts with existing land uses (including displacement of existing structures and residences) because of the construction of permanent features of the facility. Under Alternative 5A, approximately 61 permanent structures would be removed or relocated within the water conveyance facilities footprint, including an estimated 13 residential buildings. The analysis of physical effects on structures in Chapter 13, *Land Use*, Section 13.3.3.9, indicates that the physical footprints of the intake facilities and their associated conveyance pipelines would be anticipated to create the largest disruption to structures. Chapter 13, *Land Use*, Section 13.3.3.2, Table 13-4, summarizes the estimated number of structures affected across structure type and alternative, and Mapbook Figure M13-4 in Chapter 13 shows the distribution of these effects across the modified pipeline/tunnel conveyance alignment.

As discussed in detail under Alternative 4, a disproportionate effect on minority populations would occur because construction of Intake 2 would result in the displacement of residential structures and permanent structures within census blocks where the minority population is greater than 50%. When required, DWR would provide compensation to property owners for property losses due to implementation of the alternative. Compensation would reduce the severity of economic effects related to this physical effect but would not reduce the severity of the physical effect itself. For these reasons, this would be an adverse effect.

In addition, Chapter 13, *Land Use,* Section 13.3.3.9, examines the potential to divide existing communities. A tunnel carrying water south from Intake 2 to the intermediate forebay would be placed under the community of Hood. The tunnel would be constructed below the surface and would not interfere with the existing community; therefore, the alignment would not create a physical structure adjacent to or through the existing community. While construction activities for Intake 2 and the intermediate forebay would occur in the relative proximity of the community of Hood, the community would not be crossed by these facilities. Although permanent physical structures adjacent to or through Hood are not anticipated to result from this alternative, activities associated with construction of Intake 2 could increase road traffic around Hood in certain areas for a limited period of time. Mitigation Measures TRANS-1a and TRANS-1b are available to address this effect. However, permanent structures in the community's vicinity constitute an adverse effect.

Socioeconomics

The potential impact on minority and low-income communities associated with changes in socioeconomic conditions for Alternative 5A would be the same as described for Alternative 4, but of slightly less magnitude due to construction of only one intake. The discussion of Alternative 4 in in Chapter 13, *Land Use*, Section 13.3.3.9, identified effects on regional economics and local employment conditions associated with constructing and operating the water conveyance facility and implementing conservation measures (called Environmental Commitments under Alternative 5A). These impacts have the potential to disproportionately affect environmental justice populations. The following adverse effects are relevant to this analysis:

Impact ECON-1: Temporary Effects on Regional Economics in the Delta Region during Construction of the Proposed Water Conveyance Facilities

Impact ECON-7: Permanent Regional Economic Effects in the Delta Region during Operation and Maintenance of the Proposed Water Conveyance Facilities

Land use changes that could affect minority and low-income populations for Alternative 5A would be the same as indicated for Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of slightly less magnitude under Alternative 5A because of construction of only one intake. Construction employment is estimated to peak at 2,107 FTE jobs in year 3. Total employment (direct, indirect, and induced) would peak in year 12, at 7,528 FTE jobs. Conversely, adverse effects associated with agricultural employment would also be somewhat lower due to only one intake facility affecting agricultural land. Alternative 5A would result in 10 direct and 37 total agricultural jobs lost during construction. Permanent effects on regional economics during operation and maintenance of the proposed water conveyance facilities would be similar to those described under Alternative 4A, Impact ECON 7 in Chapter 16, *Socioeconomics*. Increased expenditures related to operation and maintenance of water conveyance facilities would be expected to result in a permanent increase in

regional employment and income, as presented in Table 16-22 in Chapter 16. The permanent removal of agricultural land following construction would have lasting negative effects on agricultural employment and income, as shown in Table 16-23. As discussed in greater detail under Alternative 4, because the majority of farm-related employment is represented by minority populations, including those of Hispanic origin, and potentially low-income, loss of agriculture land and loses of associated employment is expected to result in a disproportionate effect on minority populations. While a net increase in employment would occur during construction of the water conveyance facility, it is expected that most new construction jobs would not likely be filled by displaced agricultural workers because the skills required are not comparable. This effect would, therefore, remain adverse because job losses would disproportionately accrue to a minority population.

Aesthetics and Visual Resources

The potential impact on minority and low-income communities associated with changes in visual resources for Alternative 5A would be the same as described for Alternative 4, but of slightly less magnitude due to construction of only one intake. The discussion of Alternative 4 in Chapter 17, *Aesthetics and Visual Resources*, Section 17.3.3.9, addresses impacts on aesthetics and visual resources in the study area. The impacts on aesthetics and visual resources have the potential to disproportionately affect environmental justice populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact AES-1: Substantial Alteration in Existing Visual Quality or Character during Construction of Conveyance Facilities

Impact AES-2: Permanent Effects on a Scenic Vista from Presence of Conveyance Facilities

Impact AES-3: Permanent Damage to Scenic Resources along a State Scenic Highway from Construction of Conveyance Facilities

Impact AES-4: Creation of a New Source of Light or Glare That Would Adversely Affect Views in the Area as a Result of Construction and Operation of Conveyance Facilities

Impact AES-6: Substantial Alteration in Existing Visual Quality or Character during Implementation of Environmental Commitments 3, 4, 6, 7, 8–12, 15, and 16

Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible

Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors

Mitigation Measure AES-1c: Develop and Implement a Tunnel Work and Reusable Tunnel Material Area Management Plan

Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned

Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities

Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan

Mitigation Measure AES-5A: Limit Construction to Daylight Hours within 0.25 Mile of Residents

Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction

Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences

Mitigation Measure AES-6a: Underground New or Relocated Utility Lines Where Feasible

Mitigation Measure AES-6b: Develop and Implement an Afterhours Low-intensity and Lights off Policy

Mitigation Measure AES-6c: Implement a Comprehensive Visual Resources Management Plan for the Delta and Study Area

The changes in the visual character of the study area that could affect minority and low-income communities under Alternative 5A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of slightly less magnitude due to construction of only one intake. As described in detail under Alternative 4, changes in the visual character of the study area would occur as a result of the construction and location of Intake 2, the intermediate forebay, and expanded Clifton Court Forebay, resulting landscape effects left behind from spoil/borrow and RTM areas, the operable barrier and transmission lines.

The change in visual character as a result of the construction of the water conveyance facilities would be evident from the communities of Walnut Grove and Clarksburg, as well as rural residences located along the entire alignment. Because of the concentration of minority and low-income populations in these communities as well as along the entire alignment, a change in visual character of the study area would disproportionately affect these populations. For these reasons, although mitigation is available to reduce the severity of these effects, this effect would be adverse.

Similar to Alternative 4, implementing conservation and stressor reduction measures as part of Alternative 5A, would result in impacts on the study area's visual quality and character. However because the precise location of the conservation and stressor reduction measures are unknown, this impact is not carried forward for further analysis of environmental justice effects.

Cultural Resources

The potential impact on minority and low-income communities associated with changes to cultural resources Alternative 5A would be the same as described for Alternative 4, but of slightly less magnitude due to construction of only one intake. The discussion of Alternative 4 in Chapter 18, *Cultural Resources*, Section 18.3.5.9, addresses cultural resources in the study area. The impacts on cultural resources have the potential to disproportionately affect minority or low-income populations. The following adverse effects and mitigation measures are relevant to this analysis:

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Impact CUL-7: Effects of Environmental Commitments on Cultural Resources

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Mitigation Measure CUL-3: Implement an Archaeological Cultural Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains If Such Resources Are Discovered during Construction

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of CM2–CM21

The impact that the loss of cultural resources from within the study area could have on minority and low-income populations under Alternative 5A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives, but of slightly less magnitude due to construction of only one intake. As discussed in greater detail under Alternative 4, the loss or damage to prehistoric cultural resources would result in a disproportionate effect on Native American populations and potentially other minorities. Despite the required mitigation measures and Native American consultation processes, construction of Alternative 5A is likely to result in adverse effects on prehistoric archaeological resources and human remains because the scale of the construction activities makes avoidance of all eligible resources infeasible. The effect on minority populations that may ascribe significance to cultural resources in the Delta would remain disproportionate even after mitigation because mitigation cannot guarantee that all resources would be avoided, or that effects on affected resources would be reduced. For these reasons this effect would be adverse because the effect would disproportionately accrue to a minority population.

Public Services and Utilities

The potential impact on minority and low-income communities associated with changes to the availability of public services and utilities under Alternative 5A would be the same as described for Alternative 4, but of slightly less magnitude due to construction of only one intake. The discussion of Alternative 4 in Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, addresses potential effects on utility infrastructure and public service providers, such as fire stations and police facilities. The following adverse effects on public services and utilities are relevant to the analysis:

Impact UT-6: Effects on Regional or Local Utilities as a Result of Constructing the Proposed Water Conveyance Facilities

Impact UT-8: Effects on Public Services and Utilities as a Result of Implementing the Proposed Environmental Commitments 3, 4, 612, 15, and 16

The impacts on public services and utilities located within the study area that could disproportionately affect minority and low-income populations under Alternative 5A would be the same as indicated disclosed under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. However, impacts would be of lesser magnitude under Alternative 5A because of construction of only one intake. Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-6, describes the potential for construction of this conveyance alternative to conflict with existing utility facilities in some locations. Alternative 5A would require relocation of regional power transmission lines and natural gas pipelines. Further, construction could disrupt utility services from damage to previously unidentified utilities, or damage to a utility that could cause a public health hazard (e.g., gas line explosion). Mitigation Measures UT-6a, UT-6b, and UT-6c would require verifying utility locations prior to construction, and relocating them to avoid effects on utility operations and worker and public health and safety. However, because relocation and potential disruption of utility infrastructure would be required and because it is possible that not all utilities would be identified, and that some service disruption associated with inadvertent damage would occur, this impact

would be adverse. Depending on the location of service loss, minority or low-income populations might be affected. However, because relocation of an existing known utility would affect the entire service area of that utility, this effect would not be anticipated to result in a disproportionate effect on a minority or low-income population. In addition, inadvertent damage to or disruption of a previously unknown utility infrastructure would also not disproportionately affect a minority or low-income populations because it would affect the general population of the affected service area. This is not considered an adverse effect.

Chapter 20, *Public Services and Utilities*, Section 20.3.3.9, Impact UT-8, describes the potential consequences of conservation measures (called Environmental Commitments under Alternative 5A) on public services at a program-level of detail. The location and construction or operational details (i.e., water consumption and water sources associated with Environmental Commitments) for these facilities and programs have not been developed. Therefore, the need for new or expanded water or wastewater treatment facilities and the potential to disrupt utilities and service in the study area is unknown. Mitigation Measures UT-6a, UT-6b, and UT-6c would reduce the effects on utilities; however, because the effectiveness of these measures is unknown, this impact would be adverse. Because the effect topic analyzes these effects at a general level of detail, it is not amenable to analysis to determine if it would result in an effect on an environmental justice population. Project-level analysis of effects on environmental justice populations would be addressed as part of future environmental analysis for implementation of Environmental Commitments.

Noise

The potential impact on minority and low-income communities associated with noise occurring under Alternative 5A would be the same as described for Alternative 4, but of slightly less magnitude due to construction of only one intake. The discussion of Alternative 4 in Chapter 23, *Noise*, Section 23.4.3.9, of the Draft EIR/EIS identifies the following adverse effects associated with new sources of noise and vibration that would be introduced into the study area under Alternative 4. The following adverse effects and mitigation measure are relevant to this analysis.

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed Environmental Commitments 3, 4, 6, 7, 9, and 10

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

The impacts of noise and vibration generated during construction of the water conveyance facilities and resulting effects on minority and low-income communities occurring under Alternative 5A would be the same as indicated under Alternative 4 because the period of construction, construction methods, and design of the water conveyance facility would be similar for the two alternatives. However, impacts would be of slightly less magnitude under Alternative 5A because of construction of only one intake. As discussed in greater detail under Alternative 4, constructing the water conveyance facilities would generate noise in exceedance of daytime and nighttime noise standards in areas zoned as sensitive land uses including residential, natural/recreational, agricultural residential, and schools. Similarly, groundborne vibration from impact pile driving would exceed vibration thresholds in areas zoned for residential, including agricultural residential. This effect of noise and vibration generated during construction would remain adverse after application of mitigation. Because the alignment of the water conveyance facility is proximate to census blocks and block groups where meaningfully greater minority and low-income populations occur it is expected that generation of noise and vibration in exceedance of thresholds would result in a potentially disproportionate effect on minority and low-income populations.

Impacts of implementing conservation and stressor reduction components (Environmental Commitments 3, 4, 6, 7, 9–12, 15, and 16) under Alternative 5A would be expected to be similar to impacts of implementing CM2–CM11 under Alternative 4. However, because fewer acres would be restored under Alternative 5A, it is expected that noise and vibration generated would be less than under Alternative 4. Nevertheless, it would be difficult to analyze potential disproportionate effects on environmental justice population because similar to CM3–CM11, the location of the conservation and stressor reduction components are not known. However, because of the distribution of minority and low-income populations in the study area, there is a potential for noise and vibration impacts to disproportionately affect these populations.

Public Health

Chapter 25, *Public Health*, identifies the potential for construction, operation, and maintenance of Alternative 5A to mobilize or increase constituents known to bioaccumulate. Although Impact PH-3 is not considered adverse or significant in Chapter 25, because a potential bioaccumulation of constituents would be likely to significantly affect environmental justice populations more than the general population, they are discussed in this section.

Impact PH-3: Substantial Mobilization of or Increase in Constituents Known to Bioaccumulate as a Result of Construction, Operation or Maintenance of the Water Conveyance Facilities

The amount of habitat restoration completed under Alternative 5A would be substantially less than under Alternative 4. One intake would be constructed and operated under Alternative 5A rather than three under Alternative 4. Sediment-disturbing activities during construction and maintenance of the intake and other water conveyance facilities proposed near or in surface waters under this alternative could result in the disturbance of existing constituents in sediment, such as pesticides or methylmercury. The effects of Alternative 5A on pesticide levels in surface waters upstream of the Delta, in the Delta, and in the SWP/CVP Export Service Areas relative to Existing Conditions and the No Action Alternative (ELT) would be similar to or slightly less than those described for the Alternative 4. Alternative 5A would not result in increased tributary flows that would mobilize organochlorine pesticides in sediments.

If mercury is sequestered in sediments at water facility construction sites, it could become suspended in the water column during construction activities, opening up a new pathway into the food chain. Construction activities (e.g., pile driving and cofferdam installation) at intake sites or barge landing locations would result in a localized, short-term resuspension of sediment and an increase in turbidity that may contain elemental or methylated forms of mercury. Please see Chapter 8, Section 8.1.3.9, *Mercury,* for a discussion of methylmercury concentrations in sediments.

Changes in methylmercury concentrations under Alternative 5A are expected to be small. As described in Chapter 8, *Water Quality,* the greatest annual average methylmercury concentration for drought conditions under Alternative 5A would be 0.169 ng/L for the San Joaquin River at Buckley Cove, which would be slightly higher than the No Action Alternative (ELT) (0.168 ng/L). Fish tissue estimates show only small or no increases for mercury concentrations relative to the No Action Alternative (ELT) based on long-term annual average concentrations in the Delta. Mercury concentrations in fish tissue expected for Alternative 5A (with Equation 1), show increases of 5 percent or less, relative to the No Action Alternative (ELT), in all modeled years. Mercury concentrations in fish tissue expected for Alternative 5A (with Equation 2), are estimated to be <1 percent relative to the No Action Alternative (ELT), in all modeled years. Because these increases are relatively small, and because it is not apparent that substantive increases are expected throughout the Delta, these estimated changes in mercury concentrations in fish tissue under Alternative 5A are expected to be within the uncertainty inherent in the modeling approach and would not likely be measureable in the environment. See Appendix 8I, *Mercury*, for a discussion of the uncertainty associated with fish tissue estimates of mercury.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the EPA reference dose of 7 µg per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).

The associated increase in human consumption of mercury caused by implementation of Alternative 5A would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 5A. This effect would be adverse.

Summary of Environmental Justice Effects under Alternative 5A

Alternative 5A would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, air quality, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

28.5.5 Cumulative Analysis

There is a potential for disproportionate effects on minority and low-income populations to occur in the study area as a result of past, present, and reasonably foreseeable future projects due to the concentration of minority and low-income populations in the study area (see Figures 28-1 and 28-2). It is expected that some disproportionate effects on environmental justice populations could occur because of the concentration of such populations in the study area, even though it is assumed that reasonably foreseeable future projects would include typical design and construction practices to avoid or minimize potential adverse effects. Accordingly, this section analyzes the cumulative effect of the combined set of reasonably foreseeable projects and programs on environmental justice populations.

This cumulative effects analysis considers projects that could have the potential to result in disproportionately high and adverse effects on minority and low-income populations through a two-step analysis. This section first summarizes the cumulative context of environmental justice effects, including the contribution of the project. This section then analyzes the contribution of the project to determine if this contribution is cumulatively considerable in relation to the context.

Table 28-4 below lists projects that have the potential to result in disproportionate effects on minority and low-income populations in the study area, and particularly within the geographic scope of effects identified in this chapter (e.g., areas of heavy construction associated with the intakes, pipeline/tunnel, and other features). Since the time of the Draft EIR/EIS notice of preparation in 2009, additional projects that could combine with the action alternatives to contribute to cumulative impacts on low-income and minority populations have been determined to be reasonably foreseeable or probable; they have been added to Table 28-4.

Table 28-4. Environmental Justice Effects of Plans, Policies, and Programs Considered for Cumulative Analysis

Agency	Program/ Project	Status	Description of Program/Project	Environmental Justice Effects
California High Speed Rail Authority	The Altamont Corridor Rail Project	Planning; Alternative Analysis	Project would provide a dedicated passenger rail connection between northern San Joaquin Valley and the San Francisco Bay Area via the Altamont Pass.	Current alternative alignments are located west of Interstate 5 in Stockton and near Tracy. Has the potential to affect environmental justice communities in the urban areas of Stockton, rural areas, and in Tracy—outside the construction impact areas for project.
Freeport Regional Water Authority and Bureau of Reclamation	Freeport Regional Water Project	Project was completed late 2010. Estimated completion of water treatment plant in 2012	Project includes an intake/pumping plant near Freeport on the Sacramento River and a conveyance structure to transport water through Sacramento County to the Folsom South Canal	No environmental justice effects identified as a result of the project
Bureau of Reclamation	Delta-Mendota Canal/California Aqueduct Intertie	Program under development. Final EIS/EIR in 2009. Record of Decision in 2009	The purpose of the intertie is to better coordinate water delivery operations between the California Aqueduct (state) and the Delta-Mendota Canal (federal) and to provide better pumping capacity for the Jones Pumping Plant. New project facilities include a pipeline and pumping plant	No environmental justice effects identified as a result of the project
Bureau of Reclamation, California Department of Water Resources	South Delta Improvements Program	Ongoing program. Final EIR/EIS 2006	Project to increase water levels and improve circulation patterns and water quality while improving operational flexibility of the State Water Project	No environmental justice effects identified as a result of the program

Agency	Program/ Project	Status	Description of Program/Project	Environmental Justice Effects
California Department of Water Resources	Temporary Barriers Project 2001–2007	Mitigated Negative Declaration 2000	Project to seasonally install up to three rock flow control structures and one rock fish control structure in south Delta channels at various times during a seven-year period (2001–2007), or until permanent flow control structures are constructed. Purpose is to protect San Joaquin salmon migrating through the Delta and provide an adequate agricultural water supply in terms of quantity, quality, and channel water levels to meet the reasonable and beneficial needs of water users in the South Delta Water Agency.	No environmental justice effects identified as a result of the project
	Suisan Marsh Habitat Management, Preservation, and Restoration Plan	Final EIS/EIR 2011	The plan is intended to balance the benefits of tidal wetland restoration with other habitat uses in Suisun Marsh by evaluating alternatives that provide a politically acceptable change in marsh-wide land uses, such as salt marsh harvest mouse habitat, managed wetlands, public use, and upland habitat.	No environmental justice effects identified as a result of the project
California Department of Water Resources and Bureau of Reclamation	In-Delta Storage Project	Currently under study	Water storage project that would inundate Webb Tract and Bacon Island and restore Holland Tract and Bouldin Island	The project would convert agricultural land to other uses.
California Department of Water Resources	Dutch Slough Tidal Marsh Restoration Project	Currently under study	Restoration 1,178 acre site located in the south Delta to tidal marsh habitat.	Land disturbing activities could disturb or destroy sensitive cultural resources.
California Department of Water Resources and Suisun Marsh Preservation Agreement agencies	Miens Landing Restoration	Currently under study	Restoration of duck clubs to tidal marsh.	Land disturbing activities could disturb or destroy sensitive cultural resources.
California Department of Water Resources	Cache Slough Area Restoration	Currently under study	Restoration of lands within the Cache Slough Complex located in the Delta	Land disturbing activities could disturb or destroy sensitive cultural resources. This project is examined as part of the BDCP alternatives and effects further described in the BDCP.

Agency	Program/ Project	Status	Description of Program/Project	Environmental Justice Effects
California Department of Water Resources	California Water Action Plan	Implementation phase	Provide assistance to disadvantage communities	Funding of projects within economically disadvantaged communities.
Delta Conservancy	California EcoRestore	Initiated in 2015	This program will accelerate and implement a suite of Delta restoration actions for up to 30,000 acres of fish and wildlife habitat by 2020.	Restoration actions could convert agricultural land to other uses.

28.5.5.1 Cumulative Effects of the No Action Alternative

The cumulative contribution of the No Action Alternative is not anticipated to result in disproportionately high and adverse effects on minority and low-income populations. Water operations in the Delta would continue to operate consistent with current practices. However, as described in Table 28-1, and the analysis of environmental justice effects under the No Action Alternative, some of the projects and environmental effects that would occur in the absence of the project will result in a disproportionate effect on minority and low-income populations.

The Delta and vicinity are within a highly active seismic area, with a generally high potential for major future earthquake events along nearby and/or regional faults, and with the probability for such events increasing over time. Based on the location, extent and non-engineered nature of many existing levee structures in the Delta area, the potential for significant damage to, or failure of, these structures during a major local seismic event is generally moderate to high. For major earthquakes along larger faults, ground rupture can extend for considerable distances (hundreds or thousands of feet). (See Appendix 3E, *Potential Seismic and Climate Change Risks to SWP/CVP Water Supplies,* for more detailed discussion) In instances of a catastrophic event due to climate change or a seismic event, there would also be a potential for adverse effect to a range of resource areas, some of which could result in a disproportionally adverse effect on minority or low-income populations, depending on the location or nature of such effects. Effects on agricultural employment following a catastrophic event would likely fall disproportionally on minority and low-income populations. Reclaiming land or rebuilding levees after a catastrophic event due to climate change or a seismic event would potentially occur near minority or low-income populations, potentially introducing adverse effects related to noise, traffic, or emissions. Such construction activities, along with the potential inundation caused by flooding as a result of a catastrophic event, could also disturb historic or prehistoric cultural resources that would affect minority populations that attach significance to these resources. While similar risks would occur under implementation of the action alternatives, these risks may be reduced by project-related levee improvements along with those projects identified for the purposes of flood protection in Table 28-4.

This review of existing plans, polices, and programs, including CEQA and CEQA/NEPA documents for those projects, revealed that the majority of plans and programs that form the cumulative context will not result in environmental justice effects. The primary reason for these conclusions is that they were able to avoid or minimize potential adverse effects. Because the cumulative context for the project includes the potential for disproportionate effects on minority and low-income populations it is necessary to examine the contribution of the action alternatives to this cumulative condition.

28.5.5.2 Concurrent Project Effects

Disproportionate impacts on low-income and minority populations within the Plan Area would occur during construction of the water conveyance water conveyance facilities under the action alternatives. These impacts are attributable to changes in land uses and resulting impacts on farm-related employment, changes in the visual character of the plan area that would affect the character of minority communities, loss or damage to cultural resources that could have disproportionate impact on Native Americans, disruption to public services provided to minority communities, changes in air quality and noise that could have a disproportionate effect on low-income and minority populations within the study area, and potential public health implications resulting from changes in the quality of water delivered to minority populations.

Most of the disproportionate impacts on low-income and minority populations identified above would occur as a result of constructing and operating the water conveyance facilities. However, disproportionate impacts on low-income and minority populations would resulting from changes in socioeconomic conditions, changes in air quality, and loss of cultural resources would also occur as CM2–CM4 and CM6–CM11 are implemented. The CMs, when combined with constructing the water conveyance facilities, would increase the likelihood that disproportionate impacts on low-income and minority communities would occur. These combined impacts include changes in farm-related employment as agricultural lands are converted to fish and wildlife habitat, air quality is further degraded and additional noise is generated during construction, additional sensitive cultural resources are damaged or destroyed.

28.5.5.3 Cumulative Effects of the Action Alternatives

As described in the environmental justice analysis in this chapter, implementation of the action alternatives would result in disproportionate effects on minority and low-income populations in the study area. These disproportionate impacts would occur as a result of changes in land use, employment, aesthetics and visual resources, cultural resources, public services and utilities, air quality and greenhouse emissions, noise, and public health effects. The following impact mechanisms were identified as contributors to potential disproportionate effects on these populations in the study area.

- Displacement of residences and residents as a result of construction of the proposed water conveyance facilities, and particularly from the construction of intake facilities.
- Physical division of an existing community as a result of constructing the proposed water conveyance facility.
- Changes in employment, including:
    - The loss of agricultural jobs from conversion of agricultural lands as a result of construction of the conveyance facilities and implementation of the habitat restoration measures.
    - The gain in construction jobs as a result of construction of the conveyance facility and implementation of the habitat restoration measures.
- Permanent visual effects as a result of construction (substantial alteration in existing visual quality or character) and operation (permanent effects on a scenic vista or scenic resources from presence of conveyance facility).

- Potential effects on identified and previously unidentified archaeological resources as well as built environment resources, especially sites containing human remains, that are of special significance to the Native American community, and other minority communities, as a result of construction of the conveyance facilities.
- Displacement of public service facilities and/or effects on regional or local utilities as a result of constructing the proposed water conveyance facilities or implementing habitat restoration measures.
- Exposure of sensitive receptors to PM2.5 during construction of the proposed water conveyance facilities (Alternatives 1B, 2B, and 6B) and implementation of the habitat restoration measures.
- Exposure of nearby receptors to noise levels, and groundborne vibration and noise, that exceed noise thresholds as a result of construction of the water conveyance facilities and implementation of the habitat restoration measures.
- Increases in bromide and DPBs at water bodies serving public water systems (the North Bay Aqueduct), with the potential for associated public health affects by populations consuming those waters, including a greater minority population.
- Increases in body burdens of mercury among fish Rock Slough and Franks Tract with the potential for an associated increase in mercury consumed by minority fishers performing subsistence fishing.

While the impact mechanisms are similar across the various action alternatives, there is a variation in the geographic scope of some of the effects depending on the conveyance alignment and its associated facilities and the number of intakes. However, each of the action alternatives would result in a disproportionate effect on minority and low-income populations. When combined with other cumulative projects presented in Table 28-4 the potential for disproportionate environmental effects on environmental justice communities would likely be greater than individual action alternatives. Therefore it is necessary to consider whether or not the contribution of the project is cumulatively considerable.

Consideration of the Magnitude of the Contribution Created by the Project Alternatives

As described above, project alternatives could result in a disproportionate impact on minority and low-income communities as a result of the loss of agricultural-related employment in combination with the large percentage of minority and low-income workers employed in this sector. While mitigation measures and environmental commitments are available to reduce this effect, the effect would remain disproportionate. In addition, because the project would result in the construction of facilities and infrastructure spanning the Delta, these effects would be distributed throughout the Delta and the constituent communities and environmental justice populations. For these reasons the project would result in a cumulative contribution to adverse effects on environmental justice populations in the Delta. Disproportionate impacts on low-income and minority populations would also occur under Alternative 4A because the impact mechanisms would be the same for constructing and operating the water conveyance facilities as Alternative 4. However, the impacts resulting from restoration actions under Alternative 4A are expected to be substantially less when compared to the other alternatives because fewer acres would be converted from agriculture to wildlife habitat.

This disproportionate change should be viewed in the context of total agricultural-related employment occurring within the study area. As described in Chapter 16, *Socioeconomics,* total agricultural employment in the Delta grew annually at a rate of 1.1% between 2006 and 2011,

reaching a high of 25,300 jobs in 2010 (see Table 16-8 in Chapter 16). The potential direct temporary loss of jobs within the agricultural sector resulting from the BDCP would range from a maximum of 90 jobs for Alternative 1B to a minimum of 10 jobs under Alternative 9. The potential permanent loss of jobs would range from a maximum of 117 jobs under Alternative 1B to a minimum of 13 under Alternatives 4s and 4A. These losses represent a very small proportion of employment within this sector. In addition, implementation of the habitat restoration measures would result in new employment opportunities within the study area. As an example, direct annual construction related employment is estimated to range from a minimum of 1,372 jobs under Alternative 5 to a peak of 6,279 jobs under Alternative 1B. Operation and maintenance-related employment is estimated to range from a peak of 200 jobs for Alternative 1B to a low of 129 jobs for Alternatives 4 and 4A. The additional projects summarized in Table 28-4 further reduce the cumulative contribution made by the action alternatives to the total disproportionate impact on low-income or minority communities because these projects would make an additional contribution to the overall negative disproportionate impact. As described in Section 28.2.2, *Low-Income Populations*, a higher proportion of low-income populations is present in construction (approximately 8%) and other services (approximately 5%), and approximately 99% of California farm laborers are Hispanic. Therefore, it can be assumed that some members of low-income and minority communities, likely those that would experience a loss of agricultural jobs, would be hired to help construct the habitat restoration features and in turn offset some of the adverse effect resulting from losses in the agricultural sector. In addition, Mitigation Measure AG-1, described in Chapter 14, *Agricultural Resources*, Section 14.3.3.2, would be available to reduce these effects by preserving agricultural productivity. The mitigation measure includes a broad program to offset the losses associated with construction of water conveyance facilities and restoration actions. The measures proposed under this program could benefit agricultural-related employment by offsetting the direct loss of agricultural lands and by providing employment opportunities associated with managing and maintaining restoration areas.

28.6 References

28.6.1 Printed References

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