Chapter 28
Environmental Justice

28.5 Environmental Consequences

28.5.3 Effects and Mitigation Approaches

28.5.3.1 Issues Not Analyzed in Detail

Resource Topics

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 below in Section 28.5.4.

Chapter 22 examines the potential for implementation of CM1 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 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 to 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 to low income and minority populations in specific locations. Therefore, effects from ROG and NO_X are not analyzed in this chapter.

28.5.8 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.

28.5.8.1 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, *Land Use*, 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 ~~81~~ 85 permanent structures would be removed or relocated within the water conveyance facilities footprint, including an estimated 19 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 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 19 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 ~~permanent~~ 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.

28.5.8.2 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 agricultural 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 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 of reduced export alternatives (6A, 6B, 6C, 7, and 8) on south-of-Delta areas are described in Chapter 30, *Growth Inducement and Other Indirect Effects,* Section 30.3.2. As described in Chapter 16, *Socioeconomics*, Section 13.3.3.9, 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, *Socioeconomics*, Section 13.3.3.9, Table 16-41. During the peak construction years, it is estimated that ~~3,937~~2,278 jobs (direct) and ~~16,029~~8,673 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 16 agricultural jobs~~/year~~ and a total loss of 57 agricultural jobs~~/year~~ (direct, indirect, and induced effects) (Chapter 16, *Socioeconomics*, Section 13.3.3.9, Table 16-42).

As described in Chapter 16, *Socioeconomics*, Section 13.3.3.9, Impact ECON-7, operation of conveyance facilities constructed under Alternative 4 would result in the direct creation of 129 jobs~~/year~~ and the creation of 183 jobs total (Chapter 16, *Socioeconomics*, Section 13.3.3.9, 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~~2~~ agricultural jobs~~/year~~ and a total of 39~~41~~ agricultural jobs~~/year~~ (including direct, indirect and induced effects) (Chapter 16, *Socioeconomics*, Section 13.3.3.9, 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 16 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~~/year~~ 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.

28.5.8.3 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–~~CM22~~CM21

Chapter 17, *Aesthetics and Visual Resources,* Section 17.3.3.9, Impact AES-6, analyzes the effect of the implementation of CM2–~~CM22~~CM21 on aesthetic and visual resources. This effect is 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 Spoil/Borrow 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 0.25 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

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~~, and~~ 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 ~~and,~~ 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 ~~pumping plants, surge towers, and~~ 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 ~~pumping stations and~~ 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 effectswould 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.

28.5.8.4 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 ~~Conservation Measures 2–22~~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 Cultural Resources Potentially Affected by 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 18.3.5.9, 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 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 because the effect would disproportionately accrue to a minority population.

28.5.8.5 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 is 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 is 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.

~~28.5.8.6 Air Quality and Greenhouse Gas Emissions~~

~~As discussed under Alternative 4, Chapter 22, *Air Quality and Greenhouse Gases*, Section 22.3.3.9 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 4 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 4 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.~~

~~28.5.8.7~~28.5.8.6 Noise

Chapter 23, *Noise,* Section 23.4.3.9, 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 ~~Conservation Measures~~ CM2~~–CM-2~~21

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, ~~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 23.3.3.9, 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 23.4.3.9, 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*). Although these mitigation measures and 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.

~~28.5.8.8~~28.5.8.7 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:

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.

~~This~~ Impact PH-2 would result in ~~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**

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. ~~s~~Sediment-disturbing activities during construction and maintenance of these intakes and other water conveyance facilities proposed near or in surface waters under this alternative~~Alternative 4~~ 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, Section 8.3.3.9, *Alternative 4—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 1–2, 3, and 5 [9,000 cfs; Operational Scenario H]*), 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 US Environmental Protection Agency 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,* 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 US 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 QA/QC 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 US Environmental Protection Agency 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 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 US 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 Measure 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 Measure 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.

~~28.5.8.9~~28.5.8.8 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.

28.6 References

28.6.1 Printed References

U.S. Department of Agriculture. 2014. Striving for Inclusion. Addressing Environmental Justice for Forest Service NEPA. Available: http://www.fs.fed.us/rmrs/docs/webinar-series/human-restoration/environmental-justice/nepa.pdf. Accessed: May 13, 2015.