Chapter 7
Land and Water Use, Social Issues, and Economics

This chapter provides environmental analyses relative to social parameters of the project area. Components of this study include a setting discussion, impact analysis criteria, project effects and significance, and applicable mitigation measures. This chapter is organized as follows:

- Section 7.1, Land and Water Use;
- Section 7.2, Social and Economic Conditions;
- Section 7.3, Utilities and Public Services;
- Section 7.4, Recreation Resources;
- Section 7.5, Power Production and Energy;
- Section 7.6, Visual/Aesthetic Resources;
- Section 7.7, Cultural Resources;
- Section 7.8, Public Health and Environmental Hazards;
- Section 7.9, Environmental Justice; and
- Section 7.10, Indian Trust Assets.

7.1 Land and Water Use

Introduction

This section describes the existing environmental conditions and the consequences of constructing and operating the project alternatives on land use and the availability of water for agricultural purposes. The primary concerns related to land and water use are incompatible land and water uses, conversion of farmland to nonagricultural use, and effects on existing agricultural operations.

Summary of Significant Impacts

There are no significant impacts on land and water use as a result of implementation of any of the alternatives.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- California Department of Conservation Farmland Mapping and Monitoring Program, Unpublished digital information for San Joaquin County, 2000;
- California Department of Water Resources Bulletin 132-01: Management of the California State Water Project, December 2002;
- California Department of Water Resources Bulletin 132-00: Management of the California State Water Project, December 2001;
- California Department of Water Resources Bulletin 132-99: Management of the California State Water Project, March 2001;
- California Department of Water Resources Bulletin 132-98: Management of the California State Water Project, November 1999;
- California Department of Water Resources Bulletin 132-97: Management of the California State Water Project, December 1998;
- Contra Costa County General Plan 1995-2010, July 1996;
- Response Plan for Water Level Concerns in the South Delta Under Water Rights Decision 1641, January 2002;
- San Joaquin County Development Title, 1997;
- San Joaquin County General Plan 2010 Review, March 2000;
- San Joaquin County General Plan 2010, July 1992, as amended; and
- site visits conducted on April 16, 2002, and July 1, 2003.

South Delta Region

The south Delta region consists primarily of agricultural lands within a network of waterways and levees. Farmers divert water from the Delta channels to irrigate crops. Diversion methods include siphons, pumps, and a tidal pump control structure at Tom Paine Slough (California Department of Water Resources and Bureau of Reclamation 1996a

Agricultural lands in the south Delta region are typically of high quality. (California Department of Conservation 2001a.) Farmland classes in the SDIP area are shown in Figure 7.1-1. Most lands are cultivated and are in agricultural production and produce high-value crops such as asparagus in addition to alfalfa, corn, cabbage, and other grain, hay, and field crops.

Approximately 160 pumps and siphons divert water to agricultural lands bordering Old River, Middle River, Grant Line Canal, and other channels in the south Delta. As a result of a 1982 lawsuit and settlement, temporary flow control barriers were installed on the Old River, Middle River, and Grant Line Canal to protect water surface elevations and local diversion capability.

Contra Costa County

The east county area of Contra Costa County is predominantly rural and includes agriculture, recreation, and open-space uses. Agriculture is the predominant land use in the east county area. Many of the Delta islands in the county, and the tracts adjacent to the Delta, currently produce dry-farmed grain and specialty crops suited to the soils and climate, such as asparagus (Contra Costa County 1996).

According to the 1998–2000 Farmland Mapping and Monitoring Program (FMMP) Farmland Conversion Report, approximately 20% of the 514,020 acres mapped in Contra Costa County was farmland, 33% was grazing land, 28% was urban and less than 1% was “other” land. The remaining 19% was classified as water.

Contra Costa County has adopted an Urban Limit Line; the Delta is outside the urban limit line because of flood hazards, soil subsistence, lack of infrastructure, and lack of services. The areas to the north and east are designated a special Delta Recreation and Resources area in the General Plan. The plan also designates Delta islands and nearby tracts as a special Delta Recreation and Resources area. The designation recognizes the location in the 100-year flood plain, limited public services, and the value of this area for agricultural uses, wildlife habitat, and low intensity recreation. (Contra Costa County 1996.) Portions of the Primary Zone are designated General Agriculture.

The county plan specifies allowable land uses within the East County area. This area includes: Holland, Palm, Orwood, and Coney Islands. Uses allowed

include: public and private outdoor recreation (including docks and marinas), equestrian facilities, wind energy systems, single-family residences on larger lots, quarries, oil and gas wells, pipelines and transmission lines, and public uses including airports, reservoirs, and landfills. Uses in the East County area, that also lie within the Primary Zone of the Delta, are required to be consistent with the goals, policies and provisions of the Delta Protection Commission's Land Use and Resource Management Plan for the Primary zone of the Delta. (Contra Costa County 1996.) There has been a great deal of suburban, residential development in the former agricultural lands in the Brentwood and Oakley areas along SR 4.

San Joaquin County

Of the 912,600 acres mapped by FMMP in San Joaquin County, approximately 70% was classified as farmland, 17% as grazing land, 8% as urban land, 5% as other land, and the remainder as water (Department of Conservation 2002a). In San Joaquin County, *other land* is a category that includes wetlands, low-density "ranchettes," and brush or timberlands unsuitable for grazing. (Department of Conservation 2002b.)

In 2001, 486,970 acres of San Joaquin County farmland were covered by the Williamson Act contract. (Department of Conservation 2002c.) San Joaquin County also provides Farmland Security Zones (FSZ) as another program to protect farmland. In 2001, 55,945 acres of farmland in San Joaquin County were protected through FSZ contracts. Of this total acreage, 47,313 acres were transferred from Williamson Act contracted land into FSZ contracts (in 1999) (Department of Conservation 2002b).

Local

The existing land uses at and adjacent to the SDIP project facilities are described below.

Head of Old River Gate at San Joaquin River

The predominant land use in the vicinity of the proposed head of Old River gate is agriculture. Land immediately north of the gate is identified as Agricultural Preserve and zoned Permanent Agricultural Extensive Land Use Zone, minimum parcel size 80 acres (AG-80). Land south of the gate is currently identified as Agricultural Preserve (San Joaquin County 2000) but is currently proposed for development.

Middle River at North Canal

Land use in the vicinity of the proposed Middle River gate is predominantly agricultural, with one residence located close to the south side of the proposed gate. Lands immediately north of, and south of, the gate are identified as FSZ and zoned AG-80 (San Joaquin County 2000).

Grant Line Canal at Delta-Mendota Canal

The predominant land use in the vicinity of the proposed Grant Line Canal gate is agriculture. Lands immediately north of, and south of, the gate are under Williamson Act contract and zoned AG-80 (San Joaquin County 2000).

Old River at Delta-Mendota Canal Gate

The predominant land use in the vicinity of the Old River at DMC gate is agriculture. The new town of Mountain House is being constructed south of the Old River levee in unincorporated San Joaquin County. Land use immediately north of and adjacent to the Old River at DMC gate site is under Williamson Act contract and zoned AG-80 (San Joaquin County 2000). South of the Old River at DMC gate site, the area is designated Medium–High Density Residential for residential and commercial development associated with Mountain House, and is zoned Agriculture–Urban Reserve, minimum parcel size 20 acres (AU-20) as an agricultural holding zone for future urbanization (San Joaquin County 2003).

West Canal

CCF and a levee are located along the west side of the West Canal. Land east of the West Canal (Coney Island) is in agricultural production and rural residential land uses. The west side of the West Canal is designated as Parks and Recreation according to the Contra Costa County General Plan, and the east side of the West Canal (Coney Island) is designated as Delta Recreation and Resources and as Agricultural Core (Contra Costa County 1996). Crops typically grown on Coney Island include safflower, alfalfa, grains, and hay (California Department of Water Resources 2003g).

Middle River

Land uses in the vicinity of the Middle River between the head of Middle River (at Old River) and its confluence with North Canal include agriculture and rural residential. Several residences are located along Wing Levee Road. Crops in this area include alfalfa, tomatoes, melons, squash, cucumbers, corn, grain, and hay. Many agricultural lands adjacent to Middle River are currently idle.

The area is designated as General Agriculture and is zoned Agriculture (San Joaquin County 1992). Most parcels adjacent to the Middle River are under Williamson Act contract, with some parcels under FSZ contract (San Joaquin County 2000).

Old River

Land uses in the vicinity of Old River include agriculture, rural residential, and recreation (marina) facilities. Crops cultivated in this area include asparagus, corn, beans, safflower, alfalfa, and grain and hay (California Department of Water Resources 2003g).

The dredging area is designated as General Agriculture in the San Joaquin County General Plan. In-channel islands are designated as Open Space. The area is zoned Agriculture (San Joaquin County 1992). Most parcels on the north side of Old River are under Williamson Act contract and zoned AG-80. Lands on the south side of Old River vary between Williamson Act contract and Agricultural Preserve designations, and are zoned primarily Permanent Agricultural Intensive Land Use Zone, minimum parcel size 40 acres (AG-40), with some AU-20 and Residential (San Joaquin County 2000).

Environmental Consequences

Assessment Methods

Land use impacts were assessed based on the compatibility of constructing and operating the project on adjacent land uses and the compatibility with local land use plans and policies. The assessment of the compatibility of the project with adjacent land uses was based on project site visits (April 16, 2002, and July 1, 2003) and review of aerial photographs. The project's compatibility with local land use plans and policies was assessed by reviewing the San Joaquin County General Plan (San Joaquin County 1992) and the Contra Costa County General Plan (Contra Costa County 1996).

The location and acres of farmland classes (e.g., prime, unique, and state and locally important farmland) in the project area were based on data provided by the Department of Conservation's Farmland Monitoring Program. San Joaquin County identifies all farmland that does not meet the state definitions for "prime," "statewide importance," or "unique," as "locally important." This designation includes land that is or has been used for irrigated pasture, dryland farming, confined livestock or dairy facilities, aquaculture, poultry facilities, and dry grazing. Contra Costa County identifies lands located in the Tassajara area, extending eastward to the county boundary and bordered on the north by the Black Hills; the Deer, Lone Tree, and Briones Valleys; the Antioch area; and the Delta as locally important farmland (Department of Conservation 2002a).

The SDIP includes the extension of agricultural diversions, the operation of flow control gates, and conveyance dredging as described in Chapter 2. Extending agricultural diversions and operating the flow control gates would ensure that changes in water levels do not affect the ability of the diversions to function properly. Consequently, the SDIP would not adversely affect the ability to divert water from Delta channels. The environmental effects of changing the amount of water exported south of the Delta is addressed in Section 5.1, Water Supply, and Chapter 9, "Growth-Inducing Impacts."

Regulatory Setting

Farmland Protection Policy Act

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to irreversible conversion of farmland to nonagricultural uses, and to ensure that federal programs are administered in a manner that would be compatible with state and local government and private farmland protection programs and policies. The FPPA directs federal agencies to consider the effects of federal programs or activities on farmland. The agencies are to consider alternative actions, as appropriate, that could lessen such adverse effects, and ensure that such federal programs, to the extent practicable, are compatible with state, local, and private farmland protection programs and policies.

California Land Conservation Act of 1965

The California Land Conservation Act of 1965 (Williamson Act) helps preserve agricultural and open space lands by discouraging conversion to urban uses. The act creates an arrangement whereby private landowners enter into a 10-year contract with counties and cities to maintain their land in agricultural and compatible open-space uses in exchange for a reduction in property taxes. The contract is automatically renewed each year for 1 additional year unless it is not renewed or cancelled.

1992 Delta Protection Act

The State's 1992 Delta Protection Act designates the Delta primary zone as an area for protection from intrusion of nonagricultural uses (Section 29703a) and establishes the Delta Protection Commission (DPC). In 1995, the DPC adopted its regional plan, *Land Use and Resource Management Plan for the Primary Zone of the Delta*.

Local

Contra Costa County

The Contra Costa County General Plan incorporates policies developed by the DPC under the Delta Protection Act. The General Plan allows construction of public facilities regardless of underlying General Plan or zoning designations. Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water."

San Joaquin County

The San Joaquin County General Plan includes the incorporation of policies developed by the DPC under the Delta Protection Act. The Community Development Section (IV) of the General Plan addresses protection of open space and natural resources. Section VI of the General Plan addresses the protection of resources, including agricultural lands. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

The proposed gate sites in San Joaquin County would be adjacent to areas designated General Agriculture (40-acre and 80-acre) and Open Space/Resource Conservation (Riparian Habitat, Significant Vegetation, and Mineral Resources) on the General Plan 2010 map of San Joaquin County. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit.

Because public water supply and treatment facilities are exempt from zoning requirements, as set forth in California Government Code Section 53091, the SDIP is not subject to the requirements of the Chapter 9 County Development Title, which serves as the County Zoning Code.

Significance Criteria

For the purposes of this analysis, impacts on land use are considered significant if implementation of the alternatives would:

- result in a substantial alteration of the present or planned land use patterns of an area, including physical disruption or division of an established community;
- conflict with adopted environmental plans and goals of local jurisdictions, or state or federal regulatory agencies, including general plans, community plans, and zoning; or
- convert a substantial amount of important farmland to nonagricultural use, or impair the agricultural productivity of important agricultural land.

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project-specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program. These programmatic mitigation measures are numbered as they appear in the ROD, and only those measures relevant to the SDIP resource area are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED programmatic mitigation measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

Agricultural Land and Water Use

1. Site and align Program features to avoid or minimize effects on agriculture.

3. Implement features that are consistent with local and regional land use plans.

20. In implementing levee reconstruction measures, work with landowners to establish levee reconstruction methods that avoid or minimize the use of agricultural land.

21. Work with landowners to establish levee subsidence BMPs that avoid effects on land use practices. Through adaptive management, further modify BMPs to reduce effects on agricultural land.

22. Implement erosion control measures to the extent possible during and after project construction activities. These erosion control measures can include grading the site to avoid acceleration and concentration of overland flows, using silt fences or hay bales to trap sediment, and revegetation areas with native riparian plants and wet meadow grasses.

23. Protect exposed soils with mulches, geotextiles, and vegetative ground covers to the extent possible during and after project construction activities in order to minimize soil loss.

25. When it appears that land within an agricultural preserve may be acquired from a willing seller by a state CALFED agency for a public improvement as used in Government Code Section 51920, advise the Director of Conservation and the local governing body responsible for the administration of the preserve of the proposal.

28. Dredged materials will be analyzed, dredged, and handled in accordance with permit requirements. Permits will incorporate mitigation strategies identified in Section 5.3, Water Quality, to prevent release of contaminants of concern.

30. Implement seepage control measures.

Alternative 1 (No Action)

As described in the affected environment section, the Middle River, Grant Line Canal, and Old River temporary barriers are currently installed on a yearly basis to raise water surface elevations upstream of the barriers, and the head of Old River barrier is installed to prevent fish migration into the south Delta. Implementing Alternative 1 would continue to provide the same level of diversion reliability to agricultural water diverters; no change relative to existing conditions is expected.

Under Alternative 1, statewide and federal programs to preserve open space and agricultural lands would continue to be implemented. The trend of land conversion from agricultural uses to urbanization and nonagricultural uses would likely continue.

Constructing and removing the temporary barriers require worker trips to and from the barriers sites and the use of heavy construction equipment. Because the temporary barriers are located on the waterside of the levees and access to the barrier sites is over existing roads, no impacts on farmland or other land uses at or adjacent to the temporary barriers would occur.

2020 Conditions

Under future no action conditions (2020 conditions) the SDIP would not be implemented. It is expected that the temporary barriers program would continue and that existing state and federal programs to preserve open space would remain in effect. It is expected that rates of conversion of land from agricultural to urbanization and nonagricultural uses would likely be similar to current trends, and that the land uses in the south Delta would be similar to those of today.

Alternatives 2A, 2B, and 2C

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact LW-1: Conflicts with Existing Land Uses as a Result of Constructing the Permanent Fish and Flow Control Gates. The proposed gate sites located in San Joaquin County would be constructed adjacent to, and partially within, areas designated General Agriculture (40-acre and 80-acre) and Open Space/Resource Conservation (Riparian Habitat, Significant Vegetation, and Mineral Resources) (San Joaquin County 2000). A 50,000-square-foot area adjacent to each of the gates would be acquired for dredge spoil disposal purposes. New access roads would also be constructed at three of the four gate sites. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

Construction of the fish control and flow control gates would not result in substantial changes in existing land uses. The effects on existing land uses at each gate site are described below.

Head of Old River Fish Gate

Constructing the head of Old River gate would result in the conversion of approximately 1.16 acres of agricultural land. This includes land required for operation and maintenance facilities and the 50,000-square-foot settling pond/runoff management basin adjacent to the gate. The footprint of the gate would not significantly affect adjacent land uses because it would be constructed primarily between the existing levees (refer to Figure 2-4b).

Access to the north side of the gate would be over an existing private roadway. Although the road would be widened to 16 feet and graveled, it would not require a wider easement. This road would be used primarily for maintenance purposes upon completion of construction. Cohen/San Joaquin Road would provide access to the south side of the gate. No improvements to this road would be required.

Middle River Flow Control Gate

Constructing the Middle River gate would result in the conversion of approximately 2.54 acres of agricultural land as a result of widening the levees to accommodate the new gate and constructing the settling pond/runoff management basin adjacent to the gate. Access to the Middle River gate would occur from both the north and south sides of the gate. No improvements to these access routes would be required.

Grant Line Canal Flow Control Gate

The Grant Line Canal gate would require conversion of approximately 10.7 acres of agricultural land as a result of setting back the north levee to accommodate the new gate and constructing operation and maintenance facilities, a settling pond/runoff management basin adjacent to the gate, and two new access roads. One access road would be 15,250 feet long by 16 feet wide and located on the north side of Grant Line Canal; the other access road would be 10,000 feet long by 16 feet wide and would be on the south side of Fabian and Bell Canal.

One seasonal residence is located in the median island between the Grant Line Canal and the Fabian and Bell Canal, approximately 300 yards from the location of the gate. No other residences are located in the vicinity of the gate. Construction and operation of the gate are not expected to affect this residence because of its distance from the gate.

Old River Flow Control Gate

The Old River at DMC gate would require conversion of up to 6 acres of agricultural land adjacent to the gate.

Access to the north and south sides of the Old River at DMC gate would be over existing private roads. These roads would be improved but would not require

additional right-of-way and would not result in the conversion of additional land. (California Department of Water Resources 2003b.)

As described above, no significant land use conflicts would result from the construction of the permanent operable gates because most land use conversions would occur immediately adjacent to the gates and would result in the conversion of only a small amount of farmland. A total of approximately 21 acres would be converted in the south Delta region. Land uses adjacent to and in the vicinity of the gates would not be affected during construction of the gates. This impact is less than significant. No mitigation is required.

Impact LW-2: Conversion of Important Farmland to Nonagricultural Use as a Result of Constructing the Permanent Fish and Flow Control Gates. Constructing the gates would result in the permanent conversion of approximately 20 acres of farmland classified as *prime*, and less than 1 acre classified as *unique* (Table 7.1-1). Estimated agricultural conversion under Alternatives 2A–2C is shown in Table 7.1-1. Conversion of farmland is estimated to range from 1.16 acres at the head of Old River gate to 10.7 acres at the Grant Line Canal gate.

Table 7.1-1. Agricultural Conversion Estimates (acres)

	Alternatives 2A–2C		Alternative 3B		Alternative 4B	
Farmland Category	Permanent Conversion of Farmlands—Gates	Temporary Conversion of Farmlands—Spoils Ponds	Permanent Conversion of Farmlands—Gates	Temporary Conversion of Farmlands—Spoils Ponds	Permanent Conversion of Farmlands—Gates	Temporary Conversion of Farmlands—Spoils Ponds
Prime	20.3		9.6		1.16	
Unique	0.045		0.045			
Total Farmlands	20.35	205	9.65	205	1.16	205

Placement of spoils ponds for channel dredging activities has not yet been determined. However, most lands in the vicinity of the channels are prime and unique.

Total important farmlands in San Joaquin County in 2001: 630,990.

Total irrigated farmlands in Contra Costa County in 2001: 55,904.

Source: California Department of Conservation 2000.

The 21 acres of land that would be removed from agricultural production as a result of implementation of Alternatives 2A–2C represent substantially less than 1% of the approximately 630,990 acres of important farmland in San Joaquin County (Department of Conservation 2002a). The 21 acres that would be converted by Alternatives 2A–2C would include 20.3 acres of prime farmland (as defined by the NRCS) and 0.045 acre of unique farmland.

A Farmland Conversion Impact Rating form, NRCS Form AD-1600, has been submitted to the NRCS for completion and review for consistency with FPPA (Appendix N). According to FPPA, if a project alternative site has an impact rating of less than 160 points, the site should be considered only minimally for protection, and no additional alternative project sites need to be evaluated. For

Alternatives 2A–2C to exceed the 160-point standard established on the Farmland Conversion Impact Rating Form, the NRCS would need to assign at least 73 points to the relative value of the land to be converted.

Factors considered by NRCS in the evaluation of the relative value of the land to be converted are: total acres of prime and unique farmland affected by the project; total acres statewide and local important farmland affected by the project; percentage of farmland in county or local government unit to be converted; and percentage of farmland in government jurisdiction with the same or higher relative value. Because the total acreage of prime, unique, and local important farmland that would be converted is approximately 21 acres, and the total acreage to be converted represents substantially less than 1% of the total important farmland in San Joaquin County, the NRCS has determined that the relative value of the land to be converted will be 68 points and would not significantly contribute to the irreversible conversion of farmland to nonagricultural uses or be inconsistent with FPPA.

Because the total acreage of lands to be converted from important farmland to nonagricultural use would be spaced apart over a large geographical area, the remaining farmlands would continue to be usable for agriculture, and the relative value of the land would not exceed the NRCS threshold, this impact is considered less than significant. No mitigation is required.

Impact LW-3: Conflict with Williamson Act and Farmland Security Zone Contract Lands as a Result of Constructing the Permanent Fish and Flow Control Gates. Under Alternatives 2A–2C, 17.8 acres of the 21 affected by Alternatives 2A–2C are subject to Williamson Act contracts; 2.54 acres are currently under FSZ contract. Certain uses are considered compatible uses of land under Williamson Act contracts (contracted lands), including agricultural, open space, and recreational uses, and uses determined by the agency administering the contract to be consistent with the intent of the Williamson Act. Uses of contracted land other than agricultural and open space uses are typically considered incompatible. Conversion to public facility uses would require Williamson Act and FSZ contracts to be terminated only for the portions of contracted land acquired for the SDIP.

A total of up to 20.3 acres of contracted land would be acquired for SDIP. Because the acquisition of lands for public facilities would result in the automatic termination of Williamson Act and FSZ contracts for the land area acquired, and the remaining lands within contracted parcels would remain under contract and viable for agricultural use, this impact is considered less than significant. No mitigation is required.

Impact LW-4: Incompatibility with Local Land Use Plans and Policies as a Result of Constructing and Operating the Permanent Fish and Flow Control Gates. Construction and operation of the permanent operable gates is exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances “shall not apply to the location or

construction of facilities for the production, generation, storage, or transmission of water." The proposed gates are not specifically identified as an allowable or conditional use according to the San Joaquin County Zoning Code; however, operation of the proposed gates would not be incompatible with the San Joaquin County zoning and General Plan designations. This impact is less than significant. No mitigation is required.

Dredging

Impact LW-5: Conflict with Existing Land Uses as a Result of Dredging in South Delta Channels. The proposed spoils pond sites in Contra Costa County and San Joaquin County would be constructed adjacent to the channel dredging areas, and in areas designated General Agriculture (80-acre) (San Joaquin County 2000). Under Alternatives 2A–2C, up to eight spoils ponds up to 80 acres each (total of 205 acres) would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

Dredging activities would occur entirely within the south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, and would therefore not conflict with existing land uses. However, the use of spoils ponds to dry the dredged material would result in the temporary conversion of approximately 205 acres of agricultural lands in San Joaquin County and Contra Costa County for approximately 5 years. Because the conversion of existing land use would be temporary, surrounding land uses would not change, and public water supply and treatment facilities are exempt from General Agriculture land use limitations, this impact is less than significant. No mitigation is required.

Impact LW-6: Incompatibility with Local Land Use Plans and Policies as a Result of Dredging in South Delta Channels. Dredging activities within south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, and the construction and use of up to eight spoils ponds, are exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water." Dredging activities and spoils ponds are not specifically identified as an allowable or conditional use according to the San Joaquin County Zoning Code; however, the proposed dredging and spoils ponds would not be incompatible with the San Joaquin County zoning and General Plan designations as they are a part of a water transmission program. Therefore, this impact is less than significant. No mitigation is required.

Impact LW-7: Temporary Conversion of Important Farmland to Nonagricultural Use from the Construction of Spoils Settling Ponds

for Channel Dredging. Dredging in south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, would result in the production of approximately 294,000 cubic yards (cy) of spoils material. The dredge spoils would be decanted in up to eight spoils ponds measuring up to 80 acres each; total combined acreage would be approximately 205 acres. The spoils ponds would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River.

Construction of the spoils ponds would occur within each 80-acre perimeter, using local soils as pond berms. The spoils ponds could be used several times over a period of up to 5 years. After the final use, the spoils ponds would be decommissioned, which would involve the complete excavation of remaining spoils, site leveling, and the return of the sites to as close to preproject conditions as possible.

The total acreage to be used by the project for spoils ponds, approximately 205 acres, for up to 5 years, is a considerable amount of farmland, and could be considered nonfarmland by the Department of Conservation's FMMP for up to three update cycles (6 years). However, because the spoils ponds are temporary facilities, would not result in permanent conversion of farmland to nonagricultural use, and would be returned to preproject conditions to the maximum extent practicable, this impact is considered less than significant. No mitigation is required.

Impact LW-8: Conversion of Important Farmland to Nonagricultural Use as a Result of Spoils Disposal from Channel Dredging. After the spoils from dredging south Delta channels are decanted in the spoils ponds, the spoils would be disposed of by either of two methods. Approximately 5% of the total spoils would be placed at sites on the land side of levees in the project area that are in need of additional reinforcing material. The second method of disposal proposed is the dispersal of approximately 95% of the spoils over farmlands adjacent to one or more of the project area channels.

The first method, levee reinforcement, would not involve disturbance to farmlands, would include CALFED Programmatic Mitigation Measure 20, and would therefore not result in the conversion of important farmland to nonagricultural use. Studies conducted during dredging in Old River for the ISDP conclude that the materials dredged were suitable for levee reinforcement purposes, under the 1997 State Water Board regulations (California Department of Water Resources 1997).

The remaining spoils, if suitable, would be spread up to 12 inches thick on farmlands in the south Delta. As described in the project description, the soils would be tested prior to any placement on farmland to ensure that the spoils would not adversely affect the composition of the farmland soils. Therefore, there would be no conversion of land resulting from the disposal of the spoils. This impact is considered less than significant.

2020 Conditions

Implementation of Alternatives 2A–2C under 2020 conditions would result in physical/structural component impacts similar to those described above. The south Delta region would remain primarily agriculture and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Implementation of the SDIP likely would allow for increases in water delivery and transfers south of the Delta. The reliability and availability of additional water in these areas may result in changes in land use. Because the exact locations and types of land use changes cannot be determined, the anticipated environmental effects of changing the amount of water exported south of the Delta is addressed in Section 5.1, Water Supply; Section 7.2, Social and Economic Conditions; and Chapter 9, "Growth-Inducing Impacts."

2020 Conditions

Implementation of Alternatives 2A–2C under 2020 conditions would result in operational component impacts similar to those described above. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Interim Operations

Interim operations would not result in the conversion or use of any land, as there would be no physical changes. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, there would be no impact, and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact LW-1: Conflicts with Existing Land Uses as a Result of Constructing the Permanent Fish and Flow Control Gates. Under Alternative 3B, the proposed head of Old River fish control gate and the Middle River and Old River at DMC flow control gates would be constructed adjacent to, and partially within, areas designated General Agriculture (40-acre and 80-acre) and Open Space/Resource Conservation (Riparian Habitat, Significant Vegetation, and Mineral Resources) (San Joaquin County 2000). A 50,000-square-foot area adjacent to each gate would be acquired for dredge spoils disposal purposes. New access roads would be constructed at two of the three

gate sites. Refer to Impact LW-1 under the analysis of Alternatives 2A–2C for the specific effects on existing land uses at the head of Old River, Middle River, and Old River at DMC gate sites. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

Construction of the fish control and flow control gates would not result in substantial changes in existing land uses. No significant land use conflicts would result from the construction of the permanent operable gates. Therefore, this impact is less than significant. No mitigation is required.

Impact LW-2: Conversion of Important Farmland to Nonagricultural Use as a Result of Constructing the Permanent Fish and Flow Control Gates. Under Alternative 3B, construction of the head of Old River fish control gate, and the Middle River and Old River at DMC flow control gates would affect an estimated 9.67 acres through the acquisition of land for the gates and for settling ponds/runoff management basins adjacent to each proposed gate. Acquiring this land for the proposed improvements would result in the conversion of important farmland that supports asparagus, alfalfa, grains, and hay crops to nonagricultural use (California Department of Water Resources 1993, 2003g). Individual acquisitions of portions of agricultural parcels would not exceed 6 acres and would average less than 1.6 acres. The remaining acreage in each parcel would remain viable for agricultural use.

The estimated 9.67 acres of land that would be removed from agricultural use by the SDIP represent substantially less than 1% of the 630,990 acres of irrigated farmland in San Joaquin County (Department of Conservation 2002a). The estimated 9.67 acres that would be converted by the proposed action would include 9.6 acres of prime farmland (as defined by the NRCS), and 0.05 acre of unique farmland.

A Farmland Conversion Impact Rating form, NRCS Form AD-1600, has been submitted to the NRCS for completion and review for consistency with FPPA (Appendix N). According to FPPA, if a project alternative site has an impact rating of less than 160 points, the site should be considered only minimally for protection, and no additional alternative project sites need to be evaluated. For Alternative 3B of the SDIP to exceed the 160-point standard established on the Farmland Conversion Impact Rating form, the NRCS would need to assign at least 68 points to the relative value of the land to be converted.

Factors considered by NRCS in the evaluation of the relative value of the land to be converted are: total acres of prime and unique farmland affected by the project; total acres statewide and local important farmland affected by the project; percentage of farmland in county or local government unit to be converted; and percentage of farmland in government jurisdiction with the same or higher relative value. Because the total acreage of prime, unique, and local important farmland is 8.3 acres, and the total acreage to be converted represents

substantially less than 1% of the total important farmland in San Joaquin County, the relative value of the land to be converted is below the 68-point threshold and would not significantly contribute to the irreversible conversion of farmland to nonagricultural uses or be inconsistent with FPPA.

Because the total acreage of lands to be converted from important farmland to nonagricultural use would be spaced apart over a large geographical area, the remaining farmlands would continue to be usable for agriculture, and the relative value of the land would not exceed the NRCS threshold, this impact is considered less than significant. No mitigation is required.

Impact LW-3: Conflict with Williamson Act and Farmland Security Zone Contract Lands as a Result of Constructing the Permanent Fish and Flow Control Gates. Under Alternative 3B, 7.06 acres affected by the SDIP are subject to Williamson Act contracts; 2.54 acres are currently under FSZ contract. Certain uses are considered compatible uses of land under Williamson Act contracts (contracted lands), including agricultural, open space, and recreational uses, and uses determined by the agency administering the contract to be consistent with the intent of the Williamson Act. Uses of contracted land for other than agricultural and open space uses are typically considered incompatible. Conversion to public facility uses would require Williamson Act and FSZ contracts to be terminated for the portions of contracted land acquired for the SDIP.

The SDIP would require terminating Williamson Act contract and FSZ protections for contracted lands acquired; however, contract protections would remain in place for the remaining portions of the affected parcels. A total of up to 9.6 acres of contracted land would be acquired for the SDIP. Because the acquisition of lands for public facilities would result in the automatic termination of Williamson Act and FSZ contracts for the land area acquired, and the remaining lands in contracted parcels would remain under contract and viable for agricultural use, this impact is considered less than significant. No mitigation is required.

Impact LW-4: Incompatibility with Local Land Use Plans and Policies as a Result of Constructing and Operating the Permanent Fish and Flow Control Gates. Construction and operation of the permanent operable gates is exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water." Therefore, implementation of the SDIP would not be incompatible with local plans and policies. This impact is less than significant. No mitigation is required.

Dredging

Impact LW-5: Conflict with Existing Land Uses as a Result of Dredging in South Delta Channels. The proposed spoils pond sites in Contra Costa County and San Joaquin County would be constructed adjacent to

the channel dredging areas and in areas designated General Agriculture (80-acre) (San Joaquin County 2000). Under Alternative 3B, up to eight spoils ponds measuring up to 80 acres each would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

Dredging activities would occur entirely within the south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, and would therefore not result in a conflict with existing land uses. However, the use of spoils ponds to dry the dredged material would result in the temporary conversion of approximately 205 acres of agricultural lands in San Joaquin County and Contra Costa County for approximately 5 years. Because the conversion of existing land use would be temporary, surrounding land uses would not change, and public water supply and treatment facilities are exempt from General Agriculture land use limitations, this impact is less than significant. No mitigation is required.

Impact LW-6: Incompatibility with Local Land Use Plans and Policies as a Result of Dredging in South Delta Channels. Dredging activities within south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, and the construction and use of up to eight spoils ponds, are exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water." Dredging activities and spoils ponds are not specifically identified as an allowable or conditional use according to the San Joaquin County Zoning Code; however, the proposed dredging and spoils ponds would not be incompatible with the San Joaquin County zoning and General Plan designations as they are a part of a water transmission program. Therefore, this impact is less than significant. No mitigation is required.

Impact LW-7: Temporary Conversion of Important Farmland to Nonagricultural Use from the Construction of Spoils Settling Ponds for Channel Dredging. Dredging in south Delta channels including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, would result in the production of approximately 294,000 cy of spoils material. The dredge spoils would be decanted in up to six spoils ponds measuring up to 80 acres each; total combined acreage would be approximately 205 acres. The spoils ponds would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River.

Construction of the spoils ponds would occur within each 80-acre perimeter, using local soils as pond berms. The spoils ponds could be used several times

over a period of up to 5 years. After the final use, the spoils ponds would be decommissioned, which would involve the complete excavation of remaining spoils, site leveling, and the return of the sites to as close to preproject conditions as possible.

The total acreage to be used by the project for spoils ponds, approximately 205 acres, for up to 5 years, is a considerable amount of farmland, and could be considered nonfarmland by the Department of Conservation's FMMP for up to three update cycles (6 years). However, because the spoils ponds are temporary facilities, would not result in permanent conversion of farmland to nonagricultural use, and would be returned to preproject conditions to the maximum extent practicable, this impact is considered less than significant. No mitigation is required.

Impact LW-8: Conversion of Important Farmland to Nonagricultural Use as a Result of Spoils Disposal from Channel Dredging. After the spoils from dredging south Delta channels are decanted in the spoils ponds, the spoils would be disposed of by one of two methods. Approximately 5% of the total spoils would be placed at sites on the landside of levees in the project area that are in need of additional reinforcing material. The second method of disposal proposed is the dispersal of approximately 95% of the spoils over farmlands adjacent to one or more of the project area channels.

The first method, levee reinforcement, would not involve disturbance to farmlands, would include CALFED Programmatic Mitigation Measure 20, and would therefore not result in the conversion of important farmland to nonagricultural use. Studies conducted during dredging in Old River for the ISDP conclude that the materials dredged were suitable for levee reinforcement purposes, under the 1997 State Water Board regulations (California Department of Water Resources 1997).

The remaining spoils, if suitable, would be spread up to 12 inches thick on farmlands in the south Delta. As described in the project description, the soils would be tested prior to any placement on farmland to ensure that the spoils would not adversely affect the composition of the farmland soils. Therefore, there would be no conversion of land resulting from the disposal of the spoils. This impact is considered less than significant. No mitigation is required.

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would result in impacts similar to those described above. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Implementation of the SDIP would likely allow for increases in water delivery and transfers south of the Delta. The reliability and availability of additional

water in these areas may result in changes in land use. Because the exact locations and types of land use changes cannot be determined, the anticipated environmental effects of changing the amount of water exported south of the Delta is addressed in Section 5.1, Water Supply; Section 7.2, Social and Economic Conditions; and Chapter 9, "Growth-Inducing Impacts."

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would result in impacts similar to those described above. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Alternative 4B

Stage 1 (Physical/Structural Component)

Fish Control Gate

Impact LW-1: Conflicts with Existing Land Uses as a Result of Constructing the Permanent Fish Control Gate. Under Alternative 4B, only the proposed head of Old River fish control gate would be constructed adjacent to, and partially within, lands designated AG-80 General Agriculture (80-acre) (San Joaquin County 2000). A 50,000-square-foot area adjacent to, and south of, the gate would be acquired for use as a settling pond/runoff management basin, and a new access road for maintenance would be constructed north of the gate. Approximately 1.16 acres of agricultural land would need to be acquired and converted to public facility use.

Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091.

Construction of the fish control gate would not result in substantial changes in existing land uses. No significant land use conflicts would result from the construction of the permanent operable gate. Therefore, this impact is less than significant. No mitigation is required.

Impact LW-2: Conversion of Important Farmland to Nonagricultural Use as a Result of Constructing the Permanent Fish Control Gate. Constructing the gate would result in the permanent conversion of approximately 1.16 acres of prime farmland to nonagricultural uses (Table 7.1-1). Because the remaining farmlands would continue to be usable for agriculture, and the relative value of the land would not exceed the NRCS threshold, this impact is considered less than significant. No mitigation is required.

Impact LW-3: Conflict with Williamson Act and Farmland Security Zone Contract Lands as a Result of Constructing the Permanent

Fish Control Gate. Under Alternative 4B, all of the acres affected are subject to Williamson Act contracts; none are currently under FSZ contract. Certain uses are considered compatible uses of land under Williamson Act contracts (contracted lands), including agricultural, open space, and recreational uses, and uses determined by the agency administering the contract to be consistent with the intent of the Williamson Act. Uses of contracted land other than agricultural and open space uses typically are considered incompatible. Conversion to public facility uses would require Williamson Act contracts to be terminated for the portions of contracted land acquired for the SDIP.

The SDIP would require terminating Williamson Act contract; however, contract protections would remain in place for the remaining portions of the affected parcels. A total of up to 1.16 acres of contracted land would be acquired for the SDIP. Because the acquisition of lands for public facilities would result in the automatic termination of Williamson Act contracts for the land area acquired, and the remaining lands in contracted parcels would remain under contract and viable for agricultural use, this impact is considered less than significant. No mitigation is required.

Impact LW-4: Incompatibility with Local Land Use Plans and Policies as a Result of Constructing and Operating the Permanent Fish Gate. Construction and operation of the permanent operable gate at the head of Old River is exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water." Therefore, implementation of SDIP would not be incompatible with local plans and policies. This impact is less than significant. No mitigation is required.

Dredging

Impact LW-5: Conflict with Existing Land Uses as a Result of Dredging in South Delta Channels. The proposed spoils pond sites in Contra Costa County and San Joaquin County would be constructed adjacent to the channel dredging areas and in areas designated General Agriculture (80-acre) (San Joaquin County 2000). Under Alternative 4B, up to eight spoils ponds measuring up to 80 acres each would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River. A new access road for maintenance purposes would be constructed north of the gate. Development in areas designated General Agriculture is restricted to agricultural and related uses; other uses generally would require a conditional-use permit. However, public water supply and treatment facilities are exempt from these requirements as set forth in California Government Code Section 53091. Because the conversion of existing land use would be temporary, surrounding land uses would not change, and public water supply and treatment facilities are exempt from General Agriculture land use limitations, this impact is less than significant. No mitigation is required.

Impact LW-6: Incompatibility with Local Land Use Plans and Policies as a Result of Dredging in South Delta Channels. Dredging activities within south Delta channels, including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, and the construction and use of up to eight spoils ponds, are exempt from the San Joaquin County Zoning Code pursuant to San Joaquin County policy. Furthermore, Government Code Section 53091 states that county zoning ordinances "shall not apply to the location or construction of facilities for the production, generation, storage, or transmission of water." Dredging activities and spoils ponds are not specifically identified as an allowable or conditional use according to the San Joaquin County Zoning Code; however, the proposed dredging and spoils ponds would not be incompatible with the San Joaquin County zoning and General Plan designations as they are a part of a water transmission program. Therefore, this impact is less than significant. No mitigation is required.

Impact LW-7: Temporary Conversion of Important Farmland to Nonagricultural Use from the Construction of Spoils Settling Ponds for Channel Dredging. Dredging in south Delta channels including Old River, Middle River, West Canal, Grant Line Canal, and Victoria and North Canals, would result in the production of approximately 294,000 cy of spoils material. The dredge spoils would be decanted in up to eight spoils ponds measuring approximately 80 acres each; total combined acreage would be approximately 205 acres. The spoils ponds would be located on farmlands adjacent to the dredging areas of West Canal and Middle River, and on the western end of Paradise Island next to Old River.

Construction of the spoils ponds would occur within each 80-acre perimeter, using local soils as pond berms. The spoils ponds could be used several times over a period of up to 5 years. After the final use, the spoils ponds would be decommissioned, which would involve the complete excavation of remaining spoils, site leveling, and the return of the sites to as close to preproject conditions as possible.

The total acreage to be used by the project for spoils ponds, approximately 205 acres, for up to 5 years, is a considerable amount of farmland, and could be considered nonfarmland by the Department of Conservation's FMMP for up to three update cycles (6 years). However, because the spoils ponds are temporary facilities, would not result in permanent conversion of farmland to nonagricultural use, and would be returned to preproject conditions to the maximum extent practicable, this impact is considered less than significant. No mitigation is required.

Impact LW-8: Conversion of Important Farmland to Nonagricultural Use as a Result of Spoils Disposal from Channel Dredging. After the spoils from dredging south Delta channels are decanted in the spoils ponds, the spoils would be disposed of by one of two methods. Approximately 5% of the total spoils would be placed at sites on the landside of levees in the project area that are in need of additional reinforcing material. The second method of

disposal proposed is the dispersal of approximately 95% of the spoils over farmlands adjacent to one or more of the project area channels.

The first method, levee reinforcement, would not involve disturbance to farmlands, would include CALFED Programmatic Mitigation Measure 20, and would therefore not result in the conversion of important farmland to nonagricultural use. Studies conducted during dredging in Old River for the ISDP conclude that the materials dredged were suitable for levee reinforcement purposes, under the 1997 State Water Board regulations (California Department of Water Resources 1997).

The remaining spoils, if suitable, would be spread up to 12 inches thick on farmlands in the south Delta. As described in the project description, the soils would be tested prior to any placement on farmland to ensure that the spoils would not adversely affect the composition of the farmland soils. Therefore, there would be no conversion of land resulting from the disposal of the spoils. This impact is considered less than significant. No mitigation is required.

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would result in impacts similar to those described above. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Implementation of Alternative 4B would likely allow for increases in water delivery and transfers south of the Delta. The reliability and availability of additional water in these areas may result in changes in land use. Because the exact locations and types of land use changes cannot be determined,the anticipated environmental effects of changing the amount of water exported south of the Delta is addressed in Section 5.1, Water Supply; Section 7.2, Social and Economic Conditions; and Chapter 9, “Growth-Inducing Impacts.”

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would result in impacts similar to those described above. The south Delta region would remain primarily agriculture, and similar amounts of land would be converted. Therefore, the impacts are less than significant, and no mitigation is required.

Cumulative Evaluation of Impacts

Cumulative impacts on Land and Water Use are analyzed in Chapter 10, “Cumulative Impacts.” This chapter also summarizes the other foreseeable future projects that may contribute to these impacts.

7.2 Social and Economic Conditions

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on social and economic conditions. Specifically, it evaluates and discusses the consequences associated with construction and operation of the project and recommends measures to mitigate significant impacts. Significance of impacts is determined by using significance criteria set forth in the State CEQA Guidelines.

The primary concerns related to social and economic conditions are effects on employment, housing, and businesses.

Summary of Significant Impacts

No significant impacts on social and economic conditions are expected to occur as a result of constructing or operating the SDIP. Social and economic impacts are discussed in detail in the Environmental Consequences section.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- California Department of Finance databases;
- California Department of Water Resources Bulletins;
- California Employment Development Department databases;
- United States Census Bureau databases; and
- United States Department of Agriculture, National Agricultural Statistics Service database.

Local Setting

This section describes the social and economic conditions in the counties that would be directly affected by constructing and operating the SDIP. These counties are San Joaquin, Contra Costa, and Alameda.

Population

Population is growing in San Joaquin, Contra Costa, and Alameda Counties because of lower housing costs (compared to the western San Francisco Bay Area), and a growing and diversifying economy in those counties (Table 7.2-1). Although the counties are growing, a significant portion of the population resides in unincorporated areas. By 2020, population in San Joaquin, Contra Costa, and Alameda Counties is expected to increase by 45%, 16%, and 21%, respectively.

Table 7.2-1. Population Trends in San Joaquin, Contra Costa, and Alameda Counties

	San Joaquin	Contra Costa	Alameda
Population total (January 1, 2003)	613,500	994,900	1,496,200
% increase since 1995	17.5	14.0	12.1
% increase since 2002	2.8	1.4	0.8
Expected population in 2020	887,600	1,152,900	1,811,800
Expected % increase in 2020	44.7	15.9	21.1
% in unincorporated areas (2003)	22	15.8	9.3

Employment

The employment rate in the three-county area has been fairly robust, given the slowdown in the computer and technology industry in the Bay Area. It appears that smaller and more diversified technology firms are moving into the counties to take advantage of more affordable rents and filling market niches. The unemployment rate in San Joaquin County is slightly higher than in Alameda and Contra Costa. The higher unemployment rate reflects seasonal employment attributable to the agriculture sector (Table 7.2-2). Overall, all three counties are expecting growth in jobs through 2006.

Table 7.2-2. Employment Trends in San Joaquin, Contra Costa, and Alameda Counties

	San Joaquin	Contra Costa and Alameda*
2002 civilian labor force	274,900	1,290,900
2002 unemployment rate (%)	10	6.1
% non-farm employment	92	99.7
Expected growth of non-farm employment (% from 1999 through 2006)	18.7	17.5

* Both Alameda and Contra Costa Counties are in the Oakland Metropolitan Statistical Area (MSA).

San Joaquin County

San Joaquin County is located in central California, to the east of the San Francisco Bay Area. The county has extensive transportation facilities in Stockton, an inland port: five railroads, one airport, and north-south and east-west interstates that provide timely transportation of passengers and goods. The county's gateway location and transportation facilitates will facilitate future employment growth in the service and industry sectors. Currently, services, government, and retail trade are the three largest industries (California Employment Development Department 2002a). Agriculture remains an important sector in San Joaquin County; it ranks sixth in production ($1.4 billion) for the state and supports dependent industries such as food processing, wholesale trade, and transportation (U.S. Department of Agriculture 2001).

Contra Costa County

Industrial activity in Contra Costa County is located near the western and northern borders with San Francisco, Suisun, and San Pablo Bays. Residential, commercial, and light industrial land uses are located more inland. The county's transportation network includes the San Francisco Bay Area Rapid Transit District (BART), attracting commercial and residential development (California Employment Development Department 2002b). The services industry dominates the Contra Costa County job base. Growth is expected to be concentrated in business (including high technology), health services (including biotechnology), manufacturing (food and clothing), and retail trade.

Alameda County

Employment in Alameda County is based on manufacturing, services, wholesale and retail businesses, and trade. Trade is expected to be a major growth industry in the future. The Emeryville-Alameda-Oakland area is a haven for businesses and business services looking for affordable office space, housing, and shorter commutes than into the western Bay Area (California Employment Development Department 2002c).

Housing and Income

Available housing in the three-county area is scarce. Affordable rentals and homes for sale, compared to the western Bay Area, are causing residents to relocate to San Joaquin, Contra Costa, and Alameda Counties (Table 7.2-3). The most affordable housing in the three-county area is in San Joaquin County.

Income in the three counties spans a somewhat wide range. San Joaquin County has the lowest median household and per capita incomes of the three counties.

Table 7.2-3. Housing Supply and Costs in San Joaquin, Contra Costa, and Alameda Counties

	San Joaquin	Contra Costa	Alameda
Housing units as of January 1, 2003	201,398	366,397	551,137
Single-family (% increase)	152,286 (30.7)	272,320 (19.0)	335,469 (12.0)
Multifamily (% increase)	39,760 (1.5)	86,386 (11.9)	208,018 (8.5)
Mobile homes	9,352	7,591	7,650
Average persons per household	3.1	2.8	2.7
% vacancy rate	< 4	2.92	3.0
% units in unincorporated areas	21.3	16.1	9.1
New housing unit permits issued (2000)	5,323	5,639	4,208
Median rent (2000)	$617	$898	$852
Median house sale price	$142,400	$267,800	$303,100
Median household income (1999)	$41,282	$63,675	$55,946
Per capita income	$23,242	$41,110	$38,624

San Joaquin County

Stockton, the county's largest city, had 42.7% of the housing units in 2003; Tracy, the second largest city, had 10.7%; and Manteca, the fourth largest city, had 9.5%. Rent and housing sales prices are likely to increase over time. The lower cost of living in San Joaquin County is still significant enough to induce residents from the San Francisco Bay Area to relocate and to attract new development to the Central Valley. The income trend is expected to increase as more people move into the county and as the county's economic base becomes more diversified.

Contra Costa County

The three most populous cities in Contra Costa County are Concord, Richmond, and Antioch, and their share of the county's total housing units is 12.4%, 9.9%, and 9.0%, respectively. Housing values are still reasonable compared to the western Bay Area counties. As Contra Costa County's industries diversify and grow, it is expected that income will rise as well.

Alameda County

Oakland is the county's largest city (with 29% of the housing units), followed by Fremont (12.8%), Hayward (8.5%), and Berkeley (8.5%). The median rent is the second highest in the three-county study area. Alameda County's median home sales price is the highest at 13% above Contra Costa County's home sales price and 113% above San Joaquin County's home sales price.

Regional Setting

The regional setting of the project includes much of the area served by the SWP. The 29 long-term water supply contractors of the SWP are organized into six service areas: Feather River, North Bay, South Bay, Central Coast, San Joaquin Valley, and Southern California. The service areas discussed below are the South Bay, Central Coast, San Joaquin Valley, and Southern California. It is expected that the service areas north of the project (Feather River and North Bay) will not be affected by the project.

This section provides general socioeconomic information for the SWP service areas affected by the project. The information is provided at the county level, although the service areas do not necessarily follow county boundaries. The county-level data are indicative of overall demographic and economic trends within the service areas. This section also provides information on water supply and demand for the SWP service areas potentially affected by the project.

South Bay Service Area

The South Bay service area includes the eastern portion of Alameda County and all of Santa Clara County. Although no part of the project is located in Alameda County, the project is close to the northeast county boundary. The water contractors in this service area are the Alameda County Flood Control and Water Conservation District, Zone 7 (serving all of East Alameda County), the Alameda County Water District, and the Santa Clara Valley Water District.

Alameda County borders San Francisco Bay on the Bay's eastern boundary and is one of the three counties in the local project area. Alameda is currently the second-most-populous Bay Area county. The county has a diverse economic and job base, including a major seaport, manufacturing, services, and wholesale and retail businesses. Trade is expected to be a major growth industry through 2006. Recent employment growth has been in engineering and management and other services sectors resulting from the arrival of technology firms to the county (California Employment Development Department 2002c). Agriculture is a small industry in Alameda compared to other counties receiving SWP allocations and consists mostly of ornamental nursery products, wine grapes, and cattle (U.S. Department of Agriculture 2001). The cost of land for development, housing, and office and retail space remains lower than the western Bay Area, thus attracting new residents and businesses to the central and eastern portions of the county.

Santa Clara County borders San Francisco Bay and Alameda County to the south. It is the most populous county in the Bay Area and has the highest median household income (California Department of Finance 2002a). The county's economic base is predominantly services and manufacturing. The unemployment rate started to rise sharply in 2001 and 2002 concurrent with the downturn in the technology industry, but despite the downturn, new jobs are expected to be created in computer-related fields (California Employment Development

Department 2002d). For an urbanized Bay Area county, Santa Clara's agricultural sector is strong, ranking twenty-third in the state. The major commodities are nursery crops, mushrooms, and cut flowers. The county historically has experienced a housing imbalance where housing values were too high for many people to live near their work.

In 2000, the South Bay service area received 195,583 acre-feet of SWP water deliveries (California Department of Water Resources 2002b). M&I water supply in the South Bay service area is limited, as it is in many California urban areas, constraining growth and forcing conservation practices. The 4.9% increase in annual water use includes water savings from conservation practices. Agriculture in this service area is unlikely to grow and, in fact, agricultural acreage may decrease in response to urban development pressures.

Central Coast Service Area

The Central Coast service area includes all of San Luis Obispo and Santa Barbara Counties. The water contractors in this service area are the San Luis Obispo County Flood Control and Water Conservation District and the Santa Barbara County Flood Control and Water Conservation District. The Central Coast water contractors did not receive their SWP entitlements until July 1997 when the Coastal Branch of the SWP was opened.

San Luis Obispo County's economy is based largely on tourism and education, resulting in a job base centered around services, government (local), and retail trade. San Luis Obispo County ranked seventeenth in agricultural production in 2001. The leading commodities were wine grapes, cattle and calves, broccoli, head lettuce, foliage plants, and cut flowers (U.S. Department of Agriculture 2001).

Santa Barbara County's economy comprises mainly services, retail trade, and government (education, federal prison, and Vandenberg Air Force Base). Smaller technology manufacturing and service firms have filled business niches left by downsizing in the aerospace and military sectors, helping to keep the unemployment rate down. The county ranked thirteenth in 2001 in agricultural revenue in California. The top commodities were wine grapes, broccoli, strawberries, head lettuce, and cauliflower (U.S. Department of Agriculture 2001). The decrease in agricultural water demand is attributed to farmland being converted to accommodate the predicted urban growth in San Luis Obispo and Santa Barbara Counties.

San Joaquin Valley Service Area

The San Joaquin Valley service area consists of all of Kings County and the western half of Kern County. The water contractors in this service area include the County of Kings, Castaic Lake Water Agency, Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency, and Tulare

Lake Basin Water Storage District. The service area also includes the Oak Flat Agricultural District, near Patterson in Stanislaus County.

Kings County is the seventh-fastest-growing county in California with Avenal, Hanford, and Lemoore leading the growth. Government, agriculture, services, and retail trade are the main industries in the county. Food processing and its sector of manufacturing are gaining in the county, diversifying the already-significant agricultural sector in the county. The unemployment rate appears high, but it is affected by seasonal fluctuations in agricultural employment. The county ranks twelfth in the state for agricultural production. Milk, cotton, cattle and calves, alfalfa, and turkeys are the leading commodities.

Kern County's fastest growing cities are Bakersfield, Delano, Ridgecrest, and Wasco. Historically, Kern County's economy has been supported by agriculture and petroleum production. It was California's fourth largest agriculture-producing county in 2001. The leading commodities were table grapes, citrus, milk, cotton and cottonseed, and almonds (U.S. Department of Agriculture 2001). Increasingly, Kern County's economy is diversifying into government (local and education), services, and value-added agriculture. Kern County has a transportation network that makes it appealing for companies looking for access to regional markets and distribution points. Similar to Kings County, seasonal unemployment in the agricultural sector raises the average unemployment rate.

The San Joaquin service area is one of the largest recipients of SWP water deliveries. In 2000, the service area received approximately 1.5 maf (California Department of Water Resources 2002b). A large portion of California's anticipated future growth is expected to occur in the Central Valley. The momentum of this predicted growth is based on demographic and migration trends; therefore, additional deliveries in SWP water will have only a minor, if any, impact on growth. Agriculture is expected to decline because of lack of water supply, urban development, and other environmental changes.

Southern California Service Area

The Southern California service area is the largest inland area and has the largest population. It encompasses almost all of Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties, and portions of Imperial and Ventura Counties[1]. There are 13 SWP contractors in the Southern California service area.

Southern California is the most populous region of the state; Los Angeles County is the most populated county, and Orange County is the second most populated. A total of 19,458,500 people lived in Los Angeles, Orange, San Diego, Riverside, and San Bernardino Counties in January 2003. This represents 55% of California's population. If the populations of Imperial and Ventura Counties are added, the population increases to 20,400,700, or 57% of the state population

[1] A small portion of Kern County is located in the Southern California service area; however, Kern County is discussed in the San Joaquin service area discussion.

(California Department of Finance 2003a). Growth is expected in the western portions of Riverside, San Bernardino, and Imperial Counties as people move away from the congested and relatively more expensive urban areas of Los Angeles, Orange, and San Diego Counties.

Environmental Consequences

Social and economic conditions may be affected in the project area during construction of the gates, dredging activities associated with project construction and operation, and the operation of the alternatives. These potential impacts are examined for the local project area (defined as San Joaquin, Contra Costa, and Alameda Counties) and for the South Bay, Central Coast, San Joaquin Valley, and Southern California SWP service areas.

Significance Criteria

Socioeconomic impacts were considered significant if construction and/or operation of the project alternatives would result in a substantial:

- increase in unemployment or decrease in personal income,
- change in the availability of housing, or
- disruption of local businesses.

Alternative 1 (No Action)

Under Alternative 1, the temporary barriers would continue to be installed, operated, and removed. The length of time the barriers are in place would not change, nor would employment and expenditures resulting from construction and operation of the barriers. Disruption of boating and associated effects on recreation-related businesses in the vicinity of the barriers would continue. In addition, the capacity of water conveyance facilities to transport water south of the Delta would not change.

No socioeconomic impacts are expected to occur in the local or export study areas because operation of the barriers and water conveyance facilities under the No Action Alternative would not change compared to existing conditions.

2020 Conditions

Under Future No Action conditions (2020 conditions), SDIP would not be implemented. It is expected that the temporary barriers program would continue to be implemented. It is also expected that no socioeconomic impacts would occur in the local or export study areas because operation of the barriers and water conveyance facilities under Future No Action conditions would not change compared to existing conditions.

Alternatives 2A, 2B, and 2C

Stage 1 (Physical/Structural Component)

Impact Soc-1: Temporary Increase in Employment and Income in the Local Area during Project Construction. The population of the local study area is estimated to increase by 192 people during construction. This increase includes construction workers and dependents that are expected to relocate to the area during the construction and dredging period. This would represent a very small increase in the study area population of approximately 3.1 million.

Construction of the gates and associated facilities would temporarily increase employment and personal income within the local study area. Employment during the construction period is estimated to increase by 210 jobs (Table 7.2-4). Total personal income associated with construction-related expenditures (salaries and purchases of equipment and supplies) is estimated to total $10.3 million (Table 7.2-5).

Table 7.2-4. Estimated Direct and Indirect/Induced Changes in Construction-Related Employment

	Employment		
Alternative	Direct	Indirect + Induced	Total
2A	140	70	210
2B	140	70	210
2C	140	70	210
3B	140	59	199
4B	120	48	168

The estimates of direct and indirect/induced changes in employment and income were evaluated based on the following estimated expenditures to construct the gates and dredge channels:

- construction would last up to 32 months,
- materials and supplies would constitute 50% of total construction costs,
- 6% of materials and supplies would be purchased locally, and
- 60% of construction workers would originate from the local study area.

Table 7.2-5. Estimated Direct and Indirect/Induced Changes in Personal Income Resulting from Construction-Related Expenditures

Alternative	Personal Income		
	Direct	Indirect + Induced	Total
2A	$6,950,727	$2,113,985	$9,064,712
2B	$6,950,727	$2,113,985	$9,064,712
2C	$6,950,727	$2,113,985	$9,064,712
3B	$5,438,743	$1,293,699	$6,732,422
4B	$3,801,600	$837,892	$4,639,492

The estimates of direct and indirect/induced changes in employment and income were evaluated based on the following estimated expenditures to construct the gates and dredge channels:

- construction would last up to 32 months,
- materials and supplies would constitute 50% of total construction costs,
- 6% of materials and supplies would be purchased locally, and
- 60% of construction workers would originate from the local study area.

Construction of the permanent gates and dredging activities would benefit the local economy by temporarily increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring within the local study area. Construction-related employment would represent a small fraction of total employment and personal income levels. The impact on employment is considered beneficial. No mitigation is required.

Impact Soc-2: Temporary Increase in Demand for Housing in the Local Area during Project Construction. The change in the demand for housing attributable to Alternatives 2A–2C is linked to the 192-person temporary increase in population. Assuming three persons per family, 64 housing units would be required to accommodate this expected temporary population increase. There are approximately 1,094,400 housing units, excluding motor homes, in the three-county area (California Department of Finance 2003b). Given the average county vacancy rate of 3.7%, there are about 40,500 vacant units in the area. The demand for the additional 64 units represents approximately 0.2% of the vacant units.

The change in vacancy rates attributable to the project would be very small, and the supply of available housing is not expected to change. This impact is less than significant. No mitigation is required.

Impact Soc-3: Disruption of Local Businesses as a Result of Construction of the Gates. No direct impacts on local business would occur because none are located at the sites of the permanent gates. Indirect effects on marinas located near the gates may occur during construction as a result of increasing travel times for boaters. DWR would continue to provide a system for

transporting boats around the construction site similar to the system used when the temporary barriers are in place. Although the transportation system may take slightly longer to transport boats around the construction site compared to the time required to transport boats around the temporary barriers, the additional time is not expected to substantially reduce the number of boats passing through the construction site. Boating opportunities and travel time to and from businesses would not substantially change during the construction period; therefore, there is not expected to be a substantial change in business activity related to boating or other water-dependent recreation activities. This impact is less than significant. No mitigation is required.

Impact Soc-4: Permanent Increase in Employment and Income in the Local Area during Project Operation. Seven jobs would be created as a result of operating the gates (Table 7.2-6). Total annual personal income generated by operation-related expenditures (salaries and purchases of equipment and supplies) is estimated to be $385,000 (Table 7.2-7).

Table 7.2-6. Estimated Direct and Indirect/Induced Changes in Employment Resulting from Operation-Related Expenditures

	Employment		
Alternative	Direct	Indirect + Induced	Total
2A	5	2	7
2B	5	2	7
2C	5	2	7
3B	4	2	6
4B	2	1	3

The estimates of direct and indirect/induced changes in employment and income were evaluated based on the following estimated expenditures to construct and operate the proposed gates:

- construction would last up to 32 months,
- materials and supplies would constitute 50% of total construction costs,
- 6% of materials and supplies would be purchased locally, and
- 60% of construction workers would originate from the local study area.

Table 7.2-7. Estimated Direct and Indirect/Induced Changes in Personal Income Resulting from Operation-Related Expenditures

Alternative	Personal Income		
	Direct	Indirect + Induced	Total
2A	$300,000	$85,000	$385,000
2B	$300,000	$85,000	$385,000
2C	$300,000	$85,000	$385,000
3B	$240,000	$68,000	$308,000
4B	$120,000	$34,000	$154,000

The estimates of direct and indirect/induced changes in employment and income were evaluated based on the following estimated expenditures to construct and operate the proposed gates:

- construction would last up to 32 months,
- materials and supplies would constitute 50% of total construction costs,
- 6% of materials and supplies would be purchased locally, and
- 60% of construction workers would originate from the local study area.

Operation of the permanent gates would benefit the local economy by increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring in the local study area. Permanent employment would represent a small fraction of the total employment and personal income levels. This impact is beneficial. No mitigation is required.

Impact Soc-5: Increase in Demand for Housing in the Local Area. No impact on the availability of housing in the study area is expected as a result of operating the gates. No increase in the demand for housing is expected because gate operators would be hired from the local area. No mitigation is required.

Impact Soc-6: Disruption of Local Businesses as a Result of Operation of the Gates. Operation of the gates is not expected to substantially affect marinas located near the gates. When the gates are operating, travel time for boats passing through the boat locks may be slightly longer than the time required to pass around the temporary barriers. Travel time trough the gates during off-season periods would not be affected because the gates would remain open. Although the time required to pass through permanent gates may be longer, the additional time is not expected to substantially reduce the number of boats navigating the waterways crossed by the gates. Boating opportunities would not change and travel time to and from local businesses would not substantially increase as a result of operating the permanent gates. Because boating opportunities in the affected waterways will be maintained, little change in business activity generated by boating or other water-dependent recreation is expected. This impact is less than significant. No mitigation is required.

2020 Conditions

Construction-related impacts on the local area resulting from implementation of Alternatives 2A–2C under 2020 conditions would be similar to those described above because construction activities would be similar to those proposed under existing conditions. Therefore, impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact Soc-7: Change in Economic Benefits in the SWP and CVP Service Areas as a Result of Increased Diversions. An evaluation of the M&I and agricultural economic benefits of changing water deliveries to the SWP and CVP service areas was conducted (Appendix O). The analysis concluded that annual M&I and agricultural water supply economic benefits attributable to Alternative 2A would total approximately $8.7 million and $9.5 million, respectively. Under Alternative 2B, M&I water benefits would decrease by $8.4 million and agricultural benefits would total $1.6 million. Annual M&I and agricultural water supply economic benefits attributable to Alternative 2C would total approximately $5.4 million and $4.4 million, respectively.

2020 Conditions

Operation-related impacts on the local area resulting from the implementation of Alternatives 2A–2C under 2020 conditions would be similar to those described above because operation would be the same as proposed under existing conditions. Therefore, impacts would be the same as described above.

Interim Operations

Interim operations would result in impacts on socioeconomics similar to those described for permanent operations of the SDIP. All impacts are less than significant, and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Impact Soc-1: Temporary Increase in Employment and Income in the Local Area during Project Construction. The population of the local study area is estimated to increase by 192 people during construction of the three gates. This increase includes construction workers and dependents that are expected to relocate to the local study area during the construction period. This would represent a very small increase in the study area population of approximately 3.1 million.

Construction of the gates and associated facilities would temporarily increase employment and personal income within the local study area. As shown in Table 7.2-4, employment during the construction period is estimated to increase by 199 jobs. Total annual personal income associated with construction-related expenditures (salaries and purchases of equipment and supplies) is estimated to total approximately $6.7 million (Table 7.2-5).

Construction of the permanent gates and associated facilities would benefit the local economy by temporarily increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring within the local study area. Construction-related employment would represent a small fraction of total employment and personal income levels. The impact on employment and income is considered beneficial. No mitigation is required.

Impact Soc-2: Temporary Increase in Demand for Housing in the Local Area during Project Construction. The impacts on housing would be nearly the same as described for Alternatives 2A–2C. Temporary impacts on housing are considered less than significant, and no mitigation is required.

Impact Soc-3: Disruption of Local Businesses as a Result of Construction of the Gates. Impacts on local businesses during construction of the gates would be the same as described for Alternatives 2A–2C. Impacts on local business are considered less than significant, and no mitigation is required.

Impact Soc-4: Permanent Increase in Employment and Income in the Local Area during Project Operation. Six jobs would be created as a result of operating the gates (Table 7.2-6). Total annual personal income generated associated with operation-related expenditures (salaries and purchases of equipment and supplies) is estimated to total $308,000 (Table 7.2-7).

Operation of the permanent gates would benefit the local economy by increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring within the local study area. Permanent employment would represent a small fraction of the total employment and personal income levels. This increase in employment and income is considered a beneficial impact. No mitigation is required.

Impact Soc-5: Increase in Demand for Housing in the Local Area. The impact on housing would be the same as described for Alternatives 2A–2C. The impact on housing is considered less than significant because gate operators would be hired from the local area. No mitigation is required.

Impact Soc-6: Disruption of Local Businesses as a Result of Operation of the Gates. The impact on local businesses when the gates are operating would be the same as described for Alternatives 2A–2C. This impact is considered less than significant, and no mitigation is required.

2020 Conditions

Construction-related impacts on the local area resulting from implementation of Alternatives 3B under 2020 conditions would be similar to those described above because construction activities would be similar to those proposed under existing conditions. Therefore, impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact Soc-7: Change in Economic Benefits in the SWP and CVP Service Areas as a Result of Increased Diversions. An evaluation of the M&I and agricultural economic benefits of changing water deliveries to the SWP and CVP service areas was conducted (Appendix O). Under Alternative 3B, M&I water benefits would decrease by $8.4 million and agricultural benefits would total $1.6 million.

2020 Conditions

Operation-related impacts on the local area resulting from the implementation of Alternative 3B under 2020 Conditions would be similar to those described for existing conditions because operation would be the same. Therefore, impacts would be the same as described above.

Alternative 4B

Stage 1 (Physical/Structural Component)

Impact Soc-1: Temporary Increase in Employment and Income in the Local Area during Project Construction. The population of the local study area is estimated to increase by 72 people during construction of the gate. This increase includes construction workers and dependents that are expected to relocate to the local study area during the construction period. This would represent a very small increase in the study area population of approximately 3.1 million.

Construction of the gate and associated facilities would temporarily increase employment and personal income within the local study area. As shown in Table 7.2-4, employment during the construction period is estimated to increase by 168 jobs. Total annual personal income associated with construction-related expenditures (salaries and purchases of equipment and supplies) is estimated to total approximately $4.6 million (Table 7.2-5).

Construction of the permanent gate and associated facilities would benefit the local economy by temporarily increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring within the local study area. Construction-related employment

would represent a small fraction of total employment and personal income levels. This impact is beneficial. No mitigation is required.

Impact Soc-2: Temporary Increase in Demand for Housing in the Local Area during Project Construction. The impacts on housing would be the same as described for Alternatives 2A–2C. Temporary impacts on housing are considered less than significant, and no mitigation is required.

Impact Soc-3: Disruption of Local Businesses as a Result of Construction of the Gates. Impacts on local businesses during construction of the gate would be similar to the impacts described for Alternatives 2A–2C, but slightly less as Alternative 4B would construct only the head of Old River fish control gate. Impacts on local business are considered less than significant, and no mitigation is required.

Impact Soc-4: Permanent Increase in Employment and Income in the Local Area during Project Operation. Three jobs would be created as a result of operating the gate (Table 7.2-6). Total annual personal income generated associated with operation-related expenditures (salaries and purchases of equipment and supplies) is estimated to total $154,000 (Table 7.2-7).

Operation of the permanent gate would benefit the local economy by increasing employment and personal income. However, these changes would be very small relative to the total economic activity occurring within the local study area. Permanent employment would represent a small fraction of the total employment and personal income levels. This impact is beneficial. No mitigation is required.

Impact Soc-5: Increase in Demand for Housing in the Local Area. The impact on housing would be slightly less than described for Alternatives 2A–2C. The impact on housing is considered less than significant because gate operators would be hired from the local area. No mitigation is required.

Impact Soc-6: Disruption of Local Businesses as a Result of Operation of the Gates. The impact on local businesses when the gate is operating would be similar to the impact as described for Alternatives 2A–2C. Only the head of Old River fish control gate would be constructed, and therefore fewer businesses have the potential to be disrupted. This impact is considered less than significant, and no mitigation is required.

2020 Conditions

Construction-related impacts on the local area resulting from implementation of Alternative 4B under 2020 Conditions would be similar to those described above because construction activities would be similar to those proposed under existing conditions. Therefore, impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact Soc-7: Change in Economic Benefits in the SWP and CVP Service Areas as a Result of Increased Diversions. An evaluation of the M&I and agricultural economic benefits of changing water deliveries to the SWP and CVP service areas was conducted (Appendix O). Under Alternative 4B, M&I water benefits would decrease by $8.4 million and agricultural benefits would total $1.6 million.

2020 Conditions

Operation-related impacts on the local area resulting from the implementation of Alternative 4B under 2020 Conditions would be similar to those described for existing conditions because operation would be the same. Therefore, there are no impacts.

Cumulative Evaluation of Impacts

Cumulative impacts on social and economic conditions are analyzed in Chapter 10, "Cumulative Impacts." This chapter also summarizes the other foreseeable future projects that may contribute to these impacts.

7.3 Utilities and Public Services

Introduction

This section describes the existing environmental conditions and the impacts of the SDIP alternatives on utilities and public services such as electricity, water supply, wastewater, and emergency services. The significance of impacts was determined based on guidance set forth in the State CEQA Guidelines.

Summary of Significant Impacts

There are no significant impacts on utilities and public services as a result of constructing or operating any of the alternatives. All impacts are discussed in detail under the Environmental Consequences section.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- Draft EIR/EIS for the ISDP, Volume I, July 1996;
- Contra Costa County General Plan 1995–2010, July 1996;
- San Joaquin County General Plan 2010, Volume I: Policies/Implementation, July 1996; and
- Site visit conducted on July 17, 2003.

Electricity

Electricity in the project vicinity is provided via high-voltage overhead transmission lines and associated substations and distribution lines to local customers. Several sets of high-voltage transmission lines traverse the area and are typically located within 100- to 120-foot-wide rights-of-way. Distribution lines are typically aligned parallel to the public roadways at an average height of 35 feet and provide electricity to individual users. Many of the distribution lines are visible from the local roadways in the project vicinity.

In the south Delta, most of the transmission lines are 230 kilovolts (kV), but others range from 60 to 500 kV. The Western Area Power Administration (WAPA) operates and maintains two sets of high-voltage transmission lines that cross West Canal. One line is aligned in a roughly southeast-northwest direction immediately south of the existing CCF intake and continues across the Byron

Tract. The second line is aligned in a northeast-southwest direction from the CVP Tracy facility (south of the forebay), across Union Island, then traverses the Middle River and continues across Middle Roberts Island in a northeast-southwest direction. Three 230-kV transmission lines connect into the nearby Tracy Substation.

The Pacific Gas and Electric Company (PG&E) operates and maintains one high-voltage transmission line in the project vicinity that is aligned in a southwest-northeast direction from the Naglee-Burke Tract; traverses the Tom Paine Slough, Paradise Cut, Old River, Middle River; continues across the Upper Roberts Island; and crosses the San Joaquin River. A second transmission line is aligned in a southwest-northeast direction from the Tom Paine Slough, across the southwest side of the Pescadero Tract, Paradise Cut, and across the southwest side of Stewart Tract.

Natural Gas

Chevron, Standard Oil, and Unocal operate and maintain several underground gas pipelines that transport natural gas and oil through the area southwest of CCF. These pipelines range from 6 to 20 inches in diameter. Most of these pipelines are aligned in a northwest-southeast direction near the Byron Highway. Natural gas pipelines also cross the eastern portion of the south Delta. Two major trunk lines cross San Joaquin County and are bisected by branch delivery lines. These natural gas delivery lines are not accessible to individual users. Many of the residential and agricultural customers in the project vicinity use on-site tanks for their gas supply.

Several gas fields in the Lathrop-Stockton area have conveyance pipelines that range from 4 to 12 inches in diameter. These gas fields are located at Roberts Island, Union Island, Lathrop, and Stockton. Natural gas pipeline markers are located along many of the local roadways in the project vicinity, and the Union Island Gas Field Central Production Facility is located along Howard Road.

Water Supply and Distribution

Water supply and distribution in the project vicinity are provided by a wide range of systems that serve statewide, regional, and individual needs. These range from large-scale elements of the SWP and CVP to the pumps and wells serving individual agricultural and residential uses.

As part of the SWP, the statewide systems in the project area include the California Aqueduct, CCF, DMC, and SWP Banks and CVP Tracy. The California Aqueduct and the DMC transport water from the south Delta to southern California. The SWP Banks facility diverts water through CCF into the California and South Bay aqueducts and on to contracting agencies in the San Francisco Bay Area, San Joaquin Valley, and southern California. The Delta

Field Division of the SWP maintains and manages these facilities and has offices adjacent to SWP Banks.

Regional water supply and distribution are administered by several agencies. In northeastern Alameda County, the Alameda County Flood Control and Water Conservation District for Zone 7 directs water resource management and watershed protection. Bethany Reservoir, located about 2 miles southwest of the Alameda/San Joaquin county line, serves as a major water storage site for this service provider. Contra Costa County's water supply is managed by special service districts and municipalities; few of these providers serve the project vicinity.

Most individuals rely primarily on individual wells and pumps, and several of the public and private suppliers tap groundwater supplies for the individual users. This includes residents of the nearby Bethel Island, Knightsen, Byron, and Discovery Bay areas. Southwestern San Joaquin County relies heavily on well water and exported fresh water from the Delta. San Joaquin County's Delta Planning Area is served by individual private water systems.

Water is supplied to individual users either by wells or directly from Delta waterways. Wells are used in Contra Costa County, but increasing concentrations of nitrates in the groundwater supply have limited their continued use or expansion. Approximately 75 miles of channels in the south Delta provide irrigation for adjacent farmlands through diversion pumps and siphons. A tidal pump control structure exists at the Tom Paine Slough. In San Joaquin County, agricultural water users include riparian rights users, agricultural users with private wells, water conservation districts, and irrigation districts.

Stormwater Drainage

Typically, stormwater drainage networks consist of both natural and human-made conveyance systems to collect, convey, and store runoff resulting from a storm event. Most stormwater drainage systems in urban areas and in some rural areas are managed by flood control districts. However, with the exception of the communities of Discovery Bay and Byron, most of the south Delta area is located in unmanaged stormwater drainage areas. As a result, most of the area in the vicinity of the project, including the proposed facility sites, is not served by highly developed stormwater drainage systems.

Impervious surfaces in the south Delta area are limited to roads, other small sections of pavement, and areas developed into rural residential or agricultural structures. The south Delta's agricultural area is drained primarily by overland flow into human-made ditches, natural drainage swales, and watercourses that discharge into Delta waterways.

Wastewater

Municipal and industrial wastewater is typically transported to a treatment facility, treated, and then the treated effluent is discharged into a receiving water body. Wastewater generated in the project vicinity is handled by sanitary sewer systems, treatment plants, and individual septic systems. Agricultural land in northeastern Alameda County is served mainly by on-site septic systems. In much of rural Contra Costa County, the use of septic tanks and leachfields is not feasible because of shallow water tables, high nitrate concentrations in groundwater, and soils with poor percolation.

The Contra Costa Water District operates a sanitary sewer and a 12.6 million gallons per day (mgd) treatment plant for the portion of the project area near Discovery Bay. Byron, Oakley, and Brentwood are served by municipal sanitation districts. In rural eastern Contra Costa County, treated wastewater effluent is used to irrigate agricultural lands or is discharged into a reclamation drain and ultimately into the Old River pursuant to a permit issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). Rural San Joaquin County is served primarily by on-site septic systems. The incorporated City of Tracy operates a sanitary sewer system and community treatment plant.

Solid Waste Disposal

Solid waste from the south Delta is transported to several landfills, depending on the area and/or county in which the waste was generated. Solid waste generated in Alameda County is transported to the nearest landfill (the Altamont Sanitary Landfill). The Altamont Landfill is approximately 6 miles southwest of the project area. The Altamont Landfill has increased capacity and is expected to reach capacity by 2037 (Lewis pers. comm.). The Vasco Road Landfill, located in Livermore, is expected to reach capacity in year 2037 (Kaufman pers. comm.). Solid waste generated in Contra Costa County is transported to the Marsh Canyon Landfill, which is approximately 14 miles from the project area. A portion of the project area lies within San Joaquin County's Central County and South County Refuse Areas. The waste from the Refuse Areas is disposed of at the Foothill Landfill near the Stanislaus County line. This landfill has substantial remaining capacity; it is expected to reach capacity by 2054 (Barrera pers. comm.).

Communications

SBC Communications, Inc. is the primary supplier of telephone service to the project area. Underground fiber trunk lines feed switching equipment, and overhead lines and poles supply individual service units. The communication lines are typically aligned parallel to the roadways and then traverse the roadways to supply the individual service units. Cable markers indicating underground cabling are located in some areas parallel to the roadways. A

network of alternative telephone companies, cellular communication companies, and cable companies also serve the region. New service to specific sites is accomplished on a case-by-case basis. Satellite dishes are located near the Union Island Gas Field Central Production Facility on Howard Road.

Police, Fire, and Ambulance Services

Police protection services are provided to the south Delta by the San Joaquin County Sheriff's Department and the California Highway Patrol (CHP) from their main offices in the City of Stockton. The Stockton CHP office patrols south Delta highways and county roads. The CHP has 70 personnel to serve the south Delta, of which 40 are patrol officers (Lawton pers. comm.). No police protection facilities are located in the project area. In addition to patrolling the local roads, the Sheriff's Department also patrols the public waterways.

Most of the area in the vicinity of the project does not have fire protection services. The unprotected areas are south of the Stockton Deepwater Ship Channel and include Union Island, Roberts Island, and Drexler Tract. Areas that are protected include from east of Lathrop and southwest of the San Joaquin River and southwest to the Contra Costa and Alameda county lines. The fire stations closest to the project area that provide fire protection services in San Joaquin County are the City of Lathrop, Manteca Fire, and seven fire stations within the City of Tracy that collectively have 60 emergency response personnel (Ohmstead pers. comm.).

The portion of the project area in Contra Costa County is served by the East Contra Costa County Fire Department. The East Contra Costa Fire Department has three stations and one boat that serve the south Delta. They collectively have eight emergency response personnel (Hein pers. comm.). The stations are located in Discovery Bay, Point of Timber, and Byron, and the boat is stationed at Bethel Island.

Ambulance services for San Joaquin and Contra Costa counties are provided by American Medical Response. In Contra Costa County, it has two emergency response personnel (Hein pers. comm.). There is a non-transport paramedic unit in Byron and a transport paramedic unit in Brentwood. In San Joaquin County, there are 13 stations that collectively have 15 ambulances with a minimum of 30 emergency response personnel on duty (Ballard pers. comm.). There are nine ambulances in Stockton, three in Lodi, and three in Tracy.

Environmental Consequences

Assessment Methods

To evaluate potential impacts on public services and utilities, the following four-step process was followed:

- reviewed the 1996 Draft EIS/EIR for the ISDP to obtain information regarding known public services and utilities in the project vicinity,
- conducted a site visit to review in the field the utilities visible from local roadways, and
- placed telephone calls to various utility/service providers.

Significance Criteria

For the purposes of this analysis, impacts on public services and utilities are considered significant if implementation of the alternatives would:

- require the construction or expansion of electrical or natural gas transmission or distribution facilities;
- require the construction or expansion of a water conveyance or treatment facilities or require new or expanded water supply entitlements;
- require the construction of new or expanded stormwater drainage facilities;
- require the construction or expansion of wastewater treatment facilities;
- cause the capacity of a solid waste landfill to be reached sooner than it would without the project;
- require the construction or expansion of communications facilities (telephone, cell, cable, satellite dish);
- adversely affect public utility facilities that are located underground or aboveground along the local roadways from project construction activities; or
- create an increased need for new fire protection, police protection, or ambulance services or adversely affect existing emergency response times or facilities.

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project-specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program.

These programmatic mitigation measures are numbered as they appear in the ROD, and only those measures relevant to the SDIP resource area are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED Programmatic Mitigation Measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

Utilities and Public Services Mitigation Measures

1. Site project facilities and transmission infrastructure to avoid existing infrastructure.
3. Coordinate construction activities with utility providers.
4. Design and operate facilities to minimize the amount of energy required and to maximize the amount of energy created.
5. Design project facilities to avoid or minimize their effect on existing infrastructure.

Alternative 1 (No Action)

Implementation of the No Action Alternative (Alternative 1) would result in no construction activities related to the project occurring in the south Delta. The SWP would continue to operate under its current pumping capacity, and the temporary barriers would continue to be installed and removed annually.

With implementation of this alternative, there would be no change in the regional demand for electricity, natural gas, or communications facilities when compared to existing conditions. There would also be no change in local or regional water supply distribution systems, and no changes to south Delta agricultural diversions would occur. Stormwater, wastewater, and solid waste disposal services would remain unchanged in the project vicinity, and there would be no change in the need for police or fire protection or ambulance services in the south Delta region compared to existing conditions.

Urban development according to the San Joaquin County General Plan is expected to continue in the future, and additional public services and utilities are expected to be required to serve the increased populations that will accompany that development. Public services and utilities needed to support the growth planned for the county are addressed in the County's General Plan. Future service provision in the County would not be affected by implementing the No Action Alternative.

Because no project facilities would be constructed as part of this alternative, no conflict with the utility poles, pipelines, satellite dishes, or other facilities would occur. Planned urban development and its required infrastructure would continue to be installed in accordance with the County's General Plan. Future public utility installation in the County would not be affected under the No Action Alternative.

2020 Conditions

Under future no action conditions (2020 conditions) the SDIP would not be implemented. It is expected that utilities and public services would remain essentially the same as those described above. However, demands on utilities and need for public services in the south Delta would increase as the regional

population increases. This increase is accounted for in the County's General Plan.

Alternatives 2A, 2B, and 2C

The demand for public services and utilities, potential for conflicts/effects on public utility facilities, and potential effects on emergency services from construction of the physical/structural component would be essentially the same under Alternatives 2A–2C; therefore, impacts for these are presented together.

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Construction of the proposed gates would have no impact on water conveyance or treatment facilities, stormwater drainage facilities, or communication facilities. Constructing the gates will not require the expansion of water supply and distribution facilities or stormwater drainage facilities. Communications services needed during project construction would likely be provided by cellular service and are not likely to adversely affect existing cellular service provided in the project vicinity.

Impact PUB-1: Disruption of Electric Service. The gate motors and boat lock hydraulic pumps would require electrical power to operate. A 120/208-volt, 3-phase, 4-watt service would be required at each gate site. The head of Old River and Middle River sites are located near existing power distribution lines and will not require construction of new power lines. The Old River at DMC gate site and Grant Line canal are more remote and will require power line extensions. Providing electrical service to the gates would result in a less than significant impact on existing services because construction of new transmission facilities would not disrupt existing uses. The impact of constructing the gates on existing electric service is considered less than significant. No mitigation is required.

Impact PUB-2: Reduction in Capacity of Local Solid Waste Landfills. Constructing and operating the gates is not expected to generate substantial amounts of solid waste because many of the gate components would be constructed offsite. Construction activities that are expected to generate the most waste would include dredging and excavating the gate foundation. Dredged material would be disposed on site. The small amount of waste generated during construction is not expected to substantially decrease the existing lifespan of landfills in the project vicinity.

Once constructed, the control facilities associated with each of the proposed gates would require solid waste disposal service. Because only one person would operate the gate, the amount of waste that would be generated at the sites is

expected to be minimal and would not substantially affect the availability of landfill capacity. This impact is less than significant. No mitigation is required.

This impact is less than significant. No mitigation is required.

Impact PUB-3: Disruption of Public Utilities. Under Alternatives 2A–2C existing utility locations at gate construction sites would be identified prior to construction. Utility lines would be avoided or relocated in coordination with the utility company or service provider. Refer to Environmental Commitments in Chapter 2, "Project Description." This impact is less than significant. No mitigation is required.

Impact PUB-4: Increase in Emergency Service Response Times. Constructing gates would result in a temporary increase in the number of construction vehicles traveling on local roadways. These construction vehicles are not expected to change the level of service provided by local roadways or increase response times by emergency service providers. This impact is less than significant. No mitigation is required.

Impact PUB-5: Increased Use of Energy. Under Alternative 2A–2C the gate mechanisms and boat lock hydraulic pumps would be electrically operated. A 120/208-volt, 3-phase, 4-watt service will be required at each gate site. Operating permanent gates would result in an increase in local electricity consumption. The amount of electricity needed to operate the gates is considered minor relative to local electricity consumption and other SWP electricity use. This impact is less than significant. No mitigation is required.

Dredging

Impact PUB-6: Disruption of Public Utilities during Channel Dredging. Under Alternatives 2A–2C existing utilities crossing West Canal, Middle River, and Old River would be identified prior to dredging. Utility lines would be avoided or relocated in coordination with the utility company or service provider. Refer to Environmental Commitments in Chapter 2, "Project Description." This impact is less than significant. No mitigation is required.

2020 Conditions

Impacts resulting from implementation of Alternatives 2A–2C would be similar to those described above because it is not expected that the project would create a significant need for additional utilities and public services. All impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

The increased diversions into CCF would not require the construction of new facilities or involve the disruption of existing utilities. There would be no impact.

2020 Conditions

Similar to 2001 conditions, there would be no impacts resulting from implementation of Alternatives 2A–2C because there would be a similar demand on utilities and public services during operations. All impacts are less than significant, and no mitigation is required.

Interim Operations

Interim operations would not result in increased runoff, wastewater, solid or hazardous waste, or the need for additional fire, police, or other public services. Therefore, impacts would be less than significant, and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

The demand for public services and utilities, potential for conflicts/effects on public utility facilities, and potential effects on emergency services from the physical/structural component of Alternative 3B are expected to be similar to those discussed for Alternatives 2A–2C but may be slightly less because no Grant Line Canal permanent gate would be constructed as part of this alternative. Therefore, impacts PUB-1 through PUB-6 would occur under Alternative 3B, but to a lesser extent. These impacts are less than significant. No mitigation is required.

Dredging

Under Alternative 3B, impacts from dredging activities would be similar to those identified under Alternative 2A–2C. No utility or public service impacts from dredging would occur.

2020 Conditions

Impacts resulting from implementation of Alternative 3B would be similar to those described above because it is not expected that the project would create a significant need for additional utilities and public services. All impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

The increased diversions into CCF would not require the construction of new facilities or involve the disruption of existing utilities. There would be no impact.

2020 Conditions

Similar to 2001 conditions, there would be no impacts resulting from implementation of Alternative 3B because there would be a similar demand on utilities and public services during operations. All impacts are less than significant, and no mitigation is required.

Alternative 4B

Stage 1 (Physical/Structural Component)

The demand for public services and utilities, potential for conflicts/effects on public utility facilities, and potential effects on emergency services from construction of this alternative are expected to be less than those discussed for Alternatives 2A–2C because Alternative 4B does not include the construction and operation of the three flow control gates. Therefore, impacts PUB-1 through PUB-6 would occur under Alternative 4B, but to a lesser extent. As described above, these impacts are less than significant. No mitigation is required.

Dredging

Under Alternative 4B, impacts from dredging activities would be similar to those identified under Alternatives 2A–2C.

2020 Conditions

Impacts resulting from implementation of Alternatives 4B would be similar to those described above because it is not expected that the project would create a significant need for additional utilities and public services. All impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

The increased diversions into CCF would not require the construction of new facilities or involve the disruption of existing utilities. There would be no impact.

2020 Conditions

Similar to 2001 conditions, there would be no impacts resulting from implementation of Alternative 3B because there would be a similar demand on utilities and public services during operations. All impacts are less than significant, and no mitigation is required.

Cumulative Evaluation of Impacts

Cumulative impacts on public utilities and services are analyzed in Chapter 10, "Cumulative Impacts." This chapter summarizes the other foreseeable future projects that may contribute to these impacts.

7.4 Recreation Resources

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on recreation opportunities and facilities.

Summary of Significant Impacts

There are no significant impacts on recreation as a result of constructing and operating any of the alternatives. All impacts are discussed in detail under the Environmental Consequences section.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- Draft EIR/EIS for the ISDP, Volume I and Appendix 7 of Volume II, July 1996;
- *CALFED Bay-Delta Program Final Programmatic Environmental Impact Statement/Environmental Impact Report*, July 2000; and
- Sacramento–San Joaquin Delta Recreation Survey (including Boating Survey and Fishing Survey), September 1997.

Delta Region Recreation Use and Activities

Most of the recreation associated with the Delta and SWP facilities is water-dependent (i.e., boating, fishing, rafting, and swimming) or water-enhanced (camping, picnicking, hiking, bicycling, hunting, and scenic/wildlife viewing).

Wildlife viewing, fishing, hunting, and water-based recreation such as swimming, motor boating, sailing, and windsurfing are popular throughout the state, and particularly in the Bay-Delta regions. Recreation is a multimillion-dollar industry in the state. The demand for recreation resources in California is expected to increase with future population growth. Increasing demand is expected to put additional pressure on limited recreation resources and potentially contribute to deterioration of the quality of recreation experiences.

Recreation use of the Delta has increased substantially since the mid-1950s. Recreation use in the late 1950s and early 1960s was estimated at 2.5 million visitor days[1]. By the late 1970s, recreation use in the Delta was estimated to range from 7 to 12 million visitor days. Hunting, sport fishing, boating, and other water-based activities have continued to be the most important recreation activities in the region. Estimates of recreation use of the Delta vary considerably. Current use levels could be as low as about 10 million visitor days, based on 1985 estimates expanded to account for population growth in the region. Based on recreation surveys conducted in 1996 for the DPC, the potential use level could be upwards of 40 million visitor days. Use is expected to increase concurrent with the growth that is occurring in the surrounding counties.

Table 7.4-1 lists the use levels that were determined from the DPR 1996 survey for fishing, non-fishing recreation, boating, and non-boating recreation throughout the Delta.

Table 7.4-1. Delta-Wide 1996 Fishing and Boating Recreation Use

Activity	Activity/Participation Days[a]	Activity	Activity Days[a]
Boating Recreation[b]		**Fishing Recreation[d]**	
Boating	8.1 million	Fishing from boat	11.8 million
Swimming from boat	–[c]	Fishing from shore	9.6 million
Fishing from boat	–	Fishing in tournament	0.2 million
Hunting from boat	–		
Non-Boating Recreation[b]		**Non-Fishing Recreation[d]**	
Sightseeing	3.2 million	Boating	7.1 million
Viewing wildlife	3.2 million	Swimming	6.2 million
Swimming from shore	2.9 million	Wildlife viewing	5.5 million
Walking for pleasure	2.6 million		

[a] The duration of an activity/participation day was not defined in DPR 1997.

[b] As reported in the boating survey portion of the DPR 1997 report.

[c] – = Data not provided.

[d] As reported in the fishing survey portion of the DPR 1997 report.

Source: California Department of Parks and Recreation 1997.

The Delta is conveniently located near several large population centers and serves the growing urban population in the Sacramento metropolitan area, the San Francisco Bay area, and the Stockton/Modesto/Tracy region. The DPR 1997 survey of boaters and anglers indicated that approximately 50% of the

[1] A visitor day represents one person spending a day or portion of a day in one or more types of activities.

recreationists in the Delta live within 50 miles of the Delta, and the average distance traveled one way was 70 to 75 miles.

In addition, the survey results indicated that a majority of visitors (50–60%) stay in the Delta 1 day or less. Approximately 35% stay 2 to 4 days, and approximately 11% stay 5 days or longer. The peak recreation period occurs from May through September. Use from March to September accounts for an estimated 75% of total annual use. According to the 1997 DPR survey report, most boating use occurred between 8:00 a.m. and 4:00 p.m., and most use was by boaters during June, July, and August.

Most of the navigable waterways in the Delta are public, and most of the land is private. This lack of public lands limits the use of the Delta for recreation, causing concentration of use in a few areas where marinas and other facilities provide recreational opportunities and access to the Delta waterways. There are few public parks in the Delta, and some of the recreation areas are accessible only by boat. This also limits access to the Delta for some recreationists.

Recreation use in the Delta is primarily water-oriented. Almost every type of recreation boating activity can be found in Delta waterways. Marinas account for most recreation facility types in the Delta. Activities include waterskiing, fishing, boating, sightseeing, camping, and picnicking. Fishing and boating are the most popular recreation activities in the Delta, together accounting for approximately 70% of total use. Boating accounts for approximately 17% of all visits, followed by fishing, relaxing, sightseeing, and camping.

Boating opportunities in the Delta have increased over the years and include houseboating, sailing, waterskiing, windsurfing, fishing, and other pleasure boating. Commercial boating excursions in the Delta are rare and are mainly limited to the Stockton Deepwater Ship Channel; however, individuals and groups often rent small fishing boats and houseboats.

Popular access points for boating, waterskiing, and personal watercrafting include Windmill Cove near SR 4; King Island, Paradise Points, Herman & Helen's near Eight Mile Road; Tower Park near SR 12; and River's End Marina & RV Park near the City of Tracy. Houseboating is concentrated along Eight Mile Road. Windsurfing typically occurs along SR 160 between Sherman Island and Rio Vista and at Windy Cove. The limited number of boating access points across the Delta and the lack of readily available rentals for ski boats and personal watercraft continue to be issues for recreational users.

Sport fishing in the Delta is a year-round activity, and includes bank fishing and the use of private vessels and commercial passenger vessels. Important sport fish in the Delta include striped bass, white sturgeon, Chinook salmon, and American shad.

Not all recreation activities in the Delta are associated with water. The more popular land-based recreation activities include hunting, camping, picnicking,

walking for pleasure, bicycling, wildlife viewing, photographing wildlife, sightseeing (driving for pleasure), and attending special events.

Much of the open space in the Delta is used for public parks and wildlife refuges. Approximately 23 public recreation facilities are located in the Delta. Three state agencies maintain five recreation areas, and the remaining recreation areas are operated by county and city agencies.

Hunting continues on private lands, in public areas, on waterways, and on various small Delta islands. Popular areas include Sherman Island Wildlife Area, Twitchell Island, Franks Tract State Recreation Area, and CCF.

The majority of the DPR 1997 survey respondents (83%) indicated that Delta marinas were either adequate or more than adequate, and the majority of respondents indicated that launch ramps, and fuel docks were adequate or more than adequate. Respondents also thought that most types of other facilities[2] were either adequate or more than adequate. Approximately 60% of respondents indicated that restrooms were either somewhat inadequate or very inadequate. Most (67%) respondents indicated that swimming beaches were either inadequate or very inadequate, and fishing piers were indicated as either somewhat inadequate or very inadequate by 59% of the survey respondents.

In addition, sightseeing was identified by the 1997 DPR survey as the most common activity by the respondents, followed by boating and wildlife viewing, and windsurfing. Walking for pleasure ranked the highest in terms of average annual recreation days, followed by wildlife viewing, swimming, and attending special events. Tent camping and picnicking had the highest number of participants per group, followed by boating.

Project Area Recreation Use and Activities

The south Delta channels are used heavily for boating, fishing, and other water activities, providing an estimated 25% of Delta recreation. DWR conducted boat surveys on different days in each of several years (between 1991 and 1995 [excluding 1994]) at the proposed gate locations to determine the level of use and types of recreational boating at each site. In addition, boats were counted along the waterways on several different weekdays, weekends, and holidays from May to September. The surveys were conducted because of concerns regarding the impact of the temporary flow control structures on boating.

Table 7.4-2 summarizes the total number of boats[3] identified during the survey for each of the survey years. Activities identified during the survey included waterskiing, fishing, and cruising (driving a powerboat for pleasure along the waterways).

[2] These included tent campsites, RV campsites, picnic sites, public parking, places to buy food, scenic vista/overlooks, hiking trails, wildlife vistas, hunting areas, and windsurfing access.
[3] Includes aluminum boats (up to 14 feet long), ski boats, cruisers, and jet skis.

Table 7.4-2. Total Number of Boats Observed from 1991 to 1995[a] Survey by Year by Location

	Number of Boats[b] Identified by Year			
Location	1991	1992	1993	1995
Old River at San Joaquin River	52	29	33	40
San Joaquin River at Old River	113	95	96	98
Middle River	9	5	9	9
West Grant Line Canal	188	149	177	126
Old River near Tracy	33	–	–	21
East Grant Line Canal	–	–	–	88

[a] The survey was not conducted in 1994.

[b] Number of boats was calculated as average number of boats per day.

– = No data available.

Source: California Department of Water Resources and Bureau of Reclamation 1996a.

The DWR survey revealed that aluminum boats (up to 14 feet long), ski boats, cruisers, and jet skis made up the vast majority of the boats that use the south Delta. Most of the boats used in the south Delta, as indicated by the survey, were ski boats, and the greatest usage occurred on holidays and weekends. In general, on each day surveyed, the Grant Line Canal and the head of Old River had a large number of boats, and Middle River and Old River had limited usage because of shallow channels upstream of the sites. Grant Line Canal was the most popular for ski boats and jet skiing followed by head of Old River. Old River was more popular for fishing boats, and Middle River boating was fairly evenly distributed.

In addition to DWR's survey, the California DPR conducted a survey for the DPC and the California Department of Boating and Waterways (DBW) in 1996 of registered boat owners and licensed anglers who use the Delta for recreation. The purpose of the survey was to determine the number of boaters and anglers who use the Delta and other information, including the areas where they recreate, the activities in which they participate, and user satisfaction with facilities available in the Delta.

The DPR boating survey report designated zones within the Delta, with the project area designated as Zone F (Figure 7.4-1). Survey results indicated that very little boat launching and use occurred in the project area. The most common water-dependent recreation activity in this area was waterskiing, followed by cruising, fishing, and swimming from a boat. A comparison of the amount of recreation in this area with recreation use in the entire Delta indicates that most Delta-wide boating occurred outside Zone F. For example, even though waterskiing was the most common recreation activity in this area, only 16% of Delta-wide waterskiing occurred in this zone.

The most common non-boating recreational activities in Zone F identified in the boat survey were sightseeing, fishing from shore, wildlife viewing, picnicking, and swimming. When comparing the level of non-boating recreation participation in this area with use in the entire Delta, the survey results indicated that very little recreation use occurred in Zone F. The most popular recreation activity was bicycling.

DPR's 1997 fishing survey report also designated the project area as Zone F. The survey results indicated that, within Zone F, fishing from shore was the most common fishing activity, followed by fishing from a boat, then fishing in a tournament. When comparing fishing participation in Zone F with total fishing participation in all zones combined, it was determined that Zone F was not a popular location for any type of fishing (only about 14% of those who fished from a boat in the Delta did so in this zone).

The most common non-fishing recreational activities in Zone F identified by the fishing survey was swimming. A comparison of those participating in non-fishing activities in this area with the total non-fishing participation in all Delta zones combined revealed that this zone received a low level of use for most activities, with less than 20% of all recreation activities that occurred in the Delta occurring in this zone.

Project Area Recreation Facilities

Existing recreation facilities in the south Delta study area are listed in Table 7.4-3 and are shown on Figure 7.4-2. As shown, 33 water-dependent recreation facilities, including several large marinas, are located in the south Delta. In addition, two campgrounds and one trail are located in the area.

Table 7.4-3. Recreation Facilities and Facility Amenities within a 6-mile radius of Proposed South Delta Improvements

Facility Name	Rentals[a]	Services[b]	Camping	Guest Docks	Fuel	Supplies[c]	Food[d]
Buckley Cove Launching	–	–	–	–	–	–	–
Bullfrog Landing & Marina	FB	R			G	I, BT, M	RE, B
Cruiser Haven				LC, SC, O, RR, S		I, M	SN
River's End Marina & RV Park		X		X		X	X
Discovery Bay Yacht Harbor		BL, PO		LC, SC, O, RR, S	G, D	I, P, M	GS, SN
Dos Reis Park		BL	X				
Fore N' Aft	–	–	–	–	–	–	–
Haven Acres		BL, L		LC, SC, O, RR	G	I, BT	SN, RE, B
Heinbockle Harbor	–	–	–	–	–	–	–
Islander Mobile Park	–	–	–	–	–	–	–
Klamath Ferryboat	–	–	–	–	–	–	–
Ladd's Stockton Marina		R, DD				I, M	SN
Lazy M Marina		BL	X	SC, O, RR	G	I, P, BT, M	GS, SN, B
Mossdale Crossing Park	–	–	–	–	–	–	–
Mossdale Marina			X	SC, O	G	I, BT	SN, B
Mossdale Trailer Park		BL, L	X	SC, S, R		P	
Oakwood Lake	–	–	–	–	–	–	–
Orwood Resort		BL	X	SC, S, R	G	I, P, BT, M	GS, SN, RE, B
Riverpoint Landing		P, BL, R, DD		LC, SC, O, E	G, D	X	
Stephens 5 Star Marina		BL, R, DD					
Stockton Rod & Gun Club	–	–	–	–	–	–	–
Stockton Yacht Harbor	–	–	–	–	–	–	–
Tides Resort			X	SC, O			SN, B
Tiki Laguna Resort Marina		BL	X	LS, SC, E, O, RR, S	G	I, P	GS, SN
Tracy Oasis Marina Resort	FB	BL, R, L	X	LC, SC, E, O, RR, S	G	I, P, BT, M	GS, SN, RE, B
Turner Cut Resort	HB	BL, DD	X	LC, SC, E, O, RR, S	G	I, P, BT, M	RE, B
Turtle Beach Resort (private)	–	–	–	–	–	–	–
Union Point				LC, SC, O	G	X	SN, RE, B

Facility Name	Rentals[a]	Services[b]	Camping	Guest Docks	Fuel	Supplies[c]	Food[d]
Waterfront Yacht Harbor	X (?)	PO		LC, SC, E, O, RR, S	G, D	I, M	SN, B
Weston Ranch Marina (proposed)	–	–	–	–	–	–	–
Whiskey Slough Harbor		BL, PO	X	LC, SC, E, O, RR	G	I, BT, M	SN, B
Windmill Cove		BL		LC, SC, E, O, RR, S	G	I	SN, B

– Data not provided.

[a] Rentals include ski boats (SB), houseboats (HB), and fishing boats (FB).

[b] Services include boat launching (BL), boat/motor repair (R), dry dock (DD), and pump-out station (PO),' laundry (L), and showers (S).

[c] Guest Docks include large craft (LC), small craft (SC), electricity (E), overnight (O), restrooms (RR), showers (S).

[d] Fuel includes, gasoline (G) and diesel (D).

[e] Supplies include ice (I), propane (P), bait and tackle (BT), and marine supplies (M).

[f] Food includes snack bars (SN), restaurants (RE), grocery stores (GS),bars (B), and liquor store (LS).

Source: Hal Schell, no date; California Delta Chambers and Visitors Bureau 2004.

North-of-Delta Recreation Use and Activities

Shasta Reservoir

Lands and recreation facilities at Shasta Reservoir are managed as a unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) by the U.S. Forest Service (USFS). Approximately 80% of the recreational use in the Whiskeytown-Shasta-Trinity NRA occurs at Shasta Reservoir (U.S. Forest Service 2000). When full, the lake has a surface area of approximately 29,500 acres, 370 miles of shoreline, and surface elevation of 1,067 feet above msl. The lake has four main arms: the Sacramento River, McCloud River, Pit River, and Squaw Creek.

Water-dependent activities include power boating, houseboating, waterskiing, and warmwater and coldwater fishing. Water-enhanced activities include camping, hunting, and wildlife viewing. Recreational use at Shasta Reservoir averages about 2.4 million visitor days per year, with an estimated 75% of the recreational use occurring between May and September (Bureau of Reclamation 1997).

Facilities include several marinas, seven public boat ramps, three picnic areas, and 26 public campgrounds. Boat ramp facilities are located on all four arms of the reservoir. Several boat ramps have multiple lanes/ramps allowing boat launching to occur at low lake levels. The Hirz Bay and Packer's Bay boat ramps, located on the McCloud River arm, have three ramps and can remain in

operation until the lake elevation is drawn down 155 feet. The Centimudi boat ramp near Shasta Dam and the Jones Valley boat ramp on the Pit River arm can both remain in operation until the lake elevation is drawn down 210 feet.

Trinity Reservoir

Trinity Reservoir is a unit of the Whiskeytown-Shasta-Trinity NRA with recreational facilities and activities administered by the USFS. The lake has 145 miles of shoreline 17,000 surface acres, and a surface elevation of 2,370 feet above msl when full.

Water-dependent activities include power boating, houseboating, waterskiing, swimming, and fishing. Water-enhanced activities include camping, hiking, hunting, and wildlife viewing. Recreational use at Trinity Reservoir was estimated at about 485,000 recreation visitor days in 1995 (U.S. Fish and Wildlife Service et al. 1999). Recreation facilities at Trinity Reservoir include 24 campgrounds, two swimming areas, and three day-use areas. Major boat ramps operated by the USFS include Minersville on the Stuart Fork arm, Trinity Center in the North Lake area, and Fairview near the Trinity Dam. There are four marinas located on the lake.

Oroville Reservoir

Recreation facilities and activities at Oroville Reservoir are managed by DPR as part of the Lake Oroville State Recreation Area (SRA). The reservoir has 167 miles of shoreline, 15,800 surface acres, and a surface elevation when full of 900 feet above msl.

Water-dependent activities include power boating, houseboating, waterskiing, swimming and fishing. Water-enhanced activities include camping. Bidwell Canyon and Loafer Creek on the southern shoreline and Lime Saddle on the West Fork are the major use areas. In addition to formal campgrounds, camping is allowed along the lake's shoreline and at boat-in campgrounds. Most water-dependent recreation occurs during the spring and summer months.

Feather River

The lower reach of the Feather River flows from Oroville Dam to the confluence of the Sacramento River. This stretch is approximately 40 miles, and there are several recreation areas within this reach. Yuba Recreation Area and Riverfront Park in Marysville are two of the major recreation areas along this stretch.

The recreation facilities along the Feather River include boat launching ramps, marinas, fishing areas, campgrounds, picnic areas, and athletic fields. Activities such as swimming, fishing, camping, bird watching, picnicking, and bicycling are popular in this area. Rafting on the North and Middle Forks of the Feather

River runs from January to April or May, depending on flow. Summer rafting and kayaking occurs on the North Fork depending on upstream PG&E reservoir operations, though lower flows in these reaches allow recreationists to use inner tubes to float down the river.

The section of the Feather River between the Thermalito Diversion Dam and Thermalito Afterbay outlet is commonly referred to as the Low Flow Channel of the Feather River. Fishermen, wildlife and birdwatchers, sightseers, hikers, and bicyclists enjoy recreation along the Low Flow Channel. The Brad P. Freeman Trail runs beside this section of river from the diversion dam to SR 162. This section is an important recreation resource for the residents of Oroville and nearby areas. Based on DFG regulations, the river is open for fishing north of the Table Mountain Bicycle Bridge. In the spring and fall, salmon are known to congregate at the Thermalito Afterbay outlet. In recent years, the Feather River has served as habitat to 40,000 Chinook salmon in spring and fall. Downstream from the Thermalito Afterbay outlet, the river continues throughout the Oroville Wildlife Area. The Oroville Wildlife Area provides opportunities for bird watching, in-season hunting, fishing, swimming, and camping.

Folsom Reservoir

Folsom Reservoir is part of the Folsom Lake SRA, an 18,000-acre area encompassing Folsom Lake and Lake Natoma managed by the DPR. The Folsom Lake SRA is one of the most heavily used recreation areas in the California State Park System because of its proximity to large urban areas, the diminishing open space of the area, and the high regional interest in recreation. When full, the reservoir has a surface area of approximately 11,900 acres and 75 miles of shoreline and a surface elevation of 466 feet above msl.

Folsom Reservoir accommodates a variety of water-dependent recreational activities, including power and sail boating, camping, fishing, swimming, waterskiing, jet skiing, and windsurfing. Major shoreline use areas are Beal's Point, Granite Bay, and Rattlesnake Bar on the western shoreline; Folsom Point (formerly Dyke 8) and Folsom Lake Marina at Brown's Ravine on the southern and eastern shorelines; and the Peninsula Campground between the north and south forks of the American River. Each of these areas contains a boat ramp and various other recreational facilities. Folsom Lake Marina at Brown's Ravine, the only marina on Folsom Lake, is open year-round and has a main boat ramp, a low-water boat ramp, and 685 slips available for mooring. The recreation area has approximately 80 miles of trails available for hiking and horseback riding and approximately 30 miles of paved and unpaved bicycling trails.

Boating, sailing, and waterskiing take place throughout the main reservoir area. Anglers fish from boats throughout the lake and especially in the upper arms that are designated slow-boating zones. Fishing is mainly for coldwater species, such as rainbow trout and kokanee salmon, and warmwater species, such as bass, catfish, and sunfish. Swimming and sunbathing take place at many undesignated areas along the reservoir shoreline.

The water level at Folsom Lake dictates the type of recreation and length of the season. During years with normal precipitation, the main recreational season is May through Labor Day in September, when recreation is focused primarily on water-dependent activities. Approximately 625,000 people visited Folsom Lake SRA between July and September 2001, and approximately 695,000 people visited the SRA between April and June (California State Parks 2001). During the remaining months of the year, use consists mainly of fishing and land-based recreation. Visitation from October through December and January through March totaled approximately 175,000 and 165,000 people in 2001, respectively (California State Parks 2001). In general, the Granite Bay, Beal's Point, Folsom Point, and Brown's Ravine use areas account for approximately 50% of the use of Folsom Lake SRA.

Water-dependent activities account for nearly 85% of the recreation use at Folsom Lake. Boating is the most popular activity at the reservoir, followed by swimming and fishing. (Sacramento Area Flood Control Agency and Bureau of Reclamation 1994.)

Lake Natoma

Lake Natoma, just downstream of Folsom Reservoir, is also a unit of the Folsom Lake SRA. The lake has a surface area of approximately 500 acres at full capacity and has approximately 10 miles of shoreline. (EDAW and Surface Water Resources 1999.)

Water-dependent activities include fishing, rowing, kayaking, sailing, and windsurfing. Water-enhanced facilities consist primarily of picnic areas and bicycle, equestrian, and pedestrian trails, which are located on the north and south shores of the lake. Facilities include the California State University, Sacramento (CSUS), aquatic center. CSUS sponsors local, regional, and national rowing competitions on Lake Natoma, and its intercollegiate and club teams use the lake for rowing practice. An 8.4-mile-long segment of the Jedediah Smith Memorial Trail extends along the north shore of the lake. Developed recreation facilities are located at Mississippi Bar, Nimbus Flat, and Negro Bar. Boat-launching facilities are located at Nimbus Flat and Negro Bar, along with swimming-designated beaches.

Annual visitation at Lake Natoma is reported as part of the total visitation to the Folsom Lake SRA, discussed above in the Folsom Reservoir section.

Water-enhanced activities and water-dependent activities each account for approximately 50% of all recreation activities. Trail use (jogging, bicycling, hiking, and horseback riding), rafting, and boating are the most popular recreational uses of the lake area. The lake's water level dependably exceeds water-dependent recreation thresholds, making it a popular destination for boating, sailing, rowing, and windsurfing. (EDAW and Surface Water Resources 1999.)

Lower American River

The lower American River extends for 23 miles between Lake Natoma and the confluence with the Sacramento River. The river passes through the American River Parkway, a 6,000-acre open space corridor that includes a series of interconnected parks along the publicly owned lands of the river. The parkway has 14 county parks that provide user access to the river, and the 32-mile Jedediah Smith Memorial Trail provides bicycling, hiking, and horseback-riding opportunities from Discovery Park to the Folsom Lake SRA.

The lower American River is a major site for recreational boating (rafting, kayaking, and canoeing), fishing, swimming, and wading. Boating activity, particularly commercial rafting, depends primarily on air temperature, river flows, and season of the year. The most popular reach for rafting is from Sunrise Avenue to Goethe Park. There are 10 popular swimming areas along the river including Paradise Beach and Tiscornia Park, both with large sand beach areas. Both shoreline and boat fishing take place throughout the river. Anglers fish mainly for salmon, steelhead, and shad. Fishing is permitted year-round within the parkway, except during fall and early winter when the river is closed from Ancil Hoffman Park on the west to the Hazel Avenue Bridge on the east to protect spawning fish (EDAW and Surface Water Resources 1999).

Parkway visitation in 1997 was estimated at 6 million visitor-days. Visitation is expected to increase to 9.6 million visitor-days by 2020, assuming river flows are stable (County of Sacramento and Bureau of Reclamation 1997). Approximately 31% of all visits were associated with water-dependent activities. Boating, particularly rafting, is the most popular water-dependent activity on the river, followed by fishing and swimming (Sacramento Area Flood Control Agency and Bureau of Reclamation 1994). About 90% of annual rafting rental business occurs between Memorial and Labor Day (Jones & Stokes 2001).

Sacramento River

The Sacramento River extends for 300 miles between Keswick Reservoir and the Delta. Public access points to the river are administered by the State of California, Bureau of Land Management, and various counties and cities along the river. Popular water-dependent activities include boating, fishing and waterskiing. Water-enhanced activities include camping, hiking, picnicking, and sightseeing.

Numerous recreation areas are located on the reach of the river between Keswick Reservoir and the American River confluence. Fishing, rafting, canoeing, and kayaking activities are available along most of the upper Sacramento River and are popular activities on the river's northern reach. Boating, rafting, and swimming generally take place in summer months, and fishing is a year-round activity. Water-dependent activities (swimming, boating, fishing) account for approximately 52% of the recreation uses on the Sacramento River (County of Sacramento and Bureau of Reclamation 1997).

Downstream of the American River, the Sacramento River, is a popular boating and fishing area, with most boating occurring during the summer months. Public parks and trails, private marinas, and public boat launching facilities are located along this reach of the river.

Public parks, including Miller and Garcia Bend, have picnic sites, playgrounds, and multi-use fields. Garcia Bend Park, located in Sacramento's Pocket Area, is a 24-acre riverfront park that has a major boat-launching ramp for the entire Sacramento area, a playground, soccer fields, and a parking area. On- and off-street bike trails extend along this portion of the river. The Sacramento River Bike Trail begins with an off-street trail at the American River confluence and connects to various on-street and off-street trail segments. The southern segment is a 2-mile-long, on-levee, two-lane bike trail extending from Garcia Bend Park to a point approximately 6,000 feet north of the Freeport Bridge. The City of Sacramento is planning to extend the trail from its current end point (approximately 6,000 feet north of the Freeport Bridge) to the Freeport Shores Youth Sports Complex, with construction scheduled for 2003. Boating facilities between Sacramento and Courtland include the large Sacramento Marina, the Freeport Marina (145 berths), three medium-size marinas (50–200 berths), five small marinas (fewer than 50 berths), and five launch ramps (Delta Protection Commission 1997).

In 1980 (the last recreation-user survey completed for the entire river), total annual recreational use was estimated to total 2 million 6-hour visitor days (California Department of Water Resources 1982b). In May 1995, a survey was conducted of registered boat owners and licensed anglers who recreate in the Delta. The portion of the lower Sacramento River corridor from the City of Sacramento south to Courtland was included in the survey. Fishing from a boat, cruising, waterskiing, and swimming account for 90% of all recreation occurring on this segment of the river. Fifty-one percent of fishing took place from boats and 44% from shore. However, fishing in this segment of the river accounts for only 10% of all fishing in the Delta as a whole. In addition, recreation use of this segment of the river is low in all boat-use categories when compared to the Delta as a whole. (Delta Protection Commission 1997.)

Water-enhanced activities occurring on this segment of the Sacramento River include sightseeing, viewing wildlife, visiting cultural or historic sites, and bicycling. Other less popular activities include walking, picnicking, and swimming from shore.

South-of-Delta Recreation Use and Activities

San Luis Reservoir

San Luis Reservoir and O'Neill Forebay can be found in the foothills of Merced County on the west side of the San Joaquin Valley and lie approximately 12 miles west of the city of Los Banos. The reservoir and Forebay compose the

San Luis Reservoir SRA. The San Luis Reservoir serves both the SWP and CVP.

When full, San Luis Reservoir has approximately 12,700 surface acres, and both San Luis Reservoir and O'Neill Forebay offer activities such as boating, waterskiing, fishing, camping, and picnicking and trail use. San Luis Reservoir SRA is open year round. Boat access is available via one boat ramp at the Basalt area at the southeastern portion of the reservoir and at Dinosaur Point at the northwestern portion of the reservoir. The boat ramp at Basalt becomes difficult to use because of low reservoir levels at elevation 340 feet; the boat ramp at Dinosaur Point is difficult to access at elevation 360 feet (San Joaquin River Group 1999). There are no designated swimming areas or beaches at San Luis Reservoir, but O'Neill Forebay (with its stable surface elevation) has popular swimming, boating, fishing, and camping opportunities.

Castaic Lake

Castaic Lake is in the Castaic Mountains in southern California and has 29 miles of shoreline. Castaic Lake and Lagoon provide many opportunities for recreation. With two boat launch ramps, the upper lake offers visitors a wide range of water sports, such as sailing, waterskiing, power boating, and fishing. The east ramp is usable (above water) when the surface elevation is above elevation 1,325 feet msl. The west ramp becomes unusable earlier, at surface elevation 1,435 ft msl (Leahigh 2002 as cited in EWA 2003). Castaic Lake supports largemouth bass, bluegill, trout, crappie, and catfish. Castaic Lagoon, south of Castaic Lake, serves as a recreation area and a groundwater recharge basin. Overnight camping is available at the lagoon, which features sandy beaches, grassy picnic areas, and a two-lane boat launching ramp. Boating in Castaic Lagoon is limited to non-power boats only; sailing, canoeing, and fishing are popular activities in this area (Environmental Water Account 2003).

Lake Perris

Lake Perris can be found in northwestern Riverside County, southwest of the city of Moreno Valley. The lake is approximately 2,318 acres, and it includes three boat ramps; a marina; a water slide; two swimming beaches; hiking, biking, and equestrian trails; and picnic and camping areas. Recreation activities at Lake Perris include boating, waterskiing, fishing, swimming, camping, picnicking, horseback riding, bicycling, hiking, hunting, and rock climbing.

Pyramid Lake

Pyramid Lake is located immediately east of the Los Angeles–Ventura County line in northwestern Los Angeles County and is part of the Angeles National Forest. Recreation facilities at Pyramid Lake include a boat ramp, swimming beach, picnic area, six boat-in recreation areas, and campgrounds. Recreation

activities here include boating, waterskiing, fishing, swimming, camping, picnicking, and hiking.

Silverwood Lake

Silverwood Lake is approximately 976 acres in size and is located in southwestern San Bernardino County. Recreation facilities here consist of a boat ramp, a cartop boat ramp, swimming beaches, picnic areas, and campgrounds. Boating, waterskiing, fishing, swimming, camping, picnicking, bicycling, and hiking are among the recreation activities at Silverwood Lake.

Environmental Consequences

Assessment Methods

The recreational assessment describes the impacts on recreation from construction and operation of SDIP gates and recreation impacts as a result of changes in reservoir storage and river flows. The assessment focuses on evaluating impacts on:

- recreation activities in the south Delta within approximately 6 miles of the flow control and fish control gates, and
- water-dependent (e.g., boating and swimming) and water-enhanced recreation opportunities at major north-of-Delta reservoirs and streams and major SWP south-of-Delta reservoirs.

Effects on recreation that could occur during construction of permanent gate facilities or channel dredging activities were evaluated qualitatively. Generally, construction activities could result in a short-term loss of recreation opportunities by disrupting use of recreation areas or facilities. A long-term effect could occur if a recreation opportunity is eliminated as a result of construction activities associated with SDIP project facilities.

Impacts on south Delta recreation could occur during operation of SDIP facilities because of changes in water flow and level conditions. Output from DSM2 was used to predict changes in water level under each SDIP operational scenario that could potentially affect south Delta water-dependent recreation activities and use.

Operating the SDIP alternatives could also result in changes in reservoir storage and river flows. The resulting change in reservoir storage could change the frequency and duration that lake levels are within acceptable ranges or above the minimum level necessary to conduct recreational activities. Similarly, river flows more frequently could fall outside the ranges necessary to conduct recreation. The evaluation of effects on water-dependent recreation was conducted by comparing the CALSIM II hydrological modeling results for each

alternative with the reservoir storage and river flow recreation thresholds. Key opportunity thresholds used in this analysis are shown in Table 7.4-4.

Table 7.4-4. Recreation Opportunity Thresholds for Important North-of-Delta and South-of-Delta Recreation Resources

Water Resource	Elevation When Full	Recreation Opportunity Thresholds[a]
Folsom Reservoir	466 msl	360 msl—last boat ramp out of operation 400 msl—limited surface area (boating constrained) 405 msl—marina closes 430 msl—decline in shoreline activities
Shasta Reservoir	1,067 msl	>952msl—at least one boat ramp available on each arm 1,017 msl—limited surface area (boating constrained)
Trinity Reservoir	2,370 msl	2,170 msl—last boat ramp out of operation 2,320 msl—limited surface area (boating constrained)
Oroville Reservoir	900 msl	710 msl—last boat ramp out of operation 750 msl—limited surface area 819 msl—beaches close
Lower American River	–	State Water Board thresholds: 1,500–2,000 cfs—boating minimum range 3,000–6,000 cfs—boating optimal range 1,250–5,000 cfs—swimming CVPIA thresholds: 1,750–3,000 cfs—boating optimal range 1,750 cfs—minimum boating flows 1,500 cfs—optimal swimming flows Hodge Decision: 1,750 cfs—minimum summer recreation flows
Sacramento River	–	2,500–12,000 cfs—boating optimal range
Feather River	–	<2,5000 cfs—minimum rafting/boating elevation >5,000 cfs—optimal rafting/boating elevation
San Luis Reservoir	225 msl	340 msl—last boat ramp out of operation
Castaic Lake	1,515 msl	1,325 msl—last boat ramp out of operation 1,280 msl—minimum operating surface elevation
Lake Perris	1,590 msl	1,535 msl—last boat ramp out of operation 1,564 msl—marina closes 1,540 msl—minimum operating surface area
Pyramid Lake	2,579 msl	–
Silverwood Lake	3,355 msl	–

[a] Thresholds are measured in feet above msl for reservoirs and in cfs for rivers.

Sources: California State Water Resources Control Board 1988 (State Water Board opportunity thresholds for the Lower American River); U.S. Forest Service 2001 (boat ramp opportunity thresholds for Shasta Reservoir); U.S. Fish and Wildlife Service et al. 1999 (boat ramp opportunity thresholds for Trinity Lake); *Environmental Defense Fund v. EBMUD* 1990 (Hodge Decision; Bureau of Reclamation 1997 (all other opportunities).

A detailed discussion of CALSIM II and DSM2 modeling results is included in Chapter 5, "Physical Environment," under Section 5.1, Water Supply, and Section 5.2, Tidal Hydraulics.

Regulatory Setting

San Joaquin County General Plan

The San Joaquin County General Plan policies for recreation include emphasizing activities and facilities that are best provided on the regional level; addressing the needs of the county's residents; considering the recreational needs of the handicapped, youth, and people of low and moderate incomes; preserving natural features; providing opportunities to experience natural settings; protecting resource areas identified as being significant for recreation[4].

Contra Costa County General Plan

The Contra Costa County General Plan policies for recreation include reserving park lands to ensure that the present and future needs of the County's residents will be met; preserving areas of natural beauty or historical interest; designing parks appropriate to the need and access capabilities of all residents; public access to scenic areas on the waterfront and providing water-related recreation, such as fishing, boating, and picnicking; developing the Delta for recreation use in accordance with the state environmental goals and policies; protecting and enhancing the recreational value of the Delta; and distributing and managing recreational activity according to an area's carrying capacity (Contra Costa County 1996).

Delta Protection Act

The Delta Protection Act of 1992, includes the following sections:

- Section 29702, which indicates that the basic goals of the state for the Delta include the protection, maintenance, and, where possible, the enhancement and restoration of the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities.
- Section 29705, which indicates that the Delta's wildlife and wildlife habitats are valuable, unique, and irreplaceable resources of critical statewide significance and should be preserved and protected for the enjoyment of current and future generations.

[4] The closest areas to the proposed barrier locations that are considered by the County as significant resource areas for recreation include an area along the Middle River located approximately 2 miles north of the proposed Middle River barrier and at Trapper Slough located approximately 0.5 mile north of the Middle River barrier.

- Section 29710, which declares that agricultural, recreational, and other uses of the Delta can best be protected by implementing projects that protect wildlife habitat before conflicts arise.
- Section 29712, which acknowledges that the Delta's waterways and marinas offer recreational opportunities of statewide and local significance and are a source of economic benefit to the region, and because of increased demand and usage, public safety requirements will increase (California Public Resources Code Section 21080.22, Division 19.5, Chapter 1, Section 29702).

Delta Protection Commission Land and Resource Management Plan

The DPC Land and Resource Management Plan (LRMP) for the Primary Zone of the Delta includes the following Recreation and Access Policies and Recommendations:

- P-1: Where public funds are limited, local governments shall promote maintenance and supervision of existing public recreation areas over construction of new public facilities.
- P-2: To minimize the impacts on agriculture and wildlife habitat, local governments shall encourage expansion of existing private water-oriented commercial recreational facilities over construction of new facilities. Local governments shall ensure any new recreational facilities will be adequately supervised and maintained.
- P-3: Local governments shall develop siting criteria for recreation projects that will ensure minimal adverse impacts on: agricultural land uses, levees, and public drinking water supply intakes, and identified sensitive wetland and habitat area.
- P-4: Local governments shall improve public safety on Delta waterways through enforcement of local, state, and federal laws.
- P-5: Local governments shall encourage provision of publicly-funded amenities in or adjacent to private facilities, particularly if the private facility will agree to supervise and manage the facility (fishing pier, overlook, picnic area), thus lowering the long-term cost to the public.
- P-6: Local governments shall support multiple uses of Delta agricultural lands, such as seasonal use for hunting or improved parking and access sites.
- P-7: Local governments shall support improved access for bank fishing along state highways and county roads where safe and adequate parking can be provided and with acquisition of proper rights-of-access from the landowners. Adequate policing, garbage cleanup, sanitation facilities, and fire suppression for such access shall be provided.
- P-8: New, renovated, or expanded marinas shall include adequate restrooms, pump-out facilities, trash containers, oily waste disposal facilities, and other facilities necessary to meet needs of marina tenants. Use fees may be

charged for the use of these facilities but such fees shall not exceed the cost of maintenance.

- P-9: Local governments shall encourage new recreation facilities that take advantage of the Delta's unique characteristics.
- R-6: State and federal projects in the Primary or Secondary Zones should include appropriate recreation and/or public access components to the extent consistent with project purposes and with available funding. State and federal agencies should consider private or user group improvements on publicly owned lands to provide facilities (Delta Protection Commission 1995).

Significance Criteria

The criteria used for determining the significance of an impact on recreational resources are based on the State CEQA Guidelines and professional standards and practices. Impacts on both water-dependent and water-enhanced recreation opportunities may be considered significant if implementation of an alternative would:

- cause a change in south Delta flows or water level, river flows, or reservoir surface water elevations that would result in substantial changes to existing recreational opportunities;
- locate project facilities that would result in a substantial long-term disruption of any institutionally recognized recreational facilities or activities;
- cause an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- result in substantial inconsistency with local recreation plans and policies, including the DPC LRMP.

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project-specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program.

These programmatic mitigation measures are numbered as they appear in the ROD, and only those measures relevant to the SDIP resource area are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED programmatic mitigation measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

Recreation Mitigation Measures

1. Incorporate project-level recreation improvements and enhancements.
2. Work with recreational interests to protect and enhance recreation resources.
3. Conduct an analysis of boating circulation to ensure that appropriate alternative routes are identified and clearly marked if boating circulation in the Delta is modified due to temporary, seasonal, or permanent channel closures or to speed restrictions.
4. Identify and mark alternate boating routes.
6. Maintain boating access to prime areas.
8. Construct boat locks.
9. Provide public information regarding alternate access.
10. Avoid construction during peak-use seasons and times.
11. Post warning signs and buoys in channels.
12. Maintain reservoir levels as high as feasible during recreation season, given regulatory and other operational constraints.
13. Minimize water level fluctuation and establish minimum pool levels.
14. Coordinate operation of all reservoir facilities to minimize adverse reservoir fluctuations in any particular facility consistent with regulatory and other operational constraints.
20. Relocate, or construct new, recreation facilities and infrastructure.

Delta Protection Commission Mitigation

DWR and Reclamation are committed to adding project-level recreation improvements and enhancements and are working with the recreation subcommittee of the DPC to identify appropriate projects in and around the SDIP project area. Project-level improvements will be evaluated in separate documents when those actions are identified.

Alternative 1 (No Action)

The No Action Alternative would not result in any construction-related or operations-related recreation impacts associated with SDIP facilities.

Under the No Action Alternative temporary fish and flow control gates on Old River, Middle River and Grant Line Canal would continue to have the same effect on recreation uses as under existing conditions. Generally, boating and fishing use in the south Delta is minor compared to Delta-wide use levels (California Department of Parks and Recreation 1997). However, interviews

with south Delta commercial recreation business owners and managers (July 2003) indicate the opinion that their businesses have been adversely affected by lack of patronage since the installation of the temporary barriers (refer to the Social and Economic Conditions section for information on interviews conducted for DWR). These interviews indicate that access to south Delta channels may be affected by continued use of temporary barriers because boaters are not aware that access across temporary barriers is provided by a portage service or because boaters choose not to use the portage service. This No Action effect is the same as under existing conditions; therefore no impact would result.

Under the No Action Alternative, recreation facilities, including restrooms, drinking fountains, and picnic areas, would not be constructed at the gate sites. Therefore, this benefit to recreation would not occur if the SDIP project is not constructed as proposed. Continued operation of temporary barriers under Alternative 1 would not conflict with applicable County General Plan or DPC plans or policies.

2020 Conditions

Under Future No Action conditions (2020 conditions) SDIP would not be implemented. It is expected that the temporary barriers program would continue. It is also expected that the type of recreational uses in the south Delta and in reservoirs north and south of the Delta would remain the same as existing conditions. However, the number of users would increase as population increases throughout the state.

Alternatives 2A, 2B, and 2C

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact REC-1: Temporary Disruption to Recreational Opportunities during Construction of Gates. Construction of the fish control and flow control gates on Old River, Middle River and Grant Line Canal would disrupt boating access in these areas for a total of approximately 36 months. Each gate would require approximately 15–36 months to construct, and gates would be constructed concurrently. Temporary loss of recreation opportunities would result from the presence of construction vehicles, equipment, and personnel in and adjacent to south Delta channels; construction of cofferdams or sheetpiles at the gate locations; and temporary construction effects on channel water quality during construction (i.e., increased turbidity from suspended materials) near gate sites. The greatest potential for disruption of boating would occur on Old River and Grant Line Canal. Boating use on Middle River is generally low because of shallow, narrow channels. This impact is less than significant because:

- disruption of boating access near these sites would be temporary;
- overall, the effect of gate construction on boating access in the south Delta would be minor considering the current opportunities for this activity;

- gates would be constructed in a manner that would allow boating access through half of the channel cross section at all times,
- construction work would not occur during major summer holiday periods;
- warning signs and buoys upstream will be posted at, and downstream of, all construction equipment, sites, and activities; and
- adequate warning would be provided regarding activities and equipment in construction sites.

No mitigation is required.

Impact REC-2: Disruption of Recreation Opportunities from Permanent Gates. The location of permanent fish control and flow control gates on Old River, Middle River, and Grant Line Canal could potentially affect the amount of boating that occurs in the vicinity of gates because of perceived difficulty of navigating past these new structures. Because the permanent control gates have more operational flexibility than temporary barriers, the difficulty in navigation may be reduced. The Old River and Grant Line Canal gates would be designed to allow boat ingress/egress. The Middle River gate would be operated to allow boat passage during certain times of the day. This potential effect on boating would be most notable during summer months when recreation use is highest. The greatest potential for lost recreation opportunities would occur on Old River and Grant Line Canal. Boating on Middle River occurs less often because of shallow, narrow channels that most boats cannot access. In addition, boats cannot pass when the Middle River temporary barrier is in place. Gates on Old River and Grant Line Canal would include a boat lock to allow boat passage. In addition, DWR would implement Environmental Commitments to educate boaters about navigating in the vicinity of proposed gates (See Chapter 2). This impact is less than significant. No mitigation is required.

Impact REC-3: Reduced Accessibility to Commercial Recreation Facilities because of Gates. The location of permanent fish control and flow control gates could potentially affect the ability of boaters to access commercial recreation businesses (Figure 7.4-2) on Old River and Grant Line Canal. Interviews with marina operators and commercial recreation providers in July 2003 indicate that access to recreation sites has been an issue for recreationists since the implementation of the temporary barriers in the south Delta. Commercial recreation business owners and managers indicated that their businesses have experienced declining use and economic impacts since the temporary barriers have been in place, suggesting that temporary barriers have adversely affected public access to the south Delta channels. There are approximately 32 marinas within a 6-mile radius of the project area; therefore, reduced access to one would not result in a significant loss in recreation access or services. There are approximately 15 boat launches within the 6-mile radius and Alternative 2A–2C would reduce access to only one boat launch. The proposed permanent gates would also improve boating access from the current conditions. Boat locks on Old River and Grant Line flow control gates would allow access to marinas and other businesses. It is possible that during peak use periods (afternoons), boaters could experience a short delay at boat locks, but overall,

boating access would not be reduced. This impact is less than significant. No mitigation is required. Please refer also to Section 7.2, Social Issues and Economics.

Impact REC-4: Conflict with Applicable Policies and Regulations. Implementation of Alternatives 2A–2C would not conflict with the identified applicable policies and regulations because, compared to the temporary barriers, permanent gates would result in improved access to the south Delta channels and to the commercial recreation businesses, and no recreation facilities would be displaced by project implementation. Implementing Alternatives 2A–2C would also not conflict or be inconsistent with local or state land use and recreation goals and policies. There would be no impact. No mitigation is required.

Impact REC-5: Alteration of Present Patterns of Recreational Navigation in Waterways. The placement of a permanent fish control gate at the head of Old River and permanent flow control gates on Old River, Middle River, and Grant Line Canal, would slightly modify the present recreational navigation access in these areas when the gates are operated. The proposed gates at Head of Old River, Old River and Grant Line Canal would provide permanent boat locks to allow boat passage during this time. An operator would be employed at each boat lock during the time that the gate is operated.

Use of current boat portage services takes approximately 10 minutes per boat (Doty pers. comm.). Under Alternatives 2A–2C, Middle River would continue to have a boat portage service to allow boats to cross. However, the gate and the boat portage service will be in place year-round instead of seasonally. This impact is less than significant. No mitigation is required.

Implementation of Alternatives 2A–2C would create permanent gates with boat locks at the head of Old River, Old River and Grant Line Canal. Boats entering/exiting Old River via San Joaquin River or Grant Line Canal would be required to stop year-round and wait for access through the gate via boat lock. The time to pass through the gate using the boat lock is anticipated to average 15 minutes (Doty pers. comm.). Although the time to pass through the boat lock on average is expected to be 5 minutes longer than with the boat portage service, this increase in wait time is minimal. This impact is less than significant. No mitigation is required.

Impact REC-6: Change in Water-Dependent and Water-Enhanced Recreation Opportunities in the South Delta. Operation of Alternatives 2A–2C would result in very small changes in south Delta water surface elevations. DSM2 modeling for Alternatives 2A–2C operations predicts that water surface elevations downstream of the proposed gates would decrease by less than 2 inches compared to existing conditions and the No Action Alternative. This predicted change in water surface elevation in the Old River, between the CVP Tracy facility and SR 4 bridge, would not be noticeable to recreationists engaged in water-dependent or -enhanced activities along those waterways. This impact is less than significant. No mitigation is required.

Dredging

Impact REC-7: Temporary Disruption to Recreational Opportunities during Dredging Operations. Under Alternatives 2A–2C proposed dredging of Old River, West Canal, and Middle River (Figure 7.4-2) and maintenance dredging would occur between August 1 and November 30 and could temporarily disrupt boating access during operation of hydraulic or clam shell dredging equipment from a barge. Boating and other recreation access would be restricted in the dredged area while equipment is being operated. This project activity could result in delays in boating on the affected channels or temporary loss of the recreation opportunity. Boating use in the south Delta would not be substantially degraded by temporary operation of dredging equipment, dredging would not occur on major summer holidays or weekends, and an Environmental Commitment would be implemented to educate and inform boaters about SDIP activities (See Chapter 2). This impact is less than significant. No mitigation is required.

2020 Conditions

Recreation use within the Delta is expected to increase by 2020 in response to regional population growth. The impact on recreation resulting from constructing and operating Alternatives 2A–2C would be similar to those described above. Therefore, all impacts would be less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact REC-8: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at North-of-Delta Reservoirs and Rivers. Operation of Alternatives 2A–2C would result in very small changes in the frequency with which the surface elevation of Shasta, Oroville, Trinity, and Folsom Reservoirs would fall below levels identified as important water-dependent recreation thresholds. During the peak season, from May to September, the change in surface elevation of these reservoirs would range between 4 additional months above the recreation thresholds to 11 additional months below the recreation thresholds over the 73-year modeling period (Table 7.4-5). Operation of the alternatives would also result in a very small change in the frequency with which flows in the Sacramento, American, and Feather Rivers are within a range suitable for water-dependent recreation during the peak recreation season (May to September). Flows in the rivers would range between 1 additional month inside the recreation thresholds to 6 additional months outside the recreation thresholds over the 73-year modeling period (Table 7.4-5). The small changes in reservoir surface elevations and river flows would not adversely affect water-dependent or water-enhanced recreation at these reservoirs or rivers. In addition, these small changes are not expected to affect the abundance of sport fish in reservoirs or rivers. (Section 6.1, Fish, provides a detailed evaluation of impacts on fish.) This impact is less than significant. No mitigation is required.

Table 7.4-5. Comparisons of Reservoir Level and River Flow Exceedance Frequencies for Recreation Opportunities at Important Recreation Resources[a]

	Project Change			
	2001 Baseline	Scenario A	Scenario B	Scenario C
Recreation Threshold	Months[b]/ Percent[c]	Months[d]/ Percent[c]	Months[d]/ Percent[c]	Months[d]/ Percent[c]
Folsom Reservoir[e] (Peak Season)				
360 msl—last boat ramp out of operation	10/2.7	+1/0.3	+1/0.3	+2/0.6
400 msl—limited surface area	50/13.7	+3/0.8	+1/0.3	No change
405 msl—marina closes	64/17.5	+6/1.6	+2/0.6	+4/1.1
430 msl—decline in shoreline activities	163/44.7	+5/1.4	+3/0.8	+3/0.8
Shasta Reservoir[e] (Peak Season)				
952 msl—last boat ramp out of operation	43/11.8	+2/0.6	No change	No change
1,107 msl—limited surface area	172/47.1	+5/1.4	+3/0.8	+3/0.8
Trinity Reservoir[e] (Peak Season)				
2,170 msl—last boat ramp out of operation	12/3.3	No change	+1/0.3	+1/0.3
2,320 msl—limited surface area	195/53.4	+3/0.8	-4/1.1	-4/1.1
Oroville Reservoir[e] (Peak Season)				
710 msl—last boat ramp out of operation	21/5.8	+3/0.8	+6/1.6	+5/1.4
750 msl—limited surface area	55/15.1	+2/0.6	No change	+4/1.1
819 msl—beaches close	156/42.7	+4/1.1	+11/3.0	+6/1.6
San Luis Reservoir[e]				
340 msl–last boat ramp out of operation	5/1.4	-4/1.1	-4/1.1	-5/1.4
Lower American River[e]				
<1,500 cfs—minimum rafting/boating elevation	39/10.7	+3/0.8	+1/0.3	-1/0.3
>3,000 cfs—optimal rafting/boating elevation	177/48.5	+3/0.8	+5/1.4	+4/1.1
Feather River[e]				
<2,500 cfs—minimum rafting/boating elevation	134/36.7	No change	+1/0.3	+3/0.8
>5,000 cfs—optimal rafting/boating elevation	144/39.5	+3/0.8	+5/1.4	+4/1.1
Sacramento River[e]				
<2,500 cfs—optimal rafting/boating minimum elev	0/0	No change	No change	No change
>12,000 cfs—optimal rafting/boating elevation	92/25.2	+6/1.6	+1/0.3	-1/0.3

[a] Project changes under Scenarios A–C are for Alternative 2 and are based on a comparison with the 2001 Baseline (conditions under the 73-year hydrologic period).

[b] Number of months the reservoir level is below indicated threshold or river flows are above or below indicated threshold.

[c] Percent of time reservoir level is below indicated threshold or river flows are above or below indicated threshold or inside.

[d] Change in number of months above or below threshold or inside indicated range compared to Baseline: + additional months below threshold or inside of indicated range, - fewer months below threshold or inside indicated range.

[e] The peak season extends from May to September (365 months over the 73-year hydrologic period).

Impact REC-9: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at SWP South-of-Delta Reservoirs. Operation of Alternatives 2A–2C would result in very small changes in the storage at San Luis Reservoir and other SWP reservoirs south of the Delta. During the peak season, from May to September, the surface elevation of San Luis Reservoir would remain above the recreation thresholds for 5 additional months over the 73-year modeling period (Table 7.4-5). Changes in storage and surface elevation at other SWP south-of-Delta reservoirs are also expected to be small. These small changes are not expected to affect the abundance of sport fish in south-of-Delta reservoirs. This impact is less than significant. No mitigation is required.

2020 Conditions

As described in Sections 5.1 and 5.2, water levels within the north- and south-of-Delta storage facilities and waterways would be similar to the present levels. Therefore, impacts resulting from implementation of Alternatives 2A–2C would be similar to those described above. All impacts are less than significant, and no mitigation is required.

Interim Operations

Interim operations in south Delta would have similar effects on recreation as discussed under the No Action Alternative. No new facilities would be constructed and the temporary barriers would continue to be installed and removed annually. The slight change in diversions to CCF would not result in a substantial change in the surface elevation of Delta waterways. The impacts on recreation opportunities and use are considered less than significant, and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact REC-1: Temporary Disruption to Recreational Opportunities during Construction of Gates. Construction of the fish control and flow control gates on Old River and Middle River would disrupt boating access in these areas for a total of approximately 36 months. Each gate would require approximately 15–36 months to construct, and gates would be constructed concurrently. Temporary loss of recreation opportunities would result during the construction period in a manner similar to that described for Alternatives 2A–2C. The greatest potential for disruption of boating would occur on Old River. Boating use on Middle River is generally low because of shallow water depths. This impact is less than significant because:

- disruption of boating access near these sites would be temporary;

- overall, the effect of gate construction on boating access in the south Delta would be minor considering the current opportunities for this activity;
- gates would be constructed in a manner that would allow boating access through half of the channel cross section at all times;
- construction work would not occur during major summer holiday periods;
- warning signs and buoys upstream will be posted at, and downstream of, all construction equipment, sites, and activities; and
- adequate warning would be provided regarding activities and equipment in construction sites.

No mitigation is required.

Impact REC-2: Disruption of Recreation Opportunities from Permanent Gates. The location of permanent fish control and flow control gates on Old River and Middle River could potentially affect the amount of boating that occurs in the vicinity of gates because of perceived difficulty of navigating past these new structures. Because the permanent control gates have more operational flexibility than temporary barriers, the difficulty in navigation may be reduced. All permanent gates would be designed to allow boat ingress/egress past permanent gates. This potential effect on boating would be most notable during summer months when recreation use is highest. The greatest potential for lost recreation opportunities would occur on Old River because boating on Middle River occurs less often because of shallow water depths. The Old River gates would operate a boat lock to allow boat passage. DWR would also implement Environmental Commitments to educate boaters about navigating in the vicinity of proposed gates (See Chapter 2). This impact is less than significant. No mitigation is required.

Impact REC-3: Reduced Accessibility to Commercial Recreation Facilities because of Gates. The location of permanent fish control and flow control gates under Alternative 3B could potentially affect the ability of boaters to access commercial recreation businesses (Figure 7.4-2) on Old River in a manner similar to that described for Alternatives 2A–2C. The proposed permanent gates under Alternative 3B would improve boating accessibility compared to existing conditions and No Action Alternative conditions. This impact is less than significant. No mitigation is required. Please refer also to Section 7.2, Social Issues and Economics.

Impact REC-4: Conflict with Applicable Policies and Regulations. Implementation of Alternative 3B would not conflict with the identified applicable policies and regulations because compared to the temporary barriers, permanent gates would result in improved access to the south Delta channels and to the commercial recreation businesses, and no recreation facilities would be displaced by project implementation. Implementing Alternative 3B would also not conflict or be inconsistent with local or state land use and recreation goals and policies. This impact is less than significant. No mitigation is required.

Impact REC-5: Alteration of Present Patterns of Recreational Navigation in Waterways. The impacts on recreational navigation in south Delta waterways would be similar to those under Alternatives 2A–2C. This impact would be slightly less under Alternative 3B because no gate will be constructed at Grant Line Canal. Under this alternative there will be one less barrier that would alter patterns of recreational navigation. This impact would be less than significant. No mitigation is required.

Impact REC-6: Change in Water-Dependent and Water-Enhanced Recreation Opportunities in the South Delta. Operation of Alternative 3B would result in very small changes in south Delta water surface elevations. DSM2 modeling for Alternative 3B operations predicts that water surface elevations in Old River would decrease by less than 2 inches compared to existing conditions and the No Action Alternative. This predicted change in water surface elevation in the Old River, between the CVP Tracy facility and SR 4 bridge, would not be noticeable to recreationists engaged in water-dependent or -enhanced activities along those waterways. This impact is less than significant. No mitigation is required.

Dredging

Impact REC-7: Temporary Disruption to Recreational Opportunities during Dredging Operations. Under Alternative 3B, proposed dredging of Old River, West Canal, and Middle River (Figure 7.4-2) and maintenance dredging would occur between August 1 and November 30 and could temporarily disrupt boating access during operation of hydraulic or clam shell dredging equipment. This potential disruption would be similar to the disruption described under Alternatives 2A–2C. Boating and other recreation access would be restricted in the dredged area while equipment is being operated. This impact is less than significant for the same reason identified under Alternatives 2A–2C. No mitigation is required.

2020 Conditions

Recreation users are expected to increase in the future. However, the impacts resulting from implementation of Alternative 3B under 2020 conditions would be similar to those described above. Therefore, all impacts would be less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact REC-8: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at North-of-Delta Reservoirs and Rivers. Operation of Alternative 3B would result in very small changes in the frequency with which the surface elevation of Shasta, Oroville, Trinity, and Folsom Reservoirs and Sacramento, American, and Feather Rivers would fall below levels identified as important water-dependent recreation thresholds. During the peak season, from May to September, the surface elevation of these reservoirs would range between 4 additional months above the recreation thresholds to 11 additional months below the levels at which boating becomes constrained

over the 73-year modeling period (Table 7.4-5). Operation of this alternative would also result in a very small change in the frequency with which flows in the Sacramento, American, and Feather Rivers are within a range suitable for water-dependent recreation during the peak recreation season (May–September). Flows in the rivers would fall outside the suitable range between 0 and 5 additional months over the 73-year modeling period (Table 7.4-5). The small changes in reservoir surface elevations and river flows would not adversely affect water-dependent or water-enhanced recreation at these reservoirs or rivers. In addition, these small changes are not expected to affect the abundance of sport fish in reservoirs or rivers. (Section 6.1, Fish, provides a detailed evaluation of impacts on fish.) This impact is less than significant. No mitigation is required.

Impact REC-9: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at SWP South-of-Delta Reservoirs. Operation of Alternatives 2A–2C would result in very small changes in the storage at San Luis Reservoir and other SWP reservoirs south of the Delta. During the peak season, from May to September, the surface elevation of San Luis Reservoir would remain above the recreation thresholds for 4 additional months over the 73-year modeling period (Table 7.4-5). Changes in storage and surface elevation at other SWP south-of-Delta reservoirs are also expected to be small. These small changes are not expected to affect the abundance of sport fish in south-of-Delta reservoirs. This impact is less than significant. No mitigation is required.

2020 Conditions

As described in Sections 5.1 and 5.2, water levels within the north- and south-of-Delta storage facilities and within south Delta waterways would be similar to present levels. Therefore, impacts resulting from implementation of Alternative 3B would be similar to those described above. All impacts are less than significant, and no mitigation is required.

Alternative 4B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact REC-1: Temporary Disruption to Recreational Opportunities during Construction of Gates. Construction of the fish control and flow control gates on Old River would disrupt boating access in these areas for a total of approximately 36 months. Each gate would require approximately 15–36 months to construct, and gates would be constructed concurrently. Temporary loss of recreation opportunities would result during the construction period in a manner similar to that described under Alternatives 2A–2C and 3B. This impact is less than significant for the same reasons identified for Alternatives 2A–2C. No mitigation is required.

Impact REC-2: Disruption of Recreation Opportunities from Permanent Gates. The location of a permanent fish control gate on Old River could potentially affect the amount of boating that occurs in the vicinity of the gate because of perceived difficulty of navigating past the new structure. Because the permanent gate would have more operational flexibility than a temporary barrier, the difficulty in navigation may be reduced. The permanent gate would be designed to allow boat ingress/egress past permanent gates. This potential effect on boating would be most notable during summer months when recreation use is highest. This impact is less than significant. No mitigation is required.

Impact REC-3: Reduced Accessibility to Commercial Recreation Facilities because of Gates. The location of permanent fish control and flow control gates under Alternative 4B could potentially affect the ability of boaters to access commercial recreation businesses (Figure 7.4-2) on Old River in a manner similar to that described for Alternatives 2A–2C and 3B. The proposed permanent gates under Alternative 4B would improve boating accessibility compared to existing conditions and No Action Alternative conditions. This impact is less than significant. No mitigation is required. Please refer also to Section 7.2, Social Issues and Economics.

Impact REC-4: Conflict with Applicable Policies and Regulations. Implementation of Alternative 4B would not conflict with the identified applicable policies and regulations because compared to temporary barriers, the permanent gate would result in improved access to the south Delta channels and to the commercial recreation businesses, and no recreation facilities would be displaced by project implementation. Implementing Alternative 4B would also not conflict or be inconsistent with local or state land use and recreation goals and policies. This impact is less than significant. No mitigation is required.

Impact REC-5: Alteration of Present Patterns of Recreational Navigation in Waterways. The impacts on recreational navigation in south Delta waterways would be similar to those under Alternatives 2A–2C. The head of Old River fish control gate is the only gate that will be constructed under Alternative 4B; therefore the impacts under this alternative would be slightly less than under Alternatives 2A–2C. Under this alternative there will only be one gate that would alter patterns of recreational navigation and this gate would have a boat lock. This impact is less than significant. No mitigation is required.

Impact REC-6: Change in Water-Dependent and Water-Enhanced Recreation Opportunities in the South Delta. Operation of Alternative 4B would result in very small changes in south Delta water surface elevations. DSM2 modeling for Alternative 4B operations predicts that water surface elevations downstream of the proposed Old River fish control gate would decrease by less than 2 inches compared to existing conditions and the No Action Alternative. This predicted change in water surface elevation in the Old River, between the CVP Tracy facility and SR 4 bridge, will not be noticeable to recreationists engaged in water-dependent or -enhanced activities along those waterways. This impact is less than significant. No mitigation is required.

Dredging

Impact REC-7: Temporary Disruption to Recreational Opportunities during Dredging Operations. Under Alternative 4B, proposed dredging (Figure 7.4-2) and maintenance dredging would occur between August 1 and November 30 and could temporarily disrupt boating access during operation of hydraulic or clam shell dredging equipment similar to that described for Alternatives 2A–2C. Boating and other recreation access would be restricted in the dredged area while equipment is being operated, most likely during the months of August and September. This impact is less than significant for the same reason identified for Alternatives 2A–2C. No mitigation is required.

2020 Conditions

Recreation users are expected to increase in the future. However, the impacts resulting from implementation of Alternative 4B under 2020 conditions would be similar to those described above. Therefore, all impacts would be less than significant, and no mitigation is required.

Stage 2 (Operational Component)

Impact REC-8: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at North-of-Delta Reservoirs and Rivers. Operation of Alternative 4B would not result in changes in the frequency with which the surface elevation of Shasta, Oroville, Trinity, and Folsom Reservoirs and Sacramento, American, and Feather Rivers would fall below levels identified as important water-dependent recreation thresholds. During the peak season, from May to September, the surface elevation of these reservoirs would range between 4 additional months above the recreation thresholds to 11 additional months below the levels at which boating becomes constrained over the 73-year modeling period (Table 7.4-5). Operation of this alternative would also result in a very small change in the frequency with which flows in the Sacramento, American, and Feather Rivers are within a range suitable for water-dependent recreation during the peak recreation season (May–September). Flows in the rivers would fall outside the suitable range between 0 to 5 additional months over the 73-year modeling period (Table 7.4-5). The small changes in reservoir surface elevations and river flows would not adversely affect water-dependent or water-enhanced recreation at these reservoirs or rivers. In addition, these small changes are not expected to affect the abundance of sport fish in reservoirs or rivers. (Section 6.1, Fish, provides a detailed evaluation of impacts on fish.) This impact is less than significant. No mitigation is required.

Impact REC-9: Change in Water-Dependent and Water-Enhanced Recreation Opportunities at SWP South-of-Delta Reservoirs. Operation of Alternative 4B would result in very small changes in the storage at San Luis Reservoir and other SWP reservoirs south of the Delta. During the peak season, from May to September, the surface elevation of San Luis Reservoir would remain above the recreation thresholds for 4 additional months over the 73-year modeling period (Table 7.4-5). Changes in storage and surface elevation at other SWP south-of-Delta reservoirs are also expected to be small. These

small changes are not expected to affect the abundance of sport fish in south-of-Delta reservoirs. This impact is less than significant. No mitigation is required.

2020 Conditions

As described in Sections 5.1 and 5.2, water levels within the north- and south-of-Delta storage facilities and within south Delta waterways would be similar to present levels. Therefore, impacts resulting from implementation of Alternative 3B would be similar to those described above. All impacts are less than significant, and no mitigation is required.

Cumulative Evaluation of Impacts

Cumulative impacts on Recreation are analyzed in Chapter 10, "Cumulative Impacts." This chapter also summarizes the other foreseeable future projects that may contribute to these impacts.

7.5 Power Production and Energy

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on power production and energy. Specifically, it evaluates and discusses the consequences associated with construction and operation of the project. Significance of impacts is determined by applying significance criteria set forth in the State CEQA Guidelines.

Summary of Significant Impacts

There are no significant impacts on power production and energy as a result of implementation of any of the alternatives. All impacts are discussed in detail under the Environmental Consequences section.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- Draft EIR/EIS for the ISDP, Volume I, July 1996;
- California Department of Water Resources Bulletin 132-01: *Management of the California State Water Project*, December 2002;
- California Department of Water Resources Bulletin 132-00: *Management of the California State Water Project*, December 2001;
- California Department of Water Resources Bulletin 132-99: *Management of the California State Water Project*, March 2001;
- California Department of Water Resources Bulletin 132-98: *Management of the California State Water Project*, November 1999; and
- California Department of Water Resources Bulletin 132-97: *Management of the California State Water Project*, December 1998.

State Water Project Electrical Generation and Consumption

The primary purpose of the SWP electrical generation facilities is to meet the energy requirements of the SWP pumping plants. Because DWR has the flexibility to regulate SWP pumping on an hourly basis, maximum SWP pumping is generally scheduled when power costs are low (e.g., during the

middle of the night when there is less demand on the regional power system). By scheduling as much off-peak pumping as possible, DWR is able to take advantage of inexpensive surplus electrical generation capability. Conversely, DWR maximizes its electrical generation when electricity is the most expensive (e.g., during the afternoon and early evening in the summer). In this manner, DWR is able to manage a comprehensive power resources program that helps minimize the cost of water deliveries to SWP water supply contractors (California Department of Water Resources 2002c).

The SWP is one of the largest water and power systems in the world (California Department of Water Resources 2002c). Operation of the SWP (e.g., pumping plants that pump SWP water to farms and cities) requires more electricity than is generated by SWP facilities (e.g., hydroelectric plants at SWP reservoirs). The balance of electricity needed to operate the SWP is provided by long-term contracts with electricity providers and short-term purchases. Because of the flexibility in SWP operations (described above), DWR sells electricity to utility companies when the SWP generates electricity that is surplus to its requirements; this reduces DWR's net cost of pumping (California Department of Water Resources 2002c). Table 7.5-1 is a summary showing the amount of electricity consumed and generated throughout the SWP for 1996 through 2000, including long- and short-term purchases and electricity sales.

Table 7.5-1. Electricity Purchased and Generated by the SWP (1996–2000)[a]

Category	Year				
	2000	1999	1998	1997	1996
Electricity Required by SWP Facilities	9,190.38	5,757.53	3,445.29	5,669.61	5,308.24
Electricity Generated by SWP Facilities	6,371.67	5,673.63	5,915.17	4,566.82	5,189.82
Electricity Provided through Long-term Agreements	3,429.91	3,084.52	3,621.38	4,639.58	4,292.01
Electricity Provided through Short-term Purchases	2,310.83	1,230.77	808.50	370.13	159.29
Electricity Sales	2,921.88	4,231.40	6,899.76	3,906.91	4,332.88

Note:

[a] Units are shown in millions of kilowatt-hours.

Sources: California Department of Water Resources 1998c, 1999d, 2001d, 2001c, and 2002c.

The SWP generates a large portion of the electricity it consumes at the power plants that are owned either entirely or partially by DWR. The locations of these power plants are shown on Figure 7.5-1. In addition, DWR has several short- and long-term contracts for electricity purchases, exchanges, transfers, and sales with other electric utilities in California and the western states (California Department of Water Resources 2002c).

DWR has contracts with Southern California Edison and PG&E for most of the intrastate transmission service it needs to operate the SWP (California Department of Water Resources 2002c). DWR owns 32 circuit miles of 230-kV transmission lines connecting the Hyatt-Thermalito Powerplant to PG&E's Table Mountain Substation (California Department of Water Resources and Bureau of Reclamation 1996a).

CVP Electrical Generation and Consumption

Similar to the SWP, the federal CVP is a major generator and consumer of electricity in California. Electricity produced at Reclamation facilities is used at CVP facilities to meet authorized project purposes or sold as surplus power. Unlike the SWP, the CVP is a net producer of power—it generates more electricity than it requires to operate. Generation by CVP power plants in 2002 was approximately 4,295 million kilowatt-hours (Bureau of Reclamation 2003c). Surplus power contracts are marketed in the CVP area by the Western Area Power Administration. Preference for surplus power contracts is given to municipalities, public corporations, public and State agencies, and cooperatives or other nonprofit organizations. In the south Delta, the CVP Tracy facility is located near the SWP Banks facility and diverts water into the DMC for export.

Environmental Consequences

Assessment Methods

Changes in SWP electricity generation and consumption were assessed using the CALSIM II model (see http://modeling.water.ca.gov for a discussion of CALSIM II). For this project, DWR developed a power module based on CALSIM II. This new power module uses CALSIM II output (e.g., river and aqueduct flow, reservoir capacity) and standard electricity equations to determine how much power would be generated by SWP facilities and how much electricity would be consumed by other SWP facilities. To understand the order of magnitude changes in CVP net electricity use, CALSIM II output was also analyzed using Long-term Generation, a spreadsheet developed by the Western Area Power Administration.

The effects of operating the flow control and fish control gates are not considered in the quantitative assessment of changes in SWP electricity generation and consumption. At this time, the CALSIM II power module does not include the proposed facilities. A separate assessment was conducted, using standard engineering calculations, to determine the increase in electricity consumption by the permanent operable gates.

Significance Criteria

For electricity generation and consumption, the environmental consequences of the project are measured in terms of how the operation of the project would affect the net energy requirements of the SWP. This is consistent with the significance criteria used in the CALFED Bay-Delta Program Final Programmatic EIS/ EIR (July 2000(b)).

Effects on the SWP net energy requirements would be considered significant if net electricity consumption increased substantially. For this analysis, a substantial increase is defined as an increase in net electricity consumption of more than 10%.

Alternative 1 (No Action)

Impact POW-1: Potential Changes in SWP Electricity Generation and Consumption as a Result of Operating the Temporary Barriers. Table 7.5-2 summarizes average electricity generation and consumption for the No Action Alternative and the future no action conditions as modeled by CALSIM II. The table shows that there would not be a substantial increase in either electricity generation or consumption between the current condition and the future condition with implementation of the No Action Alternative, and no mitigation is required.

Table 7.5-2. Alternative 1 SWP Electricity Generation and Consumption, Average of All Water Years (in gigawatt-hours)

Delivery Type	2001 Demand	2020 Demand
Electricity Generation	4,663	4,820
Electricity Consumption	9,102	9,721

Source: CALSIM II model output (California Department of Water Resources 2003 unpublished information).

Impact POW-2: Increased Electricity Consumption as a Result of Operating the Temporary Barriers. No electricity would be consumed under the No Action Alternative because there would be no active operation of the temporary rock barriers.

2020 Conditions

As described above, there would be no significant changes in energy production or consumption under the future no action conditions (2020 conditions). Therefore, impacts would be less than significant, and no mitigation is required.

Alternatives 2A, 2B, 2C

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

There are no impacts to power production and energy as a result of the construction of the fish control and flow control gates.

Impact POW-3: Increased Electricity Consumption as a Result of Operating the Fish Control and Flow Control Gates. Minor changes to local electricity consumption could occur under Alternatives 2A–2C relative to the No Action Alternative. Average energy usage for the permanent gates is expected to total approximately 4,000 kilowatt-hours per month (Enas pers. comm.). Electric power will be required to operate the fish control and flow control gates. Under Alternatives 2A–2C, electricity at the head of Old River fish control gate would be used to raise and lower the bottom hinge gates, and for operating miter gates for the boat locks (the boat locks would not otherwise require power for operations). Lighting for accessory buildings and navigation/safety purposes would require additional electricity consumption. Similar electricity consumption would be required for each of the flow control gates, except that there would be no boat locks at the Middle River gate. The electricity consumed by the gates relative to overall SWP electricity consumption is very small. This impact is less than significant. No mitigation is required.

Dredging

There are no impacts to power production and energy as a result of the dredging proposed as part of Alternatives 2A–2C.

2020 Conditions

Implementation of Alternatives 2A–2C under 2020 conditions would result in physical/structural component impacts on power production or consumption as described above.

Stage 2 (Operational Component)

Impact POW-4: Potential Changes in SWP Electricity Generation and Consumption. Increasing diversions from 6,800 cfs to 8,500 cfs would allow greater flexibility in DWR's operations and potentially change the amount of electricity generated and consumed by SWP facilities. These changes depend on how the SWP Banks facility is operated. Potential changes are discussed below, with additional information presented in Table 7.5-3.

Table 7.5-3. Alternative 2 SWP Electricity Generation and Consumption, Average of All Water Years (in gigawatt-hours)

Delivery Type and Year of Demand		Alt 1	Alt. 2A (% change)	Alt. 2B (% change)	Alt. 2C (% change)
Generation	2001	4,663	**41** (0.9%)	**-6** (-0.1%)	**24** (0.5%)
	2020	4,820	**55** (1.1%)	**8** (0.2%)	**52** (1.1%)
Consumption	2001	9,102	**168** (1.8%)	**-17** (-0.2%)	**136** (1.5%)
	2020	9,721	**235** (2.4%)	**30** (0.3%)	**229** (2.4%)

Source: CALSIM II model output (California Department of Water Resources 2003h unpublished information).

Annual average SWP electricity generation would increase under operational scenarios that result in increased SWP water deliveries (e.g., Alternatives 2A and 2C), primarily as a result of increased flows through generating facilities along the California Aqueduct (e.g., Devil Canyon). Alternative 2B would result in decreased generation under 2001 demands. SWP electricity consumption would continue to outpace generation under all operational scenarios. For alternatives that result in increased water deliveries (Alternatives 2A and 2C), annual average SWP electricity consumption would increase, primarily as a result of increased pumping at pumping plants along the California Aqueduct (e.g., Edmonston) and to a lesser degree at the SWP Banks facility. For these alternatives, the increase in SWP electricity consumption would outpace the increase in generation described in the above paragraph, resulting in a net increase in consumption. Alternative 2B would result in decreased consumption under 2001 demands. Overall, net consumption changes little under Alternative 2B.

Relative to the No Action Alternative, Alternatives 2A and 2C would result in an increase in net SWP electricity consumption. On an annual average basis, the level of net SWP electricity consumption could increase up to 177 gigawatt-hours under Alternative 2C. In addition, it is possible that the increased flexibility of SWP operations would allow additional pumping to occur during off-peak times and, therefore, DWR could take advantage of more favorable off-peak rates. This potential economic benefit of increased pumping flexibility could help offset the adverse effect of increased SWP energy consumption. Because of the small increase and expected increase in flexibility, this impact would be less than significant.

Relative to the No Action Alternative, Alternative 2B would result in approximately the same level of SWP electricity generation and consumption. This impact is less than significant. No mitigation is required.

Impact POW-5: Potential Changes in CVP Electricity Generation and Consumption. Increased capacity of the SWP Banks facility combined with flexible operation by DWR could allow some diversion requirements to be transferred to the federal CVP Tracy facility. This is expected to be especially true under Alternative 2A, which increases the integrated operation of the state and federal pumping facilities in the south Delta. Because of this increased integrated operation, the potential effects of Alternative 2A on CVP electricity generation and use were analyzed using the Western Area Power Administration's Long-term Generation spreadsheet. All other operational scenarios were assumed to cause a smaller increase in net consumption than under Alternative 2A. This impact is less-than-significant. No mitigation is required.

2020 Conditions

Implementation of Alternatives 2A–2C would result in increased power generation and consumption under 2020 demands. However, overall, the consumption is greater than the generation in all alternatives. Electricity consumption under Alternative 2A is expected to increase by about 47 million kilowatt-hours per year, or about 3.8% relative to the No Action Alternative. In that same timeframe, no change is expected in electricity generation, and therefore net generation is expected to decline by an annual average of 3.8% relative to the No Action Alternative. This is comparable to the project-related changes in net SWP electricity consumption (Impact POW-3) discussed above. These impacts are less than significant, and no mitigation is required.

Interim Operations

Interim operations would result in an increase in diversions into CCF. As described above, this would result in a general net increase in consumption; however, both consumption and generation would be decreased. No permanent gates would be operated, and therefore, there would be no consumption of energy related to gate operation. These impacts are less than significant, and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

There are no impacts to power production and energy as a result of the construction of the fish control and flow control gates.

Impact POW-3: Increased Electricity Consumption as a Result of Operating the Fish Control and Flow Control Gates. Minor changes to local electricity consumption could occur relative to the No Action Alternative. Average energy usage for the permanent gates is expected to total approximately

4,000 kilowatt-hours per month (Enas pers. comm.). Electric power will be required to operate the fish control and flow control gates. Under Alternative 3B, electricity at the head of Old River fish control gate would be used for operating inflatable bladders to raise and lower the bottom-hinged gates, and for operating miter gates for the boat locks (the boat locks would not otherwise require power for operations). Lighting for accessory buildings and navigation/safety purposes would require additional electricity consumption. Similar electricity consumption would be required for each of the agricultural gates, except that there would be no boat locks at the Middle River gate. The electricity consumed by the gates relative to overall SWP electricity consumption is very small. This impact is less than significant. No mitigation is required.

Dredging

There are no impacts to power production and energy as a result of the dredging associated with Alternative 3B.

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would not result in construction-related impacts on power production or consumption as described above.

Stage 2 (Operational Component)

Impact POW-4: Potential Changes in SWP Electricity Generation and Consumption. Increasing diversions from 6,800 cfs to 8,500 cfs would allow greater flexibility in DWR's operations and potentially change the amount of electricity generated and consumed by SWP facilities. These changes would depend on how the SWP Banks facility is operated. Alternative 3B would result in decreased generation under 2001 demands. SWP electricity consumption would continue to outpace generation under Alternative 3B. Implementation of this alternative would result in decreased consumption under 2001 demands. Overall, net consumption changes little under Alternative 3B.

In addition, it is possible that the increased flexibility of SWP operations would allow additional pumping to occur during off-peak times and, therefore, DWR could take advantage of more favorable off-peak rates. This potential economic benefit of increased pumping flexibility could help offset the adverse effect of increased SWP energy consumption. Relative to the No Action Alternative, Alternative 3B would result in approximately the same level of SWP electricity generation and consumption. This impact is less than significant. No mitigation is required.

Impact POW-5: Potential Changes in CVP Electricity Generation and Consumption. Increased diversions combined with flexible operation by DWR could allow some diversion requirements to be transferred to the federal CVP Tracy facility. This is comparable to the project-related changes in net SWP electricity consumption (Impact POW-3). This impact is less-than-significant. No mitigation is required.

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would result in increased generation and consumption of energy. Overall, there is a net increase in consumption. Under 2020 conditions, electricity consumption under Alternative 2A is expected to increase by about 47 million kilowatt-hours per year, or about 3.8% relative to the No Action Alternative, and Alternative 3B is assumed to cause a smaller increase in net consumption than under Alternative 2A. In that same timeframe, no change is expected in electricity generation and, therefore, net generation is expected to decline by an annual average of 3.8% relative to the No Action Alternative. These impacts are less than significant, and no mitigation is required.

Alternative 4B

Stage 1 (Physical/Structural Component)

Fish Control Gate

There are no impacts to power production and energy as a result of the construction of the fish control gate.

Impact POW-3: Increased Electricity Consumption as a Result of Operating the Fish Control and Flow Control Gates. Minor changes to local electricity consumption could occur relative to the No Action Alternative. Average energy usage for the permanent gate is expected to total approximately 4,000 kilowatt-hours per month (Enas pers. comm.). Electric power will be required to operate the fish control gate. Under Alternative 4, electricity at the head of Old River fish control gate would be used to raise and lower the bottom hinge gates, and for operating miter gates for the boat locks (the boat locks would not otherwise require power for operations). Lighting for accessory buildings and navigation/safety purposes would require additional electricity consumption. This impact is less than significant. No mitigation is required.

Dredging

There are no impacts to power production and energy as a result of the dredging associated with Alternative 4B.

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would not result in construction-related impacts on power production or consumption as described above.

Stage 2 (Operational Component)

Impact POW-4: Potential Changes in SWP Electricity Generation and Consumption. Increasing diversions from 6,800 cfs to 8,500 cfs would allow greater flexibility in DWR's operations and potentially change the amount

of electricity generated and consumed by SWP facilities. Such changes depend on how SWP Banks is operated. Alternative 4B would result in decreased generation under 2001 demands.

SWP electricity consumption would continue to outpace generation under Alternative 4B. This alternative would result in decreased consumption under 2001 demands. Overall, net consumption changes little under Alternative 4B.

In addition, it is possible that the increased flexibility of SWP operations would allow additional pumping to occur during off-peak times, and therefore DWR could take advantage of more favorable off-peak rates. This potential economic benefit of increased pumping flexibility could help offset the adverse effect of increased SWP energy consumption. Relative to the No Action Alternative, Alternative 4B would result in approximately the same level of SWP electricity generation and consumption. This impact is less than significant. No mitigation is required.

Impact POW-5: Potential Changes in CVP Electricity Generation and Consumption. Increasing the flexibility of DWR operations could allow some diversion requirements to be transferred to the federal CVP Tracy facility. This is comparable to the project-related changes in net SWP electricity consumption (Impact POW-4). This impact is less-than-significant. No mitigation is required.

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would result in increased generation and consumption of energy. Overall, there is a net increase in consumption. Under 2020 conditions, electricity consumption under Alternative 2A is expected to increase by about 47 million kilowatt-hours per year, or about 3.8% relative to the No Action Alternative, and Alternative 4B is assumed to cause a smaller increase in net consumption than under Alternative 2A. In that same timeframe, no change is expected in electricity generation and, therefore, net generation is expected to decline by an annual average of 3.8% relative to the No Action Alternative.

Cumulative Evaluation of Impacts

Cumulative impacts on power production and energy are analyzed in Chapter 10, "Cumulative Impacts." This chapter summarizes the other foreseeable future projects that may contribute to these impacts.

7.6 Visual/Aesthetic Resources

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on visual resources or aesthetics in the project vicinity. Specifically, this section evaluates and discusses the consequences of the construction and operation of the project in terms of changes to visual character and quality, visibility of proposed changes, and viewer response to and significance of those changes. Significance of impacts is determined by using significance criteria set forth in the State CEQA Guidelines.

The primary concern related to visual/aesthetic resources in the south Delta is permanent changes in views and nighttime light and glare following construction of the gates. These impacts are considered significant because recreationists and nearby landowners with high sensitivity would be affected by the SDIP. Mitigation measures are provided that would reduce these impacts to less-than-significant levels.

Summary of Significant Impacts

Table 7.6-S summarizes the significant construction and operation related impacts on visual resources. Significant impacts would occur as a result of light and glare and changes in views associated with the river gates.

Table 7.6-S. Summary of Significant Impacts on Visual Resources

Impact	Applicable Alternative	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Impact VR-3: Changes in Views at the Head of Old River Fish Control Gate Site	2A–2C, 3B, 4B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant
Impact VR-4: Changes in Light and Glare at Head of Old River	2A–2C, 3B, 4B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion. VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards	Less than Significant
Impact VR-9: Changes in Light and Glare at the Middle River Gate Site	2A–2C, 3B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion. VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards	Less than Significant

Impact	Applicable Alternative	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Impact VR-12: Changes in Local Scenic Character at the Grant Line Canal Gate Site	2A–2C	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant
Impact VR-14: Changes in Light and Glare at the Grant Line Canal Gate Site	2A–2C	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion. VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards	Less than Significant
Impact VR-15: Inconsistency with Local Visual Policies at the Grant Line Canal Gate Site	2A–2C	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant
Impact VR-17: Changes in Local Scenic Character at the Old River at DMC Flow Control Gate Site	2A–2C, 3B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant
Impact VR-18: Changes in Views at the Old River at DMC Flow Control Gate Site	2A–2C, 3B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant
Impact VR-19: Changes in Light and Glare at the Old River at DMC Flow Control Gate Site	2A–2C, 3B	Significant	VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards	Less than Significant
Impact VR-20: Inconsistency with Local Visual Policies at the Old River at DMC Flow Control Gate Site	2A–2C, 3B	Significant	VR-MM-1: Implement Measures to Reduce Visual Intrusion.	Less than Significant

Concepts and Terminology for Visual Assessment and Visual Quality

In Webster's *New World Dictionary*, aesthetics is defined as "the study or theory of beauty and the psychological responses to it." Aesthetics (or visual resource) analysis is, therefore, a process to logically assess visible change and viewer response to that change.

Identification of existing conditions with regard to visual resources entails three steps:

1. Objective identification of the visual features (visual resources) of the landscape.

2. Assessment of the character and quality of those resources relative to overall regional visual character.
3. Identification of the importance to people, or sensitivity, of views of visual resources in the landscape.

Visual quality is evaluated using the well-established approach to visual analysis adopted by the FHWA, employing the concepts of vividness, intactness, and unity (Federal Highway Administration 1983). These terms are defined below:

- **Vividness**—The visual power or memorability of landscape components as they combine in striking or distinctive visual patterns.
- **Intactness**—The visual integrity of the natural and artificial landscape and its freedom from encroaching elements. Intactness can be present in well-kept urban and rural landscapes, as well as in natural settings.
- **Unity**—The visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the artificial landscape.

The appearance of the landscape is described below using these criteria and descriptions of the dominance of elements of form, line, color, and texture. These elements are the basic components used to describe visual character and quality for most visual assessments (U.S. Forest Service 1974, Federal Highway Administration 1983). In addition to their use as descriptors, vividness, unity, and intactness are used more objectively as part of a rating system to assess a landscape's visual quality. This rating system includes seven categories, ranging from very low to moderate to very high. Viewer sensitivity or concern is based on the visibility of resources in the landscape, the proximity of viewers to the visual resource, the relative elevation of viewers to the visual resource, the frequency and duration of views, the number of viewers, and the types and expectations of individuals and viewer groups.

The criteria for identifying importance of views are related in part to the position of the viewer relative to the resource. An area of the landscape that is visible from a particular location (e.g., an overlook) or series of points (e.g., a road or trail) is defined as a viewshed. To identify the importance of views of a resource, a viewshed may be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater is its importance to the viewer. Although distance zones in viewsheds may vary between different geographic regions or types of terrain, a commonly used set of criteria identifies the foreground zone as 0.4–0.8 kilometer (0.25–0.5 mile) from the viewer, the middleground zone as extending from the foreground zone to 4.8–8 kilometers (3–5 miles) from the viewer, and the background zone as extending from the middleground zone to infinity (U.S. Forest Service 1974).

Visual sensitivity also depends on the number and type of viewers and the frequency and duration of views. Generally, visual sensitivity increases with an increase in total numbers of viewers, the frequency of viewing (e.g., daily or

seasonally), and the duration of views (i.e., how long a scene is viewed). Also, visual sensitivity is higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service 1974; U.S. Soil Conservation Service 1978; Federal Highway Administration 1983). Views from recreation trails and areas, scenic highways, and scenic overlooks are generally assessed as having high visual sensitivity.

Affected Environment

Sources of Information

The description of existing visual/aesthetic conditions in the SDIP project area is based primarily on the following resources:

- Draft EIR/EIS for the ISDP, Volumes I and II, 1996;
- direct field observations;
- photographic documentation; and
- CALFED Bay-Delta Final Programmatic EIS/EIR, 2000.

Regional Visual Character

The Delta is a relatively flat and expansive area that occupies 1,100 square miles at the confluence of the Sacramento and San Joaquin Rivers. The Delta covers five counties and is roughly bounded (for the purposes of this project) by I-5 on the east, the Suisun Marsh on the west, the City of Sacramento to the north, and Old River on the south. SRs 4 and 160 are designated scenic highways running through the region. It is not possible to view the Delta waterways from many sections of SR 4, but features such as Mount Diablo are visible (CALFED Bay-Delta Program 2000b). The major population centers of the San Francisco Bay Area and the cities of Sacramento and Stockton are located in the surroundings of the Delta (San Joaquin County General Plan 1992).

As an agricultural region, the Delta is one of extensively managed landforms and water bodies, largely altered from their natural state. By the end of World War I, the Delta had been transformed from a large tidal marsh into the series of channels and leveed islands visible today. Because much of the Delta's land is below sea level, miles of levees are relied on for its protection against flooding. This supports agriculture, recreation, and other human-influenced land uses, further taking the Delta out of a natural visual context (California Department of Water Resources 1995a). With 700 miles of interconnected waterways, the Delta is a unique resource providing recreational opportunities such as boating, swimming, fishing, waterskiing, and bird watching (San Joaquin County General Plan 1992). Many of the human-made channels have noticeable visible

differences from natural water bodies. Features such as diversion structures; regular, evenly sloped and riprapped banks; and uniform, often straight, courses distinguish many of the dredged waterways. In some instances, slight differences in line and scale, instead of unnatural structures, are what set natural and altered channels apart, making the distinction less noticeable. The vegetation growth along the banks of watercourses created during reclamation helps them to blend visually with natural channels. From a near viewpoint, rural residential and agricultural uses separate the Delta into orderly, cultivated rows and grids. Although the imprint of humans upon the landscape is obvious, the lack of permanent structures allows the area to remain a more natural setting, especially as it is viewed from a distance.

The Delta region can be described as two separate geographic and visual areas. The lowlands range in elevation from below sea level to about 10 feet above msl and have a generally flat topography. The uplands rise from around 10 to 100 feet msl in a gently sloping alluvial plain, forming a transition between the Delta lowlands and the inland hills of the Mount Hamilton, Altamont, and Diablo ranges.

Because of the minimal topographic variation within the Delta, views in the lowlands are fairly homogenous in form, texture, and color. Foreground views are typically composed of large areas of flat agricultural land interspersed with levees, waterways, tree clusters, and occasional residential or commercial tracts. Most of the residents in the area are rural and associated with farm operations, with the exception of the Discovery Bay community and the communities lying outside of Stockton. Although these views offer little in the way of middle-ground features, on clear days the Sierra Nevada and Coast ranges are noticeable in the eastern and western backgrounds respectively.

The upland plain and the lowland are distinguishable from one another through differences in vegetation, landform, waterforms, and development patterns. Natural vegetation in the upland plain has largely been altered by agricultural, residential, and commercial land uses. Other vegetation in this area consists of grasslands, small oak clusters, and riparian areas. The vegetation of the upland plain is diversified by the presence of orchards and row crops. The background views consist of ridgelines leading up to the hills and ridges of eastern Alameda and Contra Costa Counties. Water forms in the upland plain are less frequent than in the lowlands and include rivers and streams, agricultural ponds, and drainage/irrigation canals. Residential developments are more frequent in the uplands than in the lowlands.

Viewers, Viewer Sensitivity, Aesthetic Character, and Visibility of the Project Element Locations

Viewer sensitivity varies with regard to visual change. Those viewers considered most sensitive to visual change include local residents, recreational users,

employees at business, and travelers on scenic roadways. For each project site, sensitive viewers are described.

The south Delta's aesthetic character is similar to that of the entire Delta: meandering waterways with densely vegetated instream islands intersecting large flat agricultural lands. Because of the lack of topographical variation in the south Delta, views from the levees are vast and comprise mainly sunken agricultural islands. Foreground views from the levees are mainly of roadside vegetation and cultivated fields with high voltage transmission lines crossing the landscape in some areas. In the western background, the Altamont Hills merge with the Mount Hamilton Range to the south and the Mount Diablo Range to the north. Landmarks such as Mount Diablo and the Altamont Pass windfarms complement the view.

Boaters' views are mostly short in range because of the height of the surrounding levees. Foreground views from the waterways include riprapped levees and densely vegetated instream islands, an abundance of agricultural pumps, and occasional riverside docks and residences. To the west, the Altamont Hills can sometimes be seen in the distance.

Proposed Head of Old River Fish Control Gate Site

Located at the confluence of the head of Old River and the San Joaquin River is the Old River fish control gate site. Travelers on San Joaquin Road and recreationists on Old River and the San Joaquin River are sensitive viewers in the vicinity of this site.

The Old River fish control gate site has visual quality similar to the south Delta but is scarce in vegetational cover and topographic variety. Old River and the San Joaquin River are lined with levees except for a portion on the eastern side of the confluence. Levees close to the site are tall and create a wall blocking views from the waterway (Photograph 7.6-1). The banks slope more gently toward the water on the eastern side and support larger vegetation (Photograph 7.6-2). Foreground views are almost exclusively of agricultural uses. None of the nearby farmsteads and other residences are visible from the waterway, but some can be seen from the surrounding levees. San Joaquin Road runs along the levee on the southern side of Old River (Photograph 7.6-3). This road offers good views to the site, but along with other elements, detracts visually from the vividness, intactness, and unity of the site. The vividness, intactness, and unity of the site are generally considered low to moderate.

Proposed Middle River Gate Site

The Middle River gate site is located in Middle River, San Joaquin County, near its confluence with Victoria Canal, North Canal, and Trapper Slough, approximately 13 miles southwest of Stockton. Nearby residents, travelers using

SR 4, and recreationists using adjacent waterways are considered sensitive viewers of the Middle River gate site.

The visual character of this site is typical of the south Delta. Views from the Middle River gate site are moderate to low in vividness, intactness, and unity. The Middle River gate site is surrounded by riprapped levees on both banks with moderate vegetation. A chain-link fence gates off the south bank of the gate site. Views up and down river from the site include small, densely vegetated islands (Photograph 7.6-4). Immediately southeast of the project area lies a farmstead with an agricultural pump that extends into the river (Photograph 7.6-5). A temporary rock barrier is installed at the site seasonally during the months of April, May, October, and November (Photograph 7.6-6). A county-designated scenic highway, SR 4, runs to the north of this site.

Proposed Grant Line Canal Gate Site

The Grant Line Canal gate site is located east of the confluence of Grant Line Canal and Old River. Sensitive viewers in the vicinity of the Grant Line Canal gate site consist of nearby residents and recreationists on Grant Line Canal, Fabian and Bell Canal, and Old River.

This area is characteristic of the south Delta with some unique visual qualities. Typically, the views from the gate site are moderate to high in vividness, intactness, and unity. Grant Line Canal is visually recognizable as a straight waterway (Photograph 7.6-7). A large vegetated berm separates Grant Line Canal from Fabian and Bell Canal and supports some residences. Other residences and farmsteads are located north of the project site on Union Island and west near CCF. Two vacant houses are located on the smaller islands west of the project site. The northern bank of Grant Line Canal is lightly vegetated with grasses and shrubs; much denser vegetation is located along the levees of Fabian and Bell Canal. Vertical structures include high-voltage power lines that cross the canal to the west of the gate site with a steel lattice transmission tower located on the north bank (Photograph 7.6-8). Levees protect the south side of Fabian Canal and the north side of Grant Line Canal.

Proposed Old River at Delta-Mendota Canal Gate Site

The Old River at DMC gate site is situated east of the DMC approximately 4,000 feet southeast of the intersection of the Alameda, Contra Costa, and San Joaquin County lines. Nearby residents and recreationists along Grant Line Canal and Old River are considered sensitive viewers of the Old River gate site.

Although typical of the visual character of the south Delta, the Old River gate site has some visual elements unique to the site. Typical views to the south from the Old River at DMC gate site (Photograph 7.6-9) are characterized as having moderate to high vividness, intactness, and unity. Views to the north (Photograph 7.6-10) are less picturesque because of the presence of more

developmental features and a lack of vegetation. The quality of these northern views is generally moderate to low in vividness, intactness, and unity. A number of agricultural pumps extend into the river to the east and west of the project site (Photograph 7.6-11). A seasonal rock barrier is partly submerged and supports a boat ramp that extends to the northern levee. A residence is located directly west of the project site, with a number of residences also occupying the southern edge of Old River and several small islands nearby.

Old River Dredging Site

The Old River dredging site consists of the portion of Old River at the east end of Fabian Tract to the west end of Stewart Tract. Sensitive viewers in the vicinity of the Old River dredging site include nearby residents, recreationists at Old River Golf Course and along Old River and adjacent waterways, and travelers along surrounding roads. Old River Golf Course is a public golf course located in the northwest corner of Pescadero Tract. Golfers would be sensitive to dredging operations as the aesthetics of the outdoor setting are typically associated with the golfers' experience.

Although the visual qualities of the Old River dredging site are similar to those of the south Delta, there are unique visual qualities associated with this site as well. Views from the Old River dredging site are generally moderate in vividness, intactness, and unity. The varied land uses surrounding this site include large agricultural parcels, Old River Golf Course, and numerous farmsteads and residences. Old River is lined by riprapped levees on either side and large tracts of tules can be found along the waterway edges.

If dredging is performed hydraulically, the location for the disposal of dredged material from Old River would be Stewart Tract at Paradise Cut. A settling area consisting of three basins (a primary, secondary, and return basin) would be constructed and would occupy an area approximately 600 feet long by 80 feet wide. Water would be pumped back into Old River once it reaches the return basin. It is estimated that the dredged material would occupy an area of 1 acre. The disposal area is generally moderate in vividness, intactness, and unity. Land uses surrounding the site include agriculture, residences and farmsteads, and Old River Golf Course. As at the Old River dredging location, residents, recreationists, and travelers using the levee roads around Old River would have visual sensitivity at the proposed disposal site.

Middle River Dredging Site

The Middle River dredging site extends from the head of Middle River (at Old River), MR 49 to MR 12 (Figure 2-3). Residents, recreationists, and travelers using the levee roads surrounding Middle River would be sensitive to any visual change occurring at this site.

The visual quality of the Middle River dredging site is similar to that of the south Delta (Photographs 7.6-12 and 7.6-13). Views from the Middle River dredging site are generally moderate to low in vividness, intactness, and unity. Land use surrounding this site varies. Numerous residences and farmsteads dot the landscape. Two residences on Stark Road are located directly to the east of the project site where Howard Road crosses Middle River.

Dredged material would be transferred through a pipeline to one or more settling areas on Union or Roberts Island. Views from these locations are generally moderate in vividness, intactness, and unity. Union and Roberts Islands are primarily agricultural use with some residences and farmsteads. Sensitive viewers would include residents, recreationists, and travelers on nearby roads. Approximately 925 acres would be necessary to dispose of the dredged spoils, assuming that the basins can be reused during each dredging phase. The settling area would consist of three basins (a primary, secondary, and return basin), each approximately 3,600 feet long and 1,600 feet wide. The spoils ponds would be placed according to preferable conditions (i.e., avoidance of residences and sensitive species and habitats). Once water reaches the return basin, it would be pumped back into Middle River. The dried dredged material would be used to reinforce the existing levee or for other beneficial agricultural use in the Delta vicinity.

West Canal Dredging Site

The West Canal dredging site extends from the CCF intake point north to West Canal's confluence with Victoria Canal. The visual quality of the West Canal dredging site is similar to that of the south Delta (Photograph 7.6-14). Views are generally moderate to low in vividness, intactness, and unity. CCF, a large waterbody, is located on the west side of the canal. On the east side of the canal are agricultural lands. Sensitive viewers at this site include residents, recreationists, and travelers on surrounding levee roads.

If hydraulic dredging is used, the locations for dredge spoils extend north-south, adjacent to the canal, on both sides of the canal. Widdows Island lies directly to the west of the canal, and Coney Island is to the east. Existing ponds located between CCF and West Canal would also be considered as disposal sites. Assuming that the ponds could be reused after each dredging phase, it is estimated that all of the dredged material would occupy an area approximately 264 acres in size. Pipelines would carry the dredged material from West Canal into no more than two settling ponds, each 3,600 feet long by 1,600 feet wide. Each settling area would consist of three settling basins, a primary, secondary, and return basin. Once water reaches the return basin, it would be pumped back into West Canal. Dried material would be reshaped to reinforce the existing levee or used in other beneficial ways in the vicinity.

Clifton Court Forebay Intake Site

Residents of Kings Island, boaters on West Canal and Old River, and recreationists using West Canal, Old River, and the levees surrounding CCF are sensitive to any visual change occurring at the CCF intake site.

The CCF intake site is located at the northwest corner of CCF. Visual elements unique to the intake site include riprapped levees on both sides of the West Canal, which supports recreational uses, a small, vegetated island east of the site, and a residential island known as Kings Island. Views to Kings Island are partially blocked by mature vegetation. To the northeast of the project location, levees run along the south of Victoria Island, and tules edging Old River screen the views. The project site supports little vegetation and can be seen from surrounding levees (Photograph 7.6-14). High-voltage power lines cross the site to the south. This site offers good views of coastal mountains to the west. In general, visual quality of the CCF intake site is moderate to high.

Existing Sources of Light and Glare in the Project Vicinity

Because of the general lack of buildings and extensive nature of most farms in the region, few artificial sources of light and glare exist. Existing sources of light and glare in the project vicinity include water surfaces, reflections from paved surfaces, vehicles, and reflective building materials. The residences, commercial establishments, and other structures in the project vicinity are also sources of light and glare.

Environmental Consequences

Assessment Methods

Analysis of the visual effects of the project are based on:

- direct field observation from key vantage points such as public roadways;
- photographic documentation of key views of and from the project site, as well as regional visual context;
- review of project construction drawings; and
- review of the project in regard to compliance with state and local ordinances and regulations and professional standards pertaining to visual quality.

With an establishment of the existing (baseline) conditions, alternatives or other change to the landscape can be systematically evaluated for its degree of impact. The degree of impact depends both on the magnitude of change in the visual resource (i.e., visual character and quality) and on viewers' responses to and

concern for those changes. This general process is similar for all established federal procedures of visual assessment (Smardon et al. 1986) and represents a suitable methodology of visual assessment for other projects and areas.

The approach for this visual assessment is adapted from FHWA's visual impact assessment system (Federal Highway Administration 1983) in combination with other established visual assessment systems. The visual impact assessment process involves identification of:

- relevant policies and concerns for protection of visual resources;
- visual resources (i.e., visual character and quality) of the region, the immediate project area, and the project site;
- important viewing locations (e.g., roads) and the general visibility of the project area and site using descriptions and photographs;
- viewer groups and their sensitivity; and
- potential impacts.

Regulatory Setting

Federal

The preparation of environmental impact statements is guided by the NEPA CEQ regulations at the federal level. These regulations state that the following should be taken into account when determining an impacts significance: direct effects of the alternatives; indirect effects of the alternatives; and possible conflicts between the alternatives and the objectives of federal, regional, state, and local land use plans, policies and controls for the area concerned.

State

Johnston-Baker-Andal-Boatwright Delta Protection Act of 1992

At a state and local level, the Johnston-Baker-Andal-Boatwright Delta Protection Act of 1992, incorporated into Section 21080.22 and Division 19.5 of the California Public Resources Code, facilitates the recognition, preservation, and protection of Delta resources for the use and enjoyment of current and future generations. The act includes a series of findings and declarations related to the quality of the Delta environment. Protecting the unique resources of the Delta is emphasized as national, state, and local importance. It is emphasized that the protection of these resources will best be achieved through implementation of land use planning and management practices by local governments, in compliance with a comprehensive, long-term resource management plan under the act.

California Department of Transportation
State Scenic Highway Program

California's Scenic Highway Program was created by the California State Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes on the traveler's enjoyment of the view. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. The status of a state scenic highway changes from eligible to officially designated when the local jurisdiction adopts a scenic corridor protection program, applies to the Caltrans for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a Scenic Highway. For the purpose of visual resource protection, this analysis shall treat eligible roadways with the same status as officially designated roadways (California Department of Transportation 1996).

Two designated scenic highways may be affected by the proposed project alternatives. One is SR 160 (River Road), and the other is SR 4. The portion of SR 160 designated as a scenic highway extends from SR 4 near Antioch to the southern city limit of Sacramento. Designated in 1969, the route meanders through Delta agricultural areas and small towns along the Sacramento River.

Examples of visual intrusions that would degrade scenic corridors as stipulated by Caltrans include dense and continuous development, highly reflective surfaces, parking lots not screened or landscaped, billboards, noise barriers, dominance of power lines and poles, dominance of exotic vegetation, extensive cut and fill, scarred hillsides and landscape, and exposed and unvegetated earth (California Department of Transportation 1996).

Local

County of Sacramento General Plan

The Sacramento County General Plan includes the following objectives, goals, and policies that may be applicable to the visual resources analysis of the project alternatives:

Objective

Low glare external building surfaces and light fixtures that minimize reflected light and focalize illumination.

Policies

LU-22: Exterior building materials on nonresidential structures shall be composed of a minimum of 50 percent low-reflectance, non-polished finishes.

LU-23: Bare metallic surfaces such as pipes, flashing, vents and light standards on new construction shall be painted so as to minimize reflectance.

LU-24: Require overhead light fixtures to be shaded and directed away from adjacent residential areas.

LU-25: Require exterior lighting to be low-intensity and only used where necessary for safety and security purposes.

Scenic Highways Element
The Scenic Highways Element of the Sacramento County General Plan attempts to strike a balance between the goal of scenic preservation and that of minimizing vehicle miles traveled.

Goal 1: To preserve and enhance the aesthetic quality of scenic roads without encouraging unnecessary driving by personal automobile.

Objective 1: To retain designation of the River Road (State Highways 160 and 84) as an Official State Scenic Highway and to preserve and enhance its scenic qualities.

Objective 4: To strengthen the provisions of scenic corridor regulations so as to further protect the aesthetic values of the County's freeways and scenic roads. (County of Sacramento General Plan 1997)

San Joaquin County General Plan 2010

The San Joaquin County General Plan includes the following objectives, goals, and policies that may be applicable to the visual resources analysis of the project alternatives:

Open Space
Goal: Views of waterways, hilltops, and oak groves from public land and public roadways shall be protected.

Goal: Outstanding scenic vistas shall be preserved and public access provided to them whenever possible.

Goal: Development proposals along scenic routes shall not detract from the visual and recreational experience.

Goal: Waterway development and development on Delta islands shall protect the natural beauty, the fisheries, wildlife, riparian vegetation, and the navigability of the waterway. (San Joaquin County General Plan 1992.)

Significance Criteria

In addition to the specific federal, state, and local laws, ordinances, regulations, and standards for visual resources described above, the SDIP is subject to federal and state guidelines and professional standards below.

Federal Criteria

The EPA's 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material is another federal regulation considered when determining aesthetics impacts. These guidelines relate the aesthetic quality of aquatic ecosystems with the quality of life enjoyed by the general public and property owners. The 404(b)(1) Guidelines find that a dredged or fill material discharge into aquatic environments may have a potentially significant impact on aesthetic resources if they:

- mar the beauty of natural aquatic ecosystems by degrading water quality, creating distracting disposal sites, inducing inappropriate development, encouraging unplanned and incompatible human access, or by destroying vital elements that contribute to the compositional harmony or unity, visual distinctiveness, or diversity of an area;
- adversely affect the particular features, traits, or characteristics of an aquatic area that make it valuable to property owners; or
- degrade water quality, disrupt natural substrate and vegetation characteristics, deny access to or visibility of the resource, or result in changes in odor, air quality, or noise levels, thereby potentially reducing the value of an aquatic area to private property owners.

State Criteria

According to the State CEQA Guidelines, as amended in 1998, visual resource impacts are considered significant if a project has a "substantial, demonstrable negative aesthetic effect." Based on professional standards and practices, a project would normally be considered to have a significant impact it if would:

- conflict with adopted visual resource policies;
- substantially reduce the vividness, intactness, or unity of high-quality views; or
- introduce a substantial source of light and glare into the viewshed.

Professional Standards

According to professional standards, a project may be considered to have significant impact if it would significantly:

- conflict with local guidelines or goals related to visual quality;
- alter the existing natural viewsheds, including changes in natural terrain;
- alter the existing visual quality of the region or eliminate visual resources;
- increase light and glare in the project vicinity;
- result in backscatter light into the nighttime sky;

- result in a reduction of sunlight or introduction of shadows in community areas;
- obstruct or permanently reduce visually important features that are in Variety Classes A (high in vividness, intactness, unity) and B (moderate in vividness, intactness, unity), and can be viewed from visually sensitive areas (CALFED Bay-Delta Program 2000b); or
- result in long-term (that is, persisting for 2 years or more) adverse visual changes or contrasts to the existing landscape as viewed from areas with high visual sensitivity within 3 miles (also considering how many viewing sites would be affected). (CALFED Bay-Delta Program 2000b.)

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program.

The discussion of significant impacts and mitigation measures within this section will include a citation of one or more of the following programmatic mitigation measures used to build project-specific mitigation measures to offset significant impacts identified from implementation of the SDIP. These programmatic mitigation measures are numbered as they appear in the ROD, and only those measures relevant to the SDIP resource area are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED programmatic mitigation measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

Visual Resources Programmatic Mitigation Measures

2. Minimize construction activities during the peak-use recreation season.
4. Water areas where dust is generated, particularly along unpaved haul routes and during earth-moving activities, to reduce visual impacts caused by dust.
5. Locate and direct exterior lighting for construction activities so that it is concealed to the extent practicable when viewed from local roads, nearby communities, and any recreation areas.
7. Construct facilities with earth-tone building materials or other visually aesthetic design materials.
8. Revegetate disturbed areas as soon as possible after construction.
9. Locate visually obtrusive features, such as borrow pits and dredged material disposal sites, outside visually sensitive areas and observation sites.

10. Select vegetation type, placement, and density to be compatible with patterns of existing vegetation where revegetation occurs in natural areas. Vegetation such as emergent marsh grasses that can tolerate period flooding and drying may be useful.
11. Install landscape screening, such as grouped plantings of trees and tall shrubs, to screen proposed facilities from nearby sensitive viewers.
12. Use native trees, bushes, shrubs and ground cover for landscaping, when appropriate, at facilities such as dams and pumping-generating plants, and along new and expanded canals and conveyance channels, in a manner that does not compromise facility safety and access.

Alternative 1 (No Action)

Under this No Action Alternative, no additional facilities related to the SDIP would be constructed, and maintenance of existing conditions in the south Delta would be continued. Therefore, there would be no changes to existing visual resources. This alternative is considered to have no impact.

2020 Conditions

Under the future no action conditions (2020 conditions) SDIP would not be implemented. It is expected that the temporary barriers program would continue and that no significant impacts on visual resources would result. Conditions would be similar to those described under existing conditions, and there would be no impact.

Alternatives 2A, 2B, and 2C

Alternatives 2A–2C would include the construction, operation, and maintenance of the following facilities associated with the SDIP: head of Old River fish control gate, Old River at DMC flow control gate, Grant Line Canal flow control gate, Middle River flow control gate; increased diversions and pumping at CCF and SWP Banks; dredging of selected portions of south Delta channels and maintenance associated with gates and dredging.

Stage 1 (Physical/Structural Component)

Head of Old River Fish Control Gate

Construction activities would introduce considerable heavy equipment and associated vehicles, including cranes for installation of steel structures and channel excavation, trucks or barges for disposal of excavated materials, and pile-driving equipment, into the viewshed of the project location. These activities generally would require additional area to accommodate the proposed construction, including a gravel access road connecting to Undine Road and a construction staging area approximately 100 by 50 feet that would be located on

the south side of Old River outside of the levee roads. These activities would be completed in one half of the channel cross section at a time using a sheetpile-braced cofferdam, or an in-the-wet construction method, that would be removed upon the completion of each construction phase. Construction is expected to occur over a period up to 30 months.

The head of Old River fish control gate would result in the addition of a concrete gate within the channel. Features of this structure include five bottom-hinged gates totaling approximately 125 feet in length, a boat lock with miter gates on either side, a fenced-and-gated permanent storage area to the north side of the channel adjacent to the gate, a control building, microwave tower, and propane tank. The gate typically would be operated from April through June and September through November annually. Other features would include floating and pile-supported warning signs, water level recorders, and navigation and security lights.

Impact VR-1: Temporary Visual Changes as a Result of Construction Activities. Construction of Alternatives 2A–2C would create temporary changes in views of and from the project area. These activities would be visible to recreationists within adjacent waterways, travelers along San Joaquin Road, and to people at nearby farmsteads and residences. The project area is located in a setting in which the presence of construction activities and equipment is somewhat common because of the placement, maintenance, and removal of the temporary barrier, although to a lesser degree than the proposed construction activities.

This adverse visual impact is considered less than significant for the following reasons: (1) low to moderate vividness, intactness, and unity of the project site views; (2) limited number of sensitive receptors; (3) the presence of construction activities at this site is familiar to viewers; and (4) construction impacts would be temporary. No mitigation is required.

Impact VR-2: Changes in Local Scenic Character and Quality at the Head of Old River Fish Control Gate Site. The construction of the head of Old River fish control gate would result in the addition of a variety of structures at the site (gate, storage area, control building, etc.). This impact is considered to be adverse because it would further detract from the visual quality of the site. However, this adverse impact is considered less than significant because the existing aesthetic character is already visually degraded through the presence of tall, riprapped levee embankments that lack vegetation and the proximity of San Joaquin Road to the project location. No mitigation is required.

Impact VR-3: Changes in Views at the Head of Old River Fish Control Gate Site. Many views from Old River, San Joaquin River, and nearby roads would be affected by the head of Old River fish control gate and associated structures. Characteristics of these that could potentially change the viewsheds in this project area include: (1) when raised, the bottom-hinged gates may block viewing distances from adjacent waterways, levees, and lands including San Joaquin Road; and (2) other proposed structures such as the levee-

top control building, and the microwave tower would further impede the existing views in the area. Because recreationists and nearby landowners with high sensitivity would be affected by these actions, this is considered a significant impact on visual resources. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-1: Implement Measures to Reduce Visual Intrusion.

- Implement the mitigation measures identified as part of the CALFED Programmatic document regarding visual resources.
- Store visually obtrusive features, such as cut and fill materials, outside visually sensitive areas.
- Construct facilities of low-sheen and non-reflective building materials to minimize glare and obtrusiveness.
- Provide a vegetative buffer to visually screen the site. The vegetative buffer would be integrated around the periphery of the site to provide substantial screening from adjacent residential or agricultural uses. The buffer plan would be consistent with local policies and guidelines for native landscaping. Vegetation should be chosen and planted to be compatible with patterns of existing vegetation. Vegetation should be planted within the first year following project completion.

Impact VR-4: Changes in Light and Glare at Head of Old River.

Nighttime Light. New nighttime light would include amber-colored security lighting and a small white navigational light. These lights would be visible for a small distance from the nearby waterways and levees and may create backscatter and ambient light visible beyond the levees to neighboring land. Lights are to be located and directed at facilities and during construction activities so that it is concealed to the extent possible when viewed from local roads, nearby communities, and any recreation areas. However, because existing light levels are extremely low in the project area and because of the rural character, the threshold for new light sources is extremely low and this change would be considered a significant adverse impact. The following mitigation is recommended to reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards.

- Luminaires shall be cut-off type fixtures that cast low-angle illumination to minimize incidental spillover of light onto adjacent properties and open space. Fixtures that project upward and horizontally should not be used. Luminaires should be focused only where needed (such as on building entrances) and should not provide a general “wash” of light on building surfaces.
- Luminaires shall be directed away from residential areas and the river adjacent to the project site.

- Luminaire lamps shall provide good color rendering and natural light qualities. Luminaire intensity should be the minimum feasible for security and maintenance and access safety.
- Luminaire mountings shall be downcast and the height of placement minimized to reduce potential for backscatter into the nighttime sky and incidental spillover into adjacent properties and open space. Luminaire mountings should have nonglare finishes.
- Where an intermittent light will be used (such as for navigation or marking purposes), slow pulses shall be considered in lieu of rapid flashes or blinking lights.

Daytime and Nighttime Glare. The project would not create a new source of substantial glare that would adversely affect day or nighttime views. This is considered a less-than-significant impact. Mitigation Measure VR-MM-1 includes an element that addresses glare through the use of low-sheen and non-reflective materials; therefore, no further specific mitigation is required.

Impact VR-5: Inconsistency with Local Visual Policies. Although the proposed head of Old River fish control gate would not contribute to the goals and policies of San Joaquin County for protection and enhancement of scenic resources, it would not substantially conflict with them either. The scale of the gate structure is small enough, and the number of sensitive receptors is small enough, that any conflicts with these goals and policies are considered a less-than-significant adverse impact. No mitigation is required.

Flow Control Gates—Middle River/Grant Line Canal/Old River

Middle River Flow Control Gate

Construction activities would introduce considerable heavy equipment and associated vehicles, including cranes, pile drivers, scrapers, excavators, backhoes, and graders, into the viewshed of the project location. These activities would generally require additional area to accommodate the proposed construction, including a gravel access road and a construction staging area on the north side of the river measuring approximately 100 feet by 100 feet. The proposed activities may be completed using an in-the-wet construction method, or a braced cofferdam, which would be cut at the required invert depth upon the completion of each construction phase. Construction is expected to occur over a period up to 18 months.

The Middle River gate would result in the addition of a concrete control structure with 12 16-foot-wide-by-10-foot-high bottom-hinged gates; a reinforced concrete foundation; steel sheetpile wall; and a permanent storage area located on the landward side of the north levee bounded by a 6-foot-high chain-link fence.

The operation of the Middle River gate would include the opening and closing of 12 bottom-hinged gates. It is expected that the gate would need to be closed 2 hours before low tide and for approximately 2 hours after the low tide event has passed. Navigational lights and security lighting would be in operation as well.

Impact VR-6: Temporary Visual Changes as a Result of Construction Activities. Construction of Alternatives 2A–2C would create temporary changes in views of and from the project area. Few viewers would be affected by the visual changes associated with the construction of the Middle River flow control gate, and these viewers are accustomed to the existing program of seasonally constructing the temporary barrier. Therefore, this is considered a less-than-significant impact. No mitigation is required because of the temporary nature of this impact.

Impact VR-7: Changes in Local Scenic Character and Quality at the Middle River Gate Site. The Middle River flow control gate would result in the addition of a variety of permanent visual elements within the project gate site area. The surrounding visual character is typically agricultural with some developed structures related to nearby farmsteads present. A temporary rock barrier is installed at the project site seasonally. The project site is visible from nearby farmsteads but few boaters use the waterways because of the low water level. As discussed for construction-related impacts, the number of viewers and sensitive receptors is considered very low. The addition of a gate at this location would likely blend into the existing mix of human-made and natural visual components of the site (California Department of Water Resources and Bureau of Reclamation 1996a). Because the effects would be limited to few viewers and the change does not introduce substantial new visual intrusions or obstructions relative to the existing condition, this is considered a less-than-significant impact. No mitigation is required.

Impact VR-8: Changes in Views of the Middle River Gate Site. Few sensitive visual receptors exist at the Middle River flow control gate site, because of visual inaccessibility. Middle River is not frequented by boaters because of shallow waters, and surrounding levees, distance, and dense vegetation impede views to the site from local residences and travelers on SR 4. This combination of factors makes it unlikely that the gate and associated structures would be visible to boaters, residents to the north, or travelers on SR 4. Views north from the farmstead along the southern levee of the project area would be limited by existing vegetation and the levee itself (California Department of Water Resources and Bureau of Reclamation 1996a). Because the effects would be limited to few viewers, this is considered a less-than-significant impact. No mitigation is required; however, implementation of Mitigation Measure VR-MM-1 discussed above for the head of Old River fish control gate is recommended to ensure that any impact is reduced to the lowest possible magnitude.

Impact VR-9: Changes in Light and Glare at the Middle River Gate Site. *Nighttime Light.* The Middle River gate and associated facilities would include new nighttime light with amber-colored security lighting and a small white navigational light. These lights would be visible for a small distance from the nearby waterways and levees, and may create backscatter and ambient light visible beyond the levees to neighboring lands. Because existing light levels are extremely low in the project area and because of the rural character, the threshold for new light sources is extremely low and this change would be considered a

significant adverse impact. The following mitigation is recommended to reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards. Refer to the discussion of this mitigation measure under the head of Old River fish control gate site.

Daytime and Nighttime Glare. It is not likely that the Middle River gate and associated facilities would create a new source of substantial glare that would adversely affect daytime or nighttime views. Also, because there is a lack of visual receptors in this location, this is considered a less-than-significant impact. No mitigation is required; however, the recommendation to use low-sheen, non-reflective materials (discussed under Mitigation Measure VR-MM-1) is also recommended here to further ensure that any impact is reduced to the lowest possible magnitude.

Impact VR-10: Inconsistency with Local Visual Policies. The small scale of the proposed facility would not be visually intrusive on the local visual quality or obstruct high quality views. Although the project would not further the county's visual resource goals and policies to protect and enhance scenic resources, the SDIP is unlikely to be substantially negative (California Department of Water Resources and Bureau of Reclamation 1996a). Therefore, inconsistency with local visual policies is considered a less-than-significant impact, and no mitigation is required.

Grant Line Canal Flow Control Gate

Construction activities would introduce considerable heavy equipment and associated vehicles, including cranes, pile drivers, scrapers, excavators, backhoes, and graders, into the viewshed of the project location. These activities would generally require additional area to accommodate the proposed construction, including a gravel access road and two construction staging areas, one to the north measuring approximately 100 feet by 100 feet, and one to the south measuring approximately 100 feet by 50 feet. The proposed activities would be completed using an in-the-wet construction method, or a sheetpile-braced cofferdam, which would be cut at the required invert depth upon the completion of each construction phase. Construction is expected to occur over a 36-month period.

The Grant Line Canal gate would result in the addition of a concrete control structure that would house four bottom-hinged gates, each 20 feet wide by 16 feet high; buried utility lines supplying electricity and communications to the area; a 50-foot-wide by 105-foot-long boat lock; and a 50-foot-wide flashboard opening. Additional structures include a control building to be built on top of the levee adjacent to the boat lock, a building to house the standby power source, and a microwave tower.

The operation of the Grant Line Canal gate would include the opening and closing of four bottom-hinged gates. It is expected that gates would need to be

closed approximately 2 hours before low tide and for approximately 2 hours after the low tide event. Navigational lights and security lighting would be in operation as well.

Impact VR-11: Temporary Visual Changes as a Result of Construction Activities at Grant Line Canal. Construction of the Grant Line Canal gate would create temporary changes in views of and from the project area. Grant Line Canal is a popular recreation area and has several residences close by (California Department of Water Resources and Bureau of Reclamation 1996a). These viewers would have high visual sensitivity.

Constructing the Grant Line Canal gate is not expected to result in a substantial change in visual character of the area because: (1) construction would be temporary with most in-water worked occurring in August, September, and October; and (2) no permanent sensitive receptors (residences) would be directly affected during construction. Therefore, this impact is considered less than significant. No mitigation is required.

Impact VR-12: Changes in Local Scenic Character at the Grant Line Canal Gate Site. The scale of the proposed Grant Line Canal gate would adversely affect the local scenic integrity. The Grant Line Canal gate would result in the addition of a variety of new visual elements within the project area. The gate would be visible by recreationists who use the canal; these groups have high viewer sensitivity. The addition of a gate at this location would likely blend into the existing mix of human-made and natural visual components of the site (California Department of Water Resources and Bureau of Reclamation 1996a); however, because of high viewer sensitivity, this is considered a significant impact. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less than significant level.

Mitigation Measure VR-MM-1. Implement Measures to Reduce Visual Intrusion. Refer to the discussion for the head of Old River fish control gate for a complete description of this measure.

Impact VR-13: Changes in Views at the Grant Line Canal Gate Site. The proposed gate structure would occasionally obstruct some existing views of the project area from water level and land-based viewpoints. Long-distance water-level views of the canal from boats would occasionally be obstructed when gates are raised above the surface. No permanent residences would have views blocked by the gate. Gate structures such as the levee-top control building and the microwave tower are not expected to substantially impede existing views of the area. The impact of the gate operations on views is considered less than significant because views of the canal from boats would only be blocked during gate operations and would only be blocked at the western end of the canal near the gate. No mitigation is required.

Impact VR-14: Changes in Light and Glare at the Grant Line Canal Gate Site. *Nighttime Light.* New nighttime light would include amber-colored security lighting and a small white navigational light. These lights would be

visible for a small distance from the nearby waterways and levees and may create backscatter and ambient light visible beyond the levees to neighboring lands. Lights are to be located and directed at facilities and during construction activities so that they are concealed to the extent possible when viewed from local roads, nearby communities, and any recreation areas. However, because existing light levels are extremely low in the project area and because of the rural character, the threshold for new light sources is extremely low, and this change would be considered a significant adverse impact. The following mitigation is recommended to reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards. Refer to the discussion of this mitigation measure under the head of Old River fish control gate site.

Daytime and Nighttime Glare. Existing vegetation would buffer nearby residents from any addition of glare into the project area. However, it is not likely that the project would create a new source of substantial glare that would adversely affect daytime or nighttime views. This is considered a less-than-significant adverse impact. No mitigation is required; however, the recommendation to use low-sheen, non-reflective materials (discussed under Mitigation Measure VR-MM-1) is also recommended here to further ensure that any impact is reduced to the lowest possible magnitude.

Impact VR-15: Inconsistency with Local Visual Policies at the Grant Line Canal Gate Site. The proposed structures' scale is large enough that a substantial conflict could arise in complying with the County of San Joaquin's goal of protecting scenic corridors from unsightly development (California Department of Water Resources and Bureau of Reclamation 1996a). This is considered a significant adverse impact. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-1. Implement Measures to Reduce Visual Intrusion. Refer to the discussion for the head of Old River fish control gate for a complete description of this measure.

Old River at Delta-Mendota Canal Flow Control Gate

A considerable amount of heavy equipment and associated vehicles would be introduced into the project area through proposed construction activities. Some of this equipment would include a crane, pile driver, scrapers, excavators, and a grader. These activities generally would require additional area to accommodate the proposed construction, including a gravel access haul road and a construction staging area approximately 100 by 100 feet that would be located on the north side of the river. A permanent access road would be connected to the southern existing country road. A new levee would be constructed north of the levee, which would eventually be breached after the new levee's construction. Portions of the existing levee would be left as a channel island. Construction is expected to occur over a period up to 30 months.

The SDIP would result in the addition of a concrete gate within the existing channel. Features of this structure include 11 16-foot-wide-by-10-foot-high bottom-hinged gates; steel sheetpile wall; buried utility lines supplying electricity and communications to the area; and a 50-foot-wide-by-105-foot-long boat lock. Other components include a control building adjacent to the boat lock, a building to house the standby fuel source, and a microwave tower. Other features would include floating and pile-supported warning signs, water level recorders, and navigation lights.

The operation of the Old River at DMC gate would include the opening and closing of 11 bottom-hinged gates. It is expected that gates would need to be closed approximately 2 hours before low tide and for approximately 2 hours after the low tide event. Navigational lights and security lighting would be in operation as well.

Impact VR-16: Temporary Visual Changes as a Result of Construction Activities at the Old River at DMC Flow Control Gate Site. Construction of the SDIP would create temporary changes in views of and from the project area. These activities would be visible to recreationists within Old River and nearby residences. These viewers would have high visual sensitivity.

This adverse visual impact is considered less than significant for the following reasons: (1) moderate vividness, intactness, and unity of the project site views; (2) viewers are familiar with the placement and removal of the existing temporary structure; and (3) construction impacts would be temporary. No mitigation is required because of the temporary nature of this impact.

Impact VR-17: Changes in Local Scenic Character at the Old River at DMC Flow Control Gate Site. The addition of the proposed concrete control structure with its 11 bottom-hinged gates and a 50-by-105-foot boat lock would dominate the viewshed from Old River. When raised, the gates would be large enough to also affect the views from nearby residences and the proposed nearby development. The levee-top control building, microwave tower, storage areas, utility lines, and addition of 49,000 square feet of riprap would remove the site visually from its existing character (California Department of Water Resources and Bureau of Reclamation 1996a). Because of the numerous sensitive receptors that would be affected at this location, this is considered a significant adverse impact. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-1: Implement Measures to Reduce Visual Intrusion. Refer to the discussion for the head of Old River fish control gate for a complete description of this measure.

Impact VR-18: Changes in Views at the Old River at DMC Flow Control Gate Site. Views from Grant Line Canal, Old River, and nearby homes would be partially restricted by the implementation of the proposed facility, affecting many sensitive receptors, and potentially causing substantial

conflict with the goals and policies of the County of San Joaquin. Characteristics of the SDIP that could potentially change the viewsheds in this project area include: (1) when raised, the gates would block viewing distances from adjacent waterways and lands; and (2) other proposed structures for this site, such as the levee-top control building, and the microwave tower, would further shorten and obstruct the existing views in the area. Because many sensitive receptors would be affected by these visual changes, this is considered a significant adverse impact. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-1. Implement Measures to Reduce Visual Intrusion. Refer to the discussion for the head of Old River fish control gate for a complete description of this measure.

Impact VR-19: Changes in Light and Glare at the Old River at DMC Flow Control Gate Site. *Nighttime Light.* New nighttime light would include amber-colored security lighting and a small white navigational light. These lights would be visible for a small distance from the nearby waterways and levees and may create backscatter and ambient light visible beyond the levees to neighboring lands. Lights are to be located and directed at facilities and during construction activities so that it is concealed to the extent possible when viewed from local roads, nearby communities, and any recreation areas. However, because existing light levels are extremely low in the project area and because of the rural character, the threshold for new light sources is extremely low, and this change would be considered a significant adverse impact. The following mitigation is recommended to reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-2: Incorporate Lighting Design Specifications for Minimum Maintenance and Access Safety Standards. Refer to the discussion of this mitigation measure under the head of Old River fish control gate site.

Daytime and Nighttime Glare. Existing vegetation would buffer nearby residents from any addition of glare into the project area. However, it is not likely that the project would create a new source of substantial glare that would adversely affect daytime or nighttime views. This is considered a less-than-significant adverse impact. No mitigation is required; however, the recommendation to use low-sheen, non-reflective materials (discussed under Mitigation Measure VR-MM-1) is also recommended here to further ensure that any impact is reduced to the lowest possible magnitude.

Impact VR-20: Inconsistency with Local Visual Policies at the Old River at DMC Flow Control Gate Site. The proposed structures' scale is large enough that a substantial conflict could arise in complying with the County of San Joaquin's goal to protect scenic corridors from unsightly development (California Department of Water Resources and Bureau of Reclamation 1996a). This is considered a significant impact. Implementation of Mitigation Measure VR-MM-1 would reduce this impact to a less-than-significant level.

Mitigation Measure VR-MM-1. Implement Measures to Reduce Visual Intrusion. Refer to the discussion for the head of Old River fish control gate for a complete description of this measure.

Dredging

Portions of West Canal, Middle River, and Old River would be dredged to improve conveyance and the operation of private agricultural siphons and pumps. In total, approximately 250,000 cubic yards of material would be dredged and spoiled. Placement of these spoils would be in an area of low visual quality and minimal visibility to people. Three dredging methods are being considered—hydraulic (suction) dredging, clamshell (mechanical) dredging, and dragline dredging. A decision on which method to use would be made before work is begun.

Construction- and operation-related impacts of dredging are included in a single discussion because this project component is more related to a temporary activity rather than the introduction of permanent facilities.

Impact VR-21: Changes in Views as a Result of Channel Dredging.

Construction activities would introduce considerable heavy equipment and associated vehicles, including dredgers, barges, and disposal trucks, into the viewshed of the project locations. In areas of hydraulic dredging, semi-permanent piping, ranging from 8 to 18 inches in diameter, would extend from the channel, over the levee, and into settling ponds adjacent to the channel. The pipe would cross the levee and require that a gravel ramp be placed on either side for vehicle and agricultural equipment access. The exact locations for these pipes are unknown at this time and are contingent upon the use of the hydraulic dredging method. The dredging process itself is unlikely to cause permanent visual intrusions on the West Canal, Middle River, or Old River. Equipment would temporarily shorten existing views in the dredging areas. This is considered a less-than-significant impact. No mitigation is required because of the temporary nature of this impact. It is likely that some viewers may be attracted to views of the dredging operation because of the unusual nature of the activity.

It is unlikely that the temporary dredging process would have substantial long-term effects on the local scenic character of the project locations. Some changes to side slopes of the channels may occur as a result of dredging. The spoils disposal locations would be in areas of minimal visibility and therefore would not cause visual impact. Part of the baseline condition of the visual environment of the SDIP project area includes earthwork and machinery as part of agricultural operations. The process of spreading and grading the spoils is not likely to be substantially different visually from this baseline. This is considered a less-than-significant impact, and no mitigation is required.

Impact VR-22: Changes in Light and Glare as a Result of Dredging Activities.

Daytime and Nighttime Glare and Nighttime Light. The dredging of West Canal, Middle River, and Old River would not introduce any permanent

sources of light or glare into the project area. This is considered a less-than-significant impact, and no mitigation is required.

Impact VR-23: Inconsistency with Local Visual Policies. The proposed dredging of the identified waterways would not conflict with applicable goals and policies. This impact is less-than-significant. No mitigation is required.

2020 Conditions

Impacts on visual resources associated with implementation of Alternatives 2A–2C under 2020 conditions would be similar to impacts that would occur under 2001 conditions as described above. In addition, the same mitigation would apply.

Stage 2 (Operational Component)

Impact VR-24: Impacts on Local Scenic Character of the State Water Project. The duration of water level fluctuations within SWP reservoirs would likely be affected by the implementation of the SDIP. Water levels are not expected to rise above maximum capacity or fall below minimum pool. However, water could remain at high or low levels for longer periods of time than they do in existing conditions. Fluctuations in water levels are typical features of a reservoir and would not cause substantial visual change (California Department of Water Resources and Bureau of Reclamation 1996a). This is considered a less-than-significant impact. No mitigation is required.

2020 Conditions

Operation-related impacts resulting from the implementation of Alternatives 2A–2C under 2020 conditions would result in an impact similar to that described above. This impact is less than significant and requires no mitigation.

Interim Operations

Interim operations would result in impacts similar to those described above for operation of the permanent gates. There would be minimal visual changes resulting from the implementation of the interim operations and the impact would be less than significant because no permanent gates would be constructed.

Alternative 3B

Alternative 3B would include the construction, operation, and maintenance of the following components associated with the proposed SDIP: head of Old River fish control gate, Old River at DMC flow control gate, and Middle River flow control gate, and increased diversions at CCF. Dredging of selected portions of south Delta channels, maintenance associated with dredging, and extension of agricultural diversions are also included in this alternative.

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Alternative 3B contains the same components as Alternatives 2A–2C, with the exception of the Grant Line Canal gate. Therefore, impacts and associated mitigation measures would be similar to those identified for the head of Old River fish control gate, Old River at DMC flow control gate, and Middle River flow control gate in the Alternatives 2A–2C discussion above.

Dredging

Impacts and associated mitigation measures would be similar to those identified for dredging within the Alternatives 2A–2C discussion above.

2020 Conditions

Impacts on visual resources associated with implementation of Alternative 3B under 2020 conditions would be similar to impacts that would occur under 2001 conditions as described above. In addition, the same mitigation would apply.

Stage 2 (Operational Component)

Impacts and associated mitigation measures would be similar to, but may be somewhat less than those identified for under Operational Component for Alternatives 2A–2C above because no Grant Line Canal permanent gate would be constructed as part of this alternative.

2020 Conditions

Operation-related impacts resulting from the implementation of Alternative 3B under 2020 conditions would result in an impact similar to that described above. This impact is less than significant and requires no mitigation.

Alternative 4B

Alternative 4B would include the construction, operation, and maintenance of the following components associated with the proposed SDIP: head of Old River fish control gate, increased diversions at CCF, dredging of selected portions of south Delta channels, and the extension of agricultural diversions.

Stage 1 (Physical/Structural Component)

Fish Control Gate

Alternative 4B includes the same components as Alternatives 2A–2C, except the Old River at DMC, Middle River, and Grant Line Canal flow control gates would not be constructed. As a result, impacts and mitigation measures for Alternative 4B would be the same as those discussed for the head of Old River fish control gate under Alternatives 2A–2C above.

Dredging

Proposed dredging activities under Alternative 4B are the same as those proposed under Alternatives 2A–2C; therefore, impacts and associated mitigation measures would be the same as those identified for dredging in the Alternatives 2A–2C discussion above.

2020 Conditions

Impacts on visual resources associated with implementation of Alternative 4B under 2020 conditions would be similar to impacts that would occur under 2001 conditions as described above. The same mitigation would apply.

Stage 2 (Operational Component)

Impacts and associated mitigation measures under Alternative 4B would be similar to, but somewhat less than those identified under the Operational Component above for Alternatives 2A–2C because no Grant Line Canal, Middle River, or Old River at DMC permanent flow control gates would be constructed as part of this alternative.

2020 Conditions

Operation-related impacts resulting from the implementation of Alternative 4B under 2020 conditions would result in an impact similar to that described above. This impact is less than significant and requires no mitigation.

Cumulative Evaluation of Impacts

Cumulative visual/aesthetic resources are analyzed in Chapter 10, "Cumulative Impacts." This chapter also summarizes the other foreseeable future projects that may contribute to these impacts.

7.7 Cultural Resources

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on cultural resources in the south Delta and includes summaries of regional prehistory, ethnography, and history. The primary concern related to cultural resources is potential damage or destruction to archaeological sites and buried human remains. These potential impacts are reduced to a less-than-significant level by implementing mitigation measures that are based on mitigation measures in the CALFED Programmatic ROD. The mitigation measures may include measures such as stopping work if archaeological materials or human remains are discovered during construction or dredging.

Summary of Significant Impacts

Table 7.7-S summarizes the significant impacts on cultural resources as a result of implementation of the project alternatives.

Table 7.7-S. Summary of Significant Impacts on Cultural Resources

Impact	Applicable Alternative	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Impact CR-2: Inadvertent Damage to or Destruction of Buried Archaeological Sites and Human Remains.	2A–2C, 3B, 4B	Significant	CR-MM-1: Stop Work If Archaeological Materials Are Discovered during Construction or Dredging. CR-MM-2: Stop Work If Human Remains Are Discovered during Construction or Dredging.	Less than significant

Affected Environment

The SDIP is located in the Sacramento–San Joaquin Delta, which is one of the areas of California that archaeologists have studied most intensively. Prior to the 1960s, archaeologists working in the Delta focused on documenting large habitation sites, which are recognizable by mounds and midden soil (Cook and Elsasser 1956). The inception of cultural resources management in 1966 resulted in archaeological studies that documented a broader range of site types, including historic archaeological sites. Study of historic cultural resources has received somewhat less attention prior to the late 1980s, although at least one

comprehensive overview of historic cultural resources and numerous project-specific historical studies have been conducted since that time (Owens 1991).

Sources of Information

The affected environment and impact assessments presented in this section are based on:

- review of existing information,
- consultation with interested parties,
- field surveys of the SDIP area of potential effects (APE),
- archival research, and
- evaluation of identified cultural resources (Jones & Stokes 2004).

Records Search

The review of existing information included records search materials provided by DWR. The records searches were conducted at the Central California Information Center (CCIC) and the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS). Each regional information center of CHRIS maintains the state's database of previous cultural resource studies and known cultural resources for the counties in its jurisdiction; the CCIC maintains the database for a seven-county area that includes San Joaquin County, whereas the NWIC maintains the database for a 16-county area that includes Contra Costa County. The records maintained by the CHRIS, including cultural resource locations and cultural resource studies containing locations of cultural resources, are not accessible to the general public but to cultural resource professionals.

In addition to the state's database of previous cultural resource studies and known cultural resources, the record searches included reviews of historic topographic maps, local historical surveys and overviews, primary and secondary historical writings, and the Caltrans' Historical Bridges Inventory.

The records search indicates that portions of the SDIP have been surveyed for archaeological resources using methods that are considered professionally sound today (Archeo-Tec 1989, 1990; Baker and Shoup 1991; Peak & Associates 1997; Shapiro 1997; Shapiro and Syda 1997a, 1997b, 1997c; True et al. 1981; U.S. Army Engineer District 1986; West 1991, 1994; West and Scott 1990; Windmiller and Osanna 2000). The proposed dredge spoil areas, however, have not been previously surveyed for the presence of cultural resources. The SDIP APE consists primarily of those areas that will be subject to ground disturbance during construction and operation activities. A survey of historic architecture and other elements of the built environment (including water conveyance features) was conducted by a qualified architectural historian.

Consultation with Interested Parties

Interested parties were consulted to obtain information about known cultural resources and the sensitivity for cultural resources in the study area. Individuals and entities known to have an interest in the prehistory, archaeology, and history of the region were contacted, including Native Americans, museums, and historical societies. The San Joaquin County Historical Society and San Joaquin County Museum were contacted by letter on May 3, 2004. No response has been received.

Jones & Stokes requested a search of the sacred lands file and a list of potentially interested Native American contacts from the Native American Heritage Commission (NAHC) on June 28, 2003. The sacred lands file search did not identify Native American cultural resources, including sacred or culturally significant sites, in the APE. On October 5, 2004, Jones & Stokes sent consultation letters to the parties listed by the NAHC. No response has been received. In addition, the ethnographic literature cited in the Ethnographic Setting below does not indicate the presence of sacred sites in the APE.

Field Surveys

A Jones & Stokes architectural historian visited the project area on July 15, 2003. The survey area included the proposed gate locations on the Middle River, Old River, and Grant Line Canal as well as proposed dredging sites on the Middle River and Old River. Because of restricted access, the proposed dredging site on the West Canal/CCF was not surveyed. Therefore, assumptions regarding cultural resources in this area were made based on surrounding areas. As part of the field process, irrigation features, buildings, and structures in the APE were inspected and photographed, and notes were gathered.

Jones & Stokes archaeologists surveyed proposed Middle River spoils ponds (ponds 1–7) on November 23 and 24, 2004 and April 14, 2005. These areas were surveyed because they were not included in previous iterations of the SDIP or in previous cultural resource inventories. All proposed spoils ponds were surveyed by walking parallel transects spaced 15–30 meters apart. Jones & Stokes surveyed approximately 185 acres for the presence of cultural resources.

Historical Research

In an effort to identify important historic people, events, and architectural trends that may have been associated with the project area, Jones & Stokes conducted archival research at the California State Library, Sacramento, the California Geological Survey Library, Sacramento, and the Jones & Stokes cultural resources library.

Prehistoric Setting

Little is known of human occupation in the lower Sacramento Valley prior to 4500 B.P. (years before present, or 1950). Because of rapid alluvial and colluvial deposition in the valley over the past 10,000 years, ancient cultural deposits are deeply buried in many areas. The earliest evidence of widespread occupation of the lower Sacramento Valley/Delta region comes from several sites assigned to the Windmiller Pattern (previously, Early Horizon), dated ca 4500–2500 B.P. (Ragir 1972).

Known Windmiller Pattern sites are concentrated on low rises or knolls within the floodplains of major creeks or rivers. Such locations provided protection from seasonal flooding and proximity to riverine, marsh, and valley grassland biotic communities. Most Windmiller Pattern sites contain cemeteries, in which skeletons are typically extended ventrally, oriented toward the west, and accompanied by abundant grave goods. Subsistence apparently focused on hunting and fishing, as evidenced by large projectile (spear or dart) points, clay net sinkers, bone fishhooks and spears, and abundant faunal remains. Collection and processing of floral resources, such as seeds and nuts, is inferred from mortar and milling slab fragments recovered from a few of the sites. Other characteristic artifacts include charm stones, quartz crystals, bone awls and needles, and abalone and olive snail shell beads and ornaments (Beardsley 1948; Gerow 1974; Heizer 1949; Heizer and Fenenga 1939; Lillard et al. 1939; Ragir 1972; Schulz 1970).

The succeeding Berkeley Pattern (formerly the Middle Horizon) dates from ca. 2500 to 1500 B.P. in the Central Valley. Berkeley Pattern sites are greater in number and more widely distributed than Windmiller sites and are characterized by deep midden deposits, suggesting intensified occupation and a broadened subsistence base. The abundance of milling slabs, mortars, and pestles indicates a dietary emphasis on vegetal resources; however, distinct projectile points and faunal remains attest to the continued importance of hunting. Fishing technology improved and diversified, suggesting greater reliance on aquatic resources. Common artifacts include mortars and milling slabs, quartz crystals, charm stones, projectile point styles, shell beads and ornaments, and bone tools. New elements include steatite beads, tubes and ear ornaments, slate pendants, and burial of the dead in flexed positions or cremations accompanied by fewer grave goods (Beardsley 1948; Fredrickson 1973; Heizer and Fenenga 1939; Lillard et al. 1939; Moratto 1984).

The late prehistoric period (ca 1500 to 100 B.P., formerly the Late Horizon) is characterized by the Augustine Pattern (Fredrickson 1973). The Augustine Pattern represents the peak cultural development of the prehistoric period in the lower Sacramento Valley and Delta regions and is characterized by intensified hunting, fishing, and gathering subsistence strategies; large, dense populations; highly developed trade networks; elaborate ceremonial and mortuary practices; and social stratification. In addition to cultural elements from the preceding patterns, new elements include shaped mortars and pestles, bone awls for basketry, bone whistles and stone pipes, clay effigies, and the introduction of the

bow and arrow as evidenced by small notched and serrated projectile points. Pottery is also found at a few of the sites assigned to this period. Burials were flexed and generally lacked grave goods (Beardsley 1948; Fredrickson 1973; Moratto 1984; Ragir 1972).

Ethnographic Setting

The aboriginal inhabitants of the area in which the APE is located are known as the Northern Valley Yokuts. *Yokuts* is a term applied to a large and diverse number of peoples inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Yokuts cultures include three primary divisions, corresponding to gross environmental zones: the Southern Valley Yokuts, the Foothill Yokuts, and the Northern Valley Yokuts (Kroeber 1976; Silverstein 1978).

The Northern Valley Yokuts lived in the northern San Joaquin Valley from around Bear Creek north of Stockton to the bend in the San Joaquin River near Mendota (Wallace 1978). The APE was inhabited by a division of the Northern Valley Yokuts known as the Cholbones (also Chulamni), which includes groups of Yokuts designated Nototemes, Jusmites, and Fugites or Tugites (Schenck 1926: Figure 1, 137–138; Wallace 1978: Figure 1, 469). Similar to most Indian groups in California, the largest political entity among the Yokuts was that of the tribelet. A tribelet consisted of a large village and a few smaller surrounding villages. Larger villages and tribelets had a chief or headman, an advisory position that was passed from father to son (Wallace 1978).

The Yokuts were seasonally mobile hunter-gathers with semi permanent villages. Seasonal movements to temporary camps would occur to exploit food resources in other environmental zones. The Northern Valley Yokuts relied heavily on acorns (which were processed into a thick soup) as a food staple, along with salmon and other fish, grass seeds and tule roots (which were processed into meal), and probably waterfowl, tule elk, and pronghorn.

Principal settlements were located on the tops of low mounds, on or near the banks of the larger watercourses. Settlements were composed of single-family dwellings, sweathouses, and ceremonial assembly chambers. Dwellings were small and lightly constructed, semi-subterranean and oval. The public structures were large and earth covered. Sedentism was fostered by the abundance of riverine resources in the area (Wallace 1978).

The Yokuts first came into contact with Europeans when Spanish explorers visited the area in the late 1700s, followed by expeditions to recover Indians who had escaped from the missions. The North Valley Yokuts were far more affected by missions than were the other groups. The loss of individuals to the missions, the influence of runaway neophytes, various epidemics in the 1800s, and the arrival of settlers and miners inflicted major depredations on the Yokuts peoples and their culture (Wallace 1978).

Historical Setting

In general, European settlers in Alta California ignored the Central Valley until the mid-19th century. The Spanish confined their settlement of the region to a thin strip along the coastline. In 1806, Gabriel Moraga explored much of the San Joaquin Valley by following the Kern and Kings Rivers into the foothills of the Sierra Nevada. After Mexico's independence from Spain in 1821, the settlement of California progressed with the issuance of rancho lands by the Mexican governors. The most notable of these governors were Juan Bautista Alvarado, Manuel Micheltorena, and Pio Pico. With the exception of a few grants in the Sacramento Valley, the ranchos were located in the same general areas as the coastal missions. Only six ranchos were located either wholly or in part in San Joaquin County, including the El Pescadero grant, which was situated in a portion of the project area (immediately south of the Grant Line/Fabian and Bell Canal). Micheltorena granted Antonio Pico the 8-square-league (approximately 35,546-acre) rancho in 1843 and following the confirmation by the U.S. Supreme Court in 1856 (and subsequent survey); Pico and Henry M. Naglee received a formal patent in 1865. Additional lands located in the project area (and outside the rancho) remained essentially unsettled before the well-publicized discovery of gold in 1848 (Bean and Rawls 1993:52; Hoffman 1862:37; Thompson 1957:144).

Following the Gold Rush, settlement in the Delta region increased dramatically, largely as a result of the passage of the Swamp and Overflow Act in 1850. The law transferred swamplands from the U.S. Government into the control of the state of California. As a result of this act, approximately 500,000 acres of newly acquired California swampland located in the Sacramento–San Joaquin Delta (and including the project area) were sold to private citizens (CALFED Bay-Delta Program 1996:10; Thompson 1957:186).

Early settlers in the project area included the Willis, Baird, Meyers, Tait, and Swain families, who located to the region currently occupied by the CCF. By 1890, Kidd Ranch and the Levi Tract were established in the vicinity of the Middle River. Within 5 years, the Bixler and Williams families settled on large land holdings on Union Island, and a Mr. Burke bought out Pico's share of the former Rancho El Pescadero. Naglee maintained ownership of his portion of the property. Lots during this period were typically 100–500 acres in size, although land to the east of the Middle River was subdivided into smaller parcels (Anonymous 1890; McMahon and Minto 1885; San Joaquin Board of Supervisors 1912).

Land speculators and individual farmers were attracted to the Delta region because of its fertile agricultural soil and because the area featured miles of navigable channels. Efforts to reclaim the land were begun immediately (largely through the efforts of Chinese laborers), although the process was time consuming and costly. Because of the expenses involved, large corporations were commonly formed to supply the capital needed to reclaim vast areas of swampland. In the Delta area, financier Lee Philips (who created California Delta Farms Incorporated) played a key role in reclaiming the region located

primarily north of the project area. Phillips purchased thousands of acres of Delta land and teamed with Japanese immigrant farmer George Shima to reclaim and plant the area with profitable crops. Other companies involved in reclamation included the Tide Land Reclamation Company and the Old River Land Reclamation Company. Overall, dredging efforts during this period were not very successful until the advent of improved dredging machinery in the late 19th century (CALFED Bay-Delta Program 1996:11; Paterson et al 1978:21a–23; Thompson 1957:220).

Based on historic maps, the project area was reclaimed between 1870 and 1890, with most of the present canal system in place by 1890. In the late 1870s, the Tide Land Reclamation Company undertook efforts to reclaim a portion of Union Island and areas to the north of the island through the construction of dams, canals, and levees. Additional levees were also constructed near the Middle River. Reclaimed land in the project area was used to grow sugar beets, corn, beans, and alfalfa and also was used as grazing pastures for livestock (CALFED Bay-Delta Program 1996:11; Owens 1991:19–20; Thompson 1957).

By the turn of the 20th century, transportation improved in the area when officials constructed roads on the tops of levees. Before this construction, roadways were virtually non-existent, and most local travel was by schooners or barges. Southern Pacific Railroad and Western Pacific Railroad also constructed rail lines in the vicinity of the project area, which not only connected the Delta to populated centers such as Sacramento and San Francisco, but also encouraged the movement of agricultural products from the Delta to outlying markets (Thomas Brothers 1920).

The 20th century also brought about changes to the canal system. By the 1920s, many of the canals and levees mentioned above were no longer present or were modified. In addition, smaller canals were constructed on Union Island and a portion of the Old River in the vicinity of the Pescadero Tract was rerouted, causing small islands to be formed. Maps from that era also indicate the area currently occupied by CCF was composed of a series of canals, including a portion of the West Canal. During this period, most of the land in the project area was subdivided into smaller parcels and owned by corporations or individual farmers. Major landholders in the project area included E. Bixler, D.M. Burns, California Irrigated Farms, and Old River Farms Company (Anonymous 1890; Budd 1926; San Joaquin Board of Supervisors 1912; U.S. Geological Survey 1914).

By the 1930s, additional crops were introduced to the area, including asparagus, sunflower seeds, and small grains. By the 1960s, CCF was created, and overall improvements were made to the canal system, including extending or rerouting some canals and levees and improving roadways (Contra Costa County Title Company 1928; Metsker 1940; West and Scott 1990).

Throughout the 20th century, the south Delta region continued to be used for agricultural purposes. Currently, large farming corporations and some large family farms own the majority of the project area. Upkeep and maintenance

continue on the water system into the present (CALFED Bay-Delta Program 1996:12).

Known Cultural Resources

Based on the records search, a review of historic maps, and the architectural and archaeological surveys, five cultural resources were identified in the SDIP APE. These consist of the Grant Line/Fabian and Bell Canal, the West Canal, a levee system, a farm complex located near Middle River, and a building complex.

Grant Line/Fabian and Bell Canal

The Grant Line/Fabian and Bell Canal is an earthen canal approximately 200 feet wide extending roughly 10 miles from east to west along the southern portion of the APE. Levees are located on either side of the canal. The segment of the canal to the east is a single waterway that divides into two separate parallel canals, creating an island strip in the middle as it extends westward. The canal to the south of the island strip is referred to as the Fabian and Bell Canal, and the canal to the east is the Grant Line Canal.

West Canal

Because of limited access, a formal pedestrian survey of the West Canal was not possible for the purposes of this project. However, based on characteristics observed at nearby irrigation features (i.e., the Grant Line/Fabian and Bell Canal), it is assumed that the West Canal displays design and construction materials and methods similar to the irrigation features located in the vicinity.

Levee System

A system of earthen levees, which borders canals and rivers, is located throughout the project area. The levees vary in width and height but typically measure approximately 40 feet wide and 10 to 15 feet high.

Farm Complex

The farm complex is located on the south bank of the Middle River in the vicinity of the proposed Middle River gate site. The complex contains a wood-frame single-family residence and several metal-framed barns and outbuildings.

Grant Line/Fabian and Bell Canal Buildings

A cluster of historic buildings is located on the island strip in the Grant Line/Fabian and Bell Canal. The buildings are windowless wood-frame structures with gabled roofs.

Environmental Consequences

Assessment Methods

Impact assessments for cultural resources focus on properties eligible for listing in the National Register of Historic Places (NRHP) (historic properties), the California Register of Historic Resources (CRHR), or those properties considered significant resources or unique archaeological resources under CEQA.

Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies consider the effects of their actions, including activities they fund or permit on properties that may be eligible for listing or are listed in the NRHP. To determine whether an undertaking could affect historic properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated for NRHP eligibility. To be eligible for listing in the NRHP, a property must be 50 years old or older and evaluated as significant (or, if less than 50 years old, be of exceptional historic significance). To qualify for listing in the NRHP, a property must represent a significant theme or pattern in history, architecture, archaeology, engineering, or culture at the local, state, or national level. It must meet one or more of the four criteria listed below and have sufficient integrity to convey its historic significance. The criteria for evaluation of the eligibility of cultural resources for listing in the NRHP are defined in 36 CFR 60.4 as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> 1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
> 2. that are associated with the lives of persons significant in our past; or
> 3. that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> 4. that have yielded, or may be likely to yield, information important in prehistory or history.

The State CEQA Guidelines define three ways that a property may qualify as a historical resource for the purposes of CEQA review:

- if the resource is listed in or determined eligible for listing in the CRHR;
- if the resource is included in a local register of historical resources, as defined in Public Resources Code (Pub. Res. Code) 5020.1(k), or is identified as significant in a historical resource survey meeting the requirements of Pub. Res. Code 5024.1(g) unless the preponderance of evidence demonstrates that it is not historically or culturally significant; or

- the lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record (14 California Code of Regulations [CCR] 15064.5(a)).

Each of these ways of qualifying as a historical resource for the purpose of CEQA is related to the eligibility criteria for inclusion in the CRHR (Pub. Res. Code 5020.1(k), 5024.1, 5024.1(g)). A historical resource may be eligible for inclusion in the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

Properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR, and therefore are significant historical resources for the purpose of CEQA (Pub. Res. Code 5024.1(d)(1)).

In addition, CEQA also distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as above, and "unique archaeological resources." An archaeological resource will be considered unique if it:

- is associated with an event or person of recognized significance in California or American history or recognized scientific importance in prehistory;
- can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable research questions;
- has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;
- is at least 100 years old and possesses substantial stratigraphic integrity; or
- involves important research questions that historical research has shown can be answered only with archaeological methods (Pub. Res. Code 21083.2).

Generally, most archaeological resources that meet the definition of *unique* will also meet the definition of a *historical resource*.

Regulatory Setting

Federal—Section 106 of the National Historic Preservation Act

Section 106 of the NHPA requires that, before beginning any undertaking, a federal agency must take into account the effects of the undertaking on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on these actions. The 36 CFR 800 regarding compliance with Section 106 state that, although the tasks necessary to comply with Section 106 may be delegated to others, the federal agency is ultimately responsible for ensuring that the Section 106 process is completed according to statute. The Section 106 process has four basic steps:

1. Initiation of the Section 106 process (define APE and scope of identification efforts).
2. Identification of historic properties.
3. Assessment of adverse effects to historic properties.
4. Resolution of adverse effects to historic properties.

The APE for the SDIP is formally defined in the confidential cultural resources inventory and evaluation report prepared for this undertaking (Jones & Stokes 2004b). The APE is confined largely to those areas that will be subject to ground-disturbance during construction and operation of the SDIP.

State—California Environmental Quality Act

CEQA requires that public agencies (in this case, DWR) that finance or approve public or private projects assess the effects of the project on cultural resources. Cultural resources are defined as buildings, sites, structures, districts, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. CEQA requires that if a project results in significant effects on important cultural resources, alternative plans or mitigation measures must be considered; only significant cultural resources, however, need to be addressed. Therefore, prior to the development of mitigation measures, the importance of cultural resources must first be determined. The steps that are normally taken in a cultural resources investigation for CEQA compliance are:

- identify cultural resources,
- evaluate the significance of resources,
- evaluate the effects of a project on *all* resources, and
- develop and implement measures to mitigate the effects of the project only on *significant* resources.

Areas of Controversy

Under CEQA, areas of controversy involve factors that reflect differing opinions among technical experts. Differences of opinion among technical experts stem from differing methodological or theoretical orientations. Although differences of theoretical and methodological approach exist among archaeologists, historians, and cultural anthropologists, these do not appear to affect the assessment of impacts that may result from the SDIP alternatives. Therefore, no areas of controversy relate to cultural resources for the purposes of the SDIP.

Evaluation of Identified Cultural Resources

Grant Line/Fabian and Bell Canal, West Canal, Levee System, Farm Complex, Grant Line/Fabian and Bell Canal Buildings

Five known cultural resources are located in the project area. Fieldwork conducted by Jones & Stokes did not identify additional cultural resources in the project area. An evaluation was conducted to determine whether these features meet the criteria for listing in the NRHP or CRHP (Jones & Stokes 2004b). None of the features appears to meet the criteria for eligibility because of loss of integrity, lack of historical and architectural significance, or non-historic dates of construction. The State Historic Preservation Officer (SHPO) must concur with these determinations pursuant to 36 CFR 800.4. Resource evaluations are summarized below.

Grant Line/Fabian and Bell Canal

Grant Line/Fabian and Bell Canal follows the same alignment as it did in the 19th century from an engineering standpoint, but the canal bears little resemblance to a canal from the period of significance. Rather, it is very much a product of the 20th century that happens to follow a historic alignment. As originally excavated, the canal would have had a wide shallow U-shape with side slopes angles dictated in part by the capabilities of the horses and scrapers as they moved down one slope and up the other. The present canal, as a result of years of dredging and chaining, now has steep slopes (some concrete lined). Furthermore the introduction of modern roads topping the levees on either side of the canal as well as numerous high- and low-power utility poles and wires gives the area a slightly modernized feel and affects the integrity of setting. Grant Line/Fabian and Bell Canal does not appear to meet the NRHP or CRHR eligibility criteria because it lacks integrity of design, materials, feeling, and workmanship to its respective period of historic significance.

West Canal

West Canal does not appear to meet the criteria for listing in the NRHP or the CRHR because it has lost integrity to its period of significance. Construction of CCF caused the canal to suffer integrity of setting. As mentioned above, the canal originally traversed reclaimed agricultural fields. The current, vast water

body to the west overshadows the canal and completely changes the sense of setting, feeling, and association. In addition, as with other canals in the area, West Canal suffered a loss of integrity to its design, materials, and workmanship as a result of constant upkeep and maintenance in the form of erosion control, dredging, and repairs along its banks.

Levee System

The levee system has lost integrity since it was initially constructed. The loss of integrity resulted from repeated maintenance and upgrading (West 1994). Levees built in the late 19th and early 20th centuries tended to be small ribbons of mounded earth measuring roughly 30–40 feet wide and 6–8 feet high. The earthen features gradually evolved to massive flat top ridges measuring up to 100 feet wide at the base and roughly 30 feet high. The loss of integrity of design, materials, and workmanship exhibited by the levee system is considerable, with the consequence that it is no longer recognizable as a 19th-century levee system. Because the levee system does not maintain integrity to its period of significance, it does not appear to meet the significance criteria of the NRHP or the CRHR.

Farm Complex and Grant Line/Fabian and Bell Canal Buildings

These historic structures and buildings do not appear to meet the significance criteria of the NRHP or the CRHR. They are not directly associated with events important to the county, state, or nation and are not known to be associated with individuals important to the area. None of the buildings and structures displays a unique design or construction method. Furthermore, the resources are somewhat deteriorated and have lost some integrity over time.

Significance Criteria

Impact assessments for cultural resources are based on the type of resource, a determination of whether a resource is considered eligible for inclusion in the NRHP or the CRHR, the type of impact, and the extent of the impact. Under CEQA, impacts on cultural resources are considered significant if they would adversely affect significant cultural resources. Similarly, pursuant to 36 CFR 800.5 regulations, a federal action or undertaking would have an adverse effect if the undertaking alters the characteristics that make a property eligible for inclusion in the NRHP. Specific actions under the SDIP that may adversely affect cultural resources include the modification of existing levees, construction of operable gates, construction of support structures and access roads, and channel dredging.

As indicated under Assessment Methods, impacts on cultural resources that may result from a federal action include:

- ground disturbance,
- modification and alteration of historic structures,
- visual and auditory intrusions to a resource's historic setting, and

- vandalism.

Physical damage or destruction to significant cultural resources, particularly archaeological sites, may affect the physical integrity of those resources and thus reduce their information or research potential (NRHP Criterion D or CRHR Criterion 4). Physical damage or alteration may also have deleterious effects on the characteristics of a cultural resource that convey its significant association with an important historical event, person, or architectural/design quality (NRHP Criteria A–C or CRHR Criteria 1–3).

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program.

The discussion of significant impacts and mitigation measures within this section will include a citation of one or more of the following programmatic mitigation measures used to build project-specific mitigation measures to offset significant impacts identified from implementation of the SDIP. These programmatic mitigation measures are numbered as they appear in the ROD, and only those measures relevant to cultural resources are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED programmatic mitigation measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

1. Conduct cultural resources inventories,
2. Avoid sites through project redesign,
3. Map sites prior to undertaking actions that affect cultural resources,
4. Conduct surface collections,
5. Perform test excavations,
6. Probe for potential buried sites,
7. Prepare reports to document mitigation work,
8. Conduct full-scale excavations of sites slated for destruction as a result of projects,
9. Prepare public interpretive documents,
10. Document historic structures by preparing Historic American Engineering Records of Historic American Building Surveys, and
11. Conduct ethnographic studies for traditional cultural properties.

Alternative 1 (No Action)

No changes in existing conditions would result from Alternative 1. Present use of the canals and levees would continue, including periodic minor modifications of canals and levees at the temporary barrier locations.

2020 Conditions

Under 2020 conditions, the SDIP project components would not be built or operated. Present use of the canals and levees would continue, including periodic minor modifications of canals and levees at the temporary barrier locations.

Alternatives 2A, 2B and 2C

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Implementation of Alternatives 2A–2C may result in direct and indirect impacts on cultural resources. Physical modification to cultural resources would result from construction of a fish control gate at the head of Old River; flow control gates at Old River, Grant Line/Fabian and Bell Canal, and Middle River; and dredging of portions of south Delta waterways. Such activities have the potential to affect both known cultural resources and as-yet-undiscovered (buried) cultural resources such as human remains. Visual intrusions to the historic setting of cultural resources would result from construction of gates. Impacts are discussed below under separate headings and by impact type.

Impact CR-1: Physical Alterations to Levees Resulting in Changes in Historic Integrity. Construction of the fish control gate at the head of Old River would result in physical alterations to levees on either side of Old River. Because the levees at this location have not retained their historic integrity they are not considered a historic property for the purposes of Section 106 of the NHPA and are not a historical resource for the purposes of CEQA. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Construction of the Old River at DMC flow control gate would result in physical alterations to levees on either side of the gate location. The levees at this location do not retain their historic integrity and thus are not considered a historic property for the purposes of Section 106 of the NHPA and are not a historical resource for the purposes of CEQA. Therefore there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to

historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Construction of the Middle River flow control gate would result in physical changes to levees on either side of the gate location. The levees at this location do not retain their historic integrity and thus they are not considered a historic property for the purposes of Section 106 of the NHPA and are not a historical resource for the purposes of CEQA. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Construction of the Grant Line/Fabian and Bell Canal flow control gate would result in changes to Grant Line/Fabian and Bell Canal. Grant Line/Fabian and Bell Canal is not a historic property for the purposes of Section 106 of the NHPA and is not a historical resource for the purposes of CEQA. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Impact CR-2: Inadvertent Damage to or Destruction of Buried Archaeological Sites and Human Remains. Construction and staging activities associated with the SDIP have the potential to disturb buried, as-yet-undiscovered archaeological sites (including submerged cultural resources) and human remains. Damage to or destruction of significant or potentially significant buried archaeological remains during construction would be a significant impact under CEQA and NEPA. This impact would be reduced to a less-than-significant level through implementation of Mitigation Measure CR-MM-1.

Similarly, damage to or destruction of human remains during construction would be a significant impact under CEQA and NEPA. This impact would be reduced to a less-than-significant level through implementation of Mitigation Measure CR-MM-2.

Mitigation Measure CR-MM-1: Stop Work If Archaeological Materials Are Discovered during Construction or Dredging. If archaeological materials (such as chipped or ground stone, historic debris, building foundations, or non-human bone) are inadvertently discovered during ground-disturbing activities, the construction contractor shall stop work in that area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find and develop appropriate treatment measures. Treatment measures shall be made in consultation with Reclamation, DWR, the SHPO, and other consulting parties to the Section 106-review process. Treatment measures, consistent with Mitigation Measures 2–5, 7, and 8, typically include development of avoidance strategies or

mitigation of impacts through data recovery programs such as excavation or detailed documentation.

If cultural resources are discovered during construction activities, the construction contractor and lead contractor compliance inspector shall verify that work is halted until appropriate treatment measures are implemented. Implementation of this mitigation measure may be sufficient to reduce impacts on archaeological sites to a less-than-significant level.

Mitigation Measure CR-MM-2: Stop Work If Human Remains Are Discovered during Construction or Dredging. If human remains of Native American origin are discovered during ground-disturbing activities, it is necessary for DWR and Reclamation to comply with state laws relating to the disposition of Native American burials, which fall within the jurisdiction of the NAHC (Pub. Res. Code 5097). If human remains are discovered or recognized in any location other than a dedicated cemetery, DWR and Reclamation shall not allow further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

- the Contra Costa or San Joaquin County Coroner has been informed and has determined that no investigation of the cause of death is required; and
- if the remains are of Native American origin,
  - the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Pub. Res. Code 5097.98, or
  - the NAHC was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the NAHC.

Impact CR-3: Visual Intrusions to the Historic Setting of Cultural Resources from Gate Construction. Gate construction would result in the addition of structures that are out of character with the historic setting of cultural resources such as historic canals, buildings, and levees:

- Construction of the head of Old River fish control gate would result in visual intrusions to the historic setting of the Old River levees.
- Construction of the Old River flow control structure would result in visual intrusions to the historic setting of the Old River levees.
- Construction of the Middle River flow control gate would result in visual intrusions to the historic setting of the Middle River levees and a historic farm complex.
- Construction of the Grant Line/Fabian and Bell Canal flow control gate would result in intrusions to the historic setting of Grant Line/Fabian and Bell Canal and the building complex on Bell Island.

None of the cultural resources affected in this manner are historic properties for the purposes of Section 106 of the NHPA or historical resources for the purposes of CEQA. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Dredging

Impact CR-4: Disturbance of West Canal. Dredging of south Delta waterways would result in physical changes to the West Canal. The West Canal, however, is not a historic property for the purposes of Section 106 of the NHPA or a historical resource for the purposes of CEQA. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

2020 Conditions

Construction of the physical/structural component of the SDIP under 2020 conditions would result in impacts on cultural resources similar to those analyzed above under 2001 conditions.

Stage 2 (Operational Component)

The operational scenarios of Alternatives 2A–2C will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels in reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

2020 Conditions

The operational scenarios of Alternatives 2A–2C under 2020 conditions will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels in reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800

regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Interim Operations

Interim operations of the SDIP are not relevant to this cultural resources impact assessment. Interim operations will not affect cultural resources because they would not result in the inundation of additional land.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control and Flow Control Gates

Implementation of Alternative 3B would result in impacts on cultural resources that are similar to those under Alternatives 2A–2C. The impacts under Alternative 3B would be slightly less than those under Alternatives 2A–2C because Alternative 3B does not include the construction of the Grant Line flow control gate. Therefore, impacts CR-1 through CR-4 would occur under Alternative 3B, but to a lesser extent. Required mitigation measures are the same for Alternative 3B as for Alternatives 2A–2C.

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would result in impacts on cultural resources similar to the 2001 conditions described in the paragraph above.

Stage 2 (Operational Component)

The operational scenario of Alternative 3B will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels in reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

2020 Conditions

Similar to the 2001 conditions described above, the operational scenarios of Alternative 3B under 2020 conditions will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels at reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Alternative 4B

Stage 1 (Physical/Structural Component)

Fish Control and Flow Control Gates

Implementation of Alternative 4B would result in impacts on cultural resources that would be similar to those under Alternatives 2A–2C and 3B, except that the physical/structural component of Alternative 4B consists only of the head of Old River fish control gate and dredging of south Delta waterways. The impacts under Alternative 4B would be slightly less than under Alternatives 2A–2C and 3B. Therefore, impacts CR-1 through CR-4 would occur under Alternative 4B, but to a lesser extent. Required mitigation measures are the same for Alternative 4B as for Alternatives 2A–2C and 3B.

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would result in impacts on cultural resources similar to the 2001 conditions described in the paragraph above.

Stage 2 (Operational Component)

The operational scenario of Alternative 4B will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels in reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

2020 Conditions

Similar to the 2001 conditions described above, the operational scenarios of Alternative 4B under 2020 conditions will not affect cultural resources because they will not result in significant departures from the range of surface elevations maintained under current rules for water levels in reservoirs affected by the SDIP. An examination of Table 7.4-5 demonstrates that the greatest change in water levels under the SDIP is 1.6% greater than normal. The SDIP will not result in significantly longer exposure of cultural resources or the inundation of cultural resources. Therefore, there is no impact under CEQA and no mitigation is required. Pursuant to 36 CFR 800 regulations, if Reclamation makes a "no historic properties affected" determination for the SDIP, and the SHPO concurs, the SDIP would not result in adverse effects to historic properties and no mitigation would be required to comply with Section 106 of the NHPA.

Cumulative Evaluation of Impacts

Cumulative impacts on cultural resources are analyzed in Chapter 10, "Cumulative Impacts." This chapter summarizes the other foreseeable future projects that may contribute to these impacts.

7.8 Public Health and Environmental Hazards

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on public health and environmental hazards, including hazardous material use and storage, emergency response and evacuation plans, and health hazards to the public in the south Delta region. Issues related to public health and environmental hazards are accidental spills or releases of hazardous materials or waste during construction, impedance of emergency response in the south Delta, and the potential to create mosquito breeding habitat. Sections 5.3, Water Quality; 5.9, Air Quality; and 5.7, Groundwater Resources, provide additional information about contaminant dispersion and control procedures.

Summary of Significant Impacts

No significant public health impacts are expected to occur as a result of constructing and operating any of the project alternatives.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- Environmental Data Report (EDR) (Please see Appendix P),
- California Department of Health Services web site,
- Interim South Delta Program EIR/EIS, and
- CALFED Programmatic EIS/EIR.

Hazardous Materials

Hazardous materials and wastes are those substances that, because of their physical, chemical, or other characteristics, may pose a risk of endangering human health or safety or of endangering the environment (California Health and Safety Code Section 25260). Types of hazardous materials include petroleum hydrocarbons, pesticides, and volatile organic carbons (VOCs). In the Delta, most hazardous waste sites are associated with agricultural production activities and may include storage facilities and agricultural pits or ponds contaminated with fertilizers, pesticides, or herbicides. There have also been oil and gas

drilling activities in the south Delta region; if not properly managed and closed, these drilling locations could be considered hazardous waste sites.

The locations of hazardous waste sites in the Delta were mapped using EDR. EDR queries hundreds of federal, state, and local databases to search for contaminants within a 1-mile radius of the proposed gate sites. These databases showed no known areas of contamination or sites where hazardous materials are used or disposed of within the SDIP project site.

Emergency Response/Evacuation Plans

Hazardous Materials

The San Joaquin County OES is responsible for planning emergency response actions to hazardous material incidents. Area response plans incorporate hazardous materials inventory data, training for emergency responses, and evacuations.

Law Enforcement

The San Joaquin County Sheriff's Department staffs a Boating Safety Division, which provides law enforcement on 600 miles of waterways in the county, including the south Delta. They own five boats and have six full-time officers, hiring additional staff during summer months when recreational activities increase. By authority and responsibility, the Sheriff's office is the designated "scene manager" for any disaster, from hazardous materials spills to major flood activity. Public protection plans are coordinated with other public agencies in preparing for disasters.

Emergency response is carried out using vehicles or boats, depending on the location's accessibility, predicted response time, and availability of resources. The average emergency response time in the south Delta is approximately 1 hour. Sheriffs have access to all gates and may use fields as well as levee roads to access channel areas in the Delta.

Currently, the Sheriff's Department uses the boat ramps to bypass the temporary barriers and to launch boats into the channels. They may also launch boats from Dos Rios, Tracy Oasis Marina, Mossdale Marina, and several private marina areas throughout the south Delta.

U.S. Coast Guard

In addition to the Sheriff's Department, the U.S. Coast Guard provides search and rescue and emergency response by boat to those areas of Delta not accessible by vehicle. Because of the Delta's many meandering sloughs and canals,

response is typically faster by driving to the nearest boat launch. The U.S. Coast Guard station in Rio Vista maintains a trailerable boat that can be launched at either River's End Marina, near CCF, or at Mossdale Marina, east of Manteca.

Currently, the U.S. Coast Guard crosses the temporary barriers using the boat ramps. It takes approximately 10 minutes to load the boat and re-launch on the other side of the barrier.

In 2002, there were 119 accidents in the Delta, including 60 injuries and 7 fatalities (California Department of Boating and Waterways 2002). Response time to these incidences by boat is approximately 1 hour (Doty pers. comm.).

Health Hazards

Water Quality

The Delta is a source of drinking water for approximately 23,000,000 Californians. If Delta projects compromise the quality of the water, more extensive treatment may be required. When water is treated, byproducts are formed that may also adversely affect drinking water quality.

THM, a byproduct of chlorination, is of particular concern as it is associated with increased cancer risk. THM concentrations in drinking water are affected by two factors: the THM formation potential of exported Delta waters and the method of disinfection. THM is discussed in more detail in Section 5.3, Water Quality.

Other potential sources that could compromise water quality are two-stroke boat engines (which use an oil-gas mixture) and four-stroke boat engines (which use pure gasoline). These petroleum products could be accidentally discharged into the south Delta, compromising water quality. Continuous testing and monitoring of Delta water by federal, state, and local agencies minimizes the impact of hazardous waste discharges on public health.

Mosquito Breeding Conditions, Habitat, and Disease Transmission

All mosquito species require standing water to complete their growth cycles; any body of standing water that remains undisturbed for more than three days represents a potential mosquito breeding site. Mosquitoes breed year-round on Delta islands, but breeding diminishes substantially during cooler weather, typically from October through April.

Two general classes of habitats, open water and flooded, provide suitable conditions for mosquito production. Open-water habitats include permanently inundated wetlands, ditches, sloughs, and ponds. Flooded habitats include managed wetlands and agricultural lands that may seasonally retain surface

water. Water bodies with water levels that slowly increase or recede produce greater numbers of mosquitoes than water levels that are stable or that rapidly fluctuate.

Mosquitoes are primary vectors for disease in the Delta. They can transmit diseases among species, such as from a horse to a bird, or from a bird to a human. In the south Delta, current mosquito control efforts focus on species that transmit malaria, encephalitis, or the West Nile virus. The West Nile virus is expected to become a permanent disease throughout the United States as mosquito vectors carry it west from the New York area. As of 2005, there have been three reported human cases of the West Nile virus in San Joaquin County (Office of Emergency Services 2005).

Pesticides

The south Delta area is used predominantly for agricultural practices, and aerial pesticide spraying of crops is common. Currently, there are four companies that are hired by local farmers to conduct aerial spraying: Haley's, Trinkle and Boys, Aerial Control, and Cavanagh. Most of these companies have scouts that investigate the area that is to be sprayed prior to spraying. However, there is no standard method for warning people that may be in the vicinity of the pesticide spraying area. State law prohibits the spraying of any pesticide or insecticide off site of the specified crop or field and requires that the applicator check the area for people before spraying. If people are in any danger of being sprayed, the applicator is required not to spray. (Williamson pers. comm.)

Environmental Consequences

This section discusses the potential for release of hazardous materials, interference with emergency response plans, and exposure of people to sources of potential health hazards. The nature of construction procedures, the operational characteristics of the SDIP, and the setting of the project area are such that the implementation of the project would not increase fire hazard in the south Delta.

Assessment Methods

The evaluation of potential impacts on public health and environmental hazards addresses the potential for health and safety hazards during project construction and operation of project facilities after construction. Information was collected through site visits, information gathered through the incorporation of findings from Sections 5.5, Flood Control and Levee Stability, and 5.3, Water Quality, and from assumptions made using the EDR reports. The analysis includes potential effects on workers related to construction activities, as well as general facility safety and hazards to both workers and the public posed by the new

facilities and their operation. Table 7.8-1 shows the number of people and type of equipment at each project site.

Table 7.8-1. Equipment and Workers for Project Components

Site	Activity	Number of workers	Equipment
Head of Old River Fish Control Gate	Construction	80	Back hoe, bottom dumps, water trucks, roller, grader, dewatering pumps, excavator, scraper, dozer, dump trucks, loader, crane, concrete trucks, pile driver, concrete pump, vibratory hammer, 40-ton crane
	Channel Dredging	6	Clamshell or hydraulic dredge, dozer, barge, large scrapers, large sheepsfoot compactor
	Operation	1 (April–May, September–October)	
	Maintenance	Up to 10	Crane and service truck
Middle River	Construction	50	Loader, dump trucks, clam shell dredge, excavator, dozer, grader, vibratory roller, water truck, 40-ton crane, barge, pile driver, 80-ton crane, concrete trucks, power tools, 25-ton crane, vibratory hammer, oil spreader, rubber tire roller, steel roller, post driver
	Channel Dredging	30	Clamshell or hydraulic dredge, dozer, barge, large scrapers, large sheepsfoot compactor
	Operation	1	
	Maintenance	Up to 10	Crane and service truck
Grant Line Canal	Construction	90	Back hoe, dozer, crane, pile driver, excavator, dump trucks, loader, concrete trucks, crane with bucket, concrete pump, bottom dumps, scraper, sheepsfoot rollers, water trucks, grader, clam shell
	Operation	1	
	Maintenance	Up to 10	Crane and service truck.
Old River at DMC	Construction	100	Back hoe, dozer, excavator, scraper, dump trucks, loader, water trucks, pile driver, concrete trucks, delivery trucks, crane, concrete pump, bottom-dumps, compactor, roller, grader, sheepsfoot, roller, clam shell, hydroseed
	Operation	1	
	Maintenance	Up to 10	Crane and service truck
West Canal	Channel Dredging	15	Clamshell or hydraulic dredge, dozer, barge, large scrapers, large sheepsfoot compactor

DMC = Delta Mendota Canal.

Regulatory Setting

Regulations and policies considered relevant to the SDIP project alternatives are summarized below.

Federal Regulations

The principal federal regulatory agency responsible for the safe use and handling of hazardous materials is the EPA. Two key federal regulations pertaining to hazardous wastes are described below. Other applicable federal regulations are contained primarily in CFR Titles 29, 40, and 49.

Resource Conservation and Recovery Act

The federal Resource Conservation and Recovery Act enables the EPA to administer a regulatory program that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

State Regulations

California regulations are equal to or more stringent than federal regulations. The EPA has granted the State of California primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous wastes are handled, stored, and disposed of properly to reduce risks to human and environmental health. Several key laws pertaining to hazardous wastes are discussed below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as unsafe raw or unused material that is part of a process or manufacturing step. They are not

considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those relating to hazardous waste.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to but more stringent than the federal Resource Conservation and Recovery Act program. The act is implemented by regulations contained in Title 26 CCR, which describes the following required aspects for the proper management of hazardous waste:

- identification and classification;
- generation and transportation;
- design and permitting of recycling, treatment, storage, and disposal facilities;
- treatment standards;
- operation of facilities and staff training; and
- closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances and Control.

Emergency Services Act

Under the Emergency Services Act, the state developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California OES. The office coordinates the responses of other agencies, including EPA, the CHP, RWQCBs, air quality management districts, and county disaster response offices.

Local and Regional Laws, Regulations, and Programs

San Joaquin County Mosquito Vector Control District

This district was formed by the San Joaquin County Board of Supervisors in 1945 under the authority of Section 2000 of the California Health and Safety Code. The District is funded by local property taxes and a special tax, based on land use type. They are responsible for all mosquito vector control in the county. Mosquito control is performed using the district's Integrated Pest Management Plan. The plan includes surveillance, biological control, physical control, chemical control, community outreach/public education, and legal abatement. If a mosquito breeding area is found that was previously not known, staff will contact the property owner to work out the details for accessing the property,

controlling the existing mosquito population, and developing a plan to reduce or eliminate the mosquito breeding conditions for the future.

Other Laws, Regulations, and Programs

Various other state regulations have been enacted that affect hazardous waste management, including:

- Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), which requires labeling of substances known or suspected by the state of California to cause cancer; and
- California Government Code Section 65962.5, which requires the Office of Permit Assistance to compile a list of possible contaminated sites in the state.

State and federal regulations also require that hazardous materials sites be identified and listed in public records. These lists include:

- Comprehensive Environmental Response, Compensation, and Liability Information System;
- National Priorities List for Uncontrolled Hazardous Waste Sites;
- Resource Conservation and Recovery Act;
- California Superfund List of Active Annual Workplan Sites; and
- Lists of state-registered underground and leaking underground storage tanks.

Significance Criteria

Criteria used for determining the significance of an impact on public health and environmental hazards are based on the State CEQA Guidelines and professional standards and practices. Impacts were considered significant if an alternative would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials to the environment;
- be located on a site that is on a list of hazardous materials sites compiled pursuant to California Government Code 65962.5, and as a result would create a significant hazard to the public or the environment;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- expose people to a significant risk of contracting a disease;

- place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- 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; or
- adversely affect drinking water quality.

CALFED Programmatic Mitigation Measures

The August 2000 CALFED Programmatic ROD includes mitigation measures for agencies to consider and use where appropriate in the development and implementation of project-specific actions. The mitigation measures address the short-term, long-term and cumulative effects of the CALFED Program.

These Programmatic Mitigation Measures are numbered as they appear in the ROD, and only those measures relevant to the SDIP resource area are listed below; therefore, numbering may appear out of sequence. To see a full listing of CALFED Programmatic Mitigation Measures, please refer to Appendix E, "Mitigation Measures Adopted in the CALFED Record of Decision."

Public Health and Environmental Hazards Mitigation Measures

1. Use various mosquito control methods, such as biological agents, chemical agents, and ecological manipulation of mosquito breeding habitat.
2. Support actions to establish or find funding for mosquito abatement activities.
6. Follow established and proper procedures and regulations for identifying, removing and disposing of contaminated materials.
9. Conduct core sampling and analysis of proposed dredged areas and engineer solutions to avoid or prevent environmental exposure to toxic substances after dredging.

Alternative 1 (No Action)

Under the No Action Alternative, the project area would not be altered. The public's risk of exposure to hazardous materials, disease, flooding, and fires would not change. Therefore, there are no impacts on public health and environmental hazards as a result of the No Action Alternative.

2020 Conditions

Under the future no action (2020 conditions), SDIP would not be implemented. Development within the south Delta region is likely to occur and may result in changes in the ambient levels of hazardous materials present in the south Delta. However, the public's risk of exposure to hazardous materials, disease, flooding, and fires would be similar to current levels. Therefore, there would be no impacts on public health and safety under 2020 conditions.

Alternatives 2A, 2B, and 2C

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact HAZ-1: Exposure to or Release of Hazardous Materials during Construction. Fuel, oils, grease, solvents and other petroleum-based products are commonly used in construction activities. Accidental releases of the products could contaminate soils and degrade surface water and groundwater quality, resulting in a safety hazard to construction workers. The potential to expose workers to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Impact HAZ-2: Increase in Emergency Response Times. Delta waterways are occasionally used by emergency service providers. The permanent flow control gates and fish control gate would slightly increase emergency response times in the event the channels blocked by the gates are used as access routes. It is estimated that passing through the boat locks would take approximately five minutes longer than the existing method of trailering boats around the temporary barriers. The gates would not impede emergency access provided over levee roads. The gates would not significantly impact emergency response times or services. No mitigation is required.

Impact HAZ-3: Exposure to or Release of Hazardous Materials during Operation. Operating and maintaining the gates may include the use of fuels, lubricants and other hazardous materials. Accidental releases of these products could contaminate soils and degrade surface water and groundwater quality, resulting in a worker or public safety hazard. The potential to expose workers or the public to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Dredging

Impact HAZ-4: Increase in Mosquito Breeding Habitat from Creation of Settling Ponds. Hydraulic dredging activities would require settling ponds to decant water from the dredged material. These settling ponds would be located adjacent to levees and away from populated areas. The ponds would vary in size, with a maximum configuration of 1,600 feet by 3,600 feet. The decant water would be discharged back to the Delta channels approximately 35 days after the dredged material is placed in the ponds. The settling ponds would be used only during dredging activities and will likely be continuously filled as space within them becomes available. Dredging activities would take place between August 1 and October 14, but by the time the pond is left standing in mid-October, mosquito breeding season will no longer be at its peak. Environmental Commitments in Chapter 2 include notification and coordination with the San Joaquin County Mosquito Abatement District. The impact on public health is considered less than significant because of the distance of the ponds to urban areas and the environmental commitment of working with the mosquito abatement district. This impact is less than significant. No mitigation is required.

Impact HAZ-5: Water Quality Degradation, Resuspension of Contaminants, and Exposure to Hazardous Materials from Dredging Activities. It is possible that dredged material is toxic or contains hazardous materials. Dredging activities and placement of this material on land adjacent to waterways has the potential to degrade water quality or expose people or the environment to a toxic risk. Other channels recently dredged in the south Delta have shown that it is unlikely that the proposed dredged material is toxic. More detail is contained in Section 5.3, Water Quality. This impact is less than significant. No mitigation is required.

2020 Conditions

Risks to public health and safety associated with implementation of Alternatives 2A–2C under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar to those described above. All impacts are less than significant, and no mitigation is required.

Stage 2 (Operational Component)

There would be no impacts as a result of the implementation of the operational component because increased diversions would have no effects on public health and environmental safety.

2020 Conditions

There would be no operation-related effects to public health and safety under 2020 conditions.

Interim Operations

There would be no impacts as a result of the implementation of the interim operations because increased diversions would have no effects on public health and environmental safety.

Alternative 3B

Stage 1 (Physical/Structural Component)

Fish Control Gate and Flow Control Gates

Impact HAZ-1: Exposure to or Release of Hazardous Materials during Construction. This impact would be similar to that described under Alternatives 2A–2C, but to a lesser extent because there would be gates only at head of Old River, Old River, and Middle River. The potential for accidental release hazardous material release is less because less material would be used during construction. The potential to expose workers to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Impact HAZ-2: Increase in Emergency Response Times. The impact on emergency response times would be similar to the impact described for Alternatives 2A, 2B, and 2C but to a lesser extend because on less gate would be constructed. The gates would slightly increase emergency response times in the event the channels crossed by the gates are used as access routes. It is estimated that passing through the boat locks would take approximately five minutes longer compared to the existing method of trailering boats around the temporary barriers. The gates would not impede emergency access provided by levee roads. The location and operation of the gates would not significantly impact emergency response times or services. No mitigation is required.

Impact HAZ-3: Exposure to or Release of Hazardous Materials during Operation. Operating and maintaining the gates may include the use of fuels, lubricants and other hazardous materials. Accidental releases of these products could contaminate soils and degrade surface water and groundwater quality, resulting in a worker or public safety hazard. The potential to expose workers or the public to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Dredging

Impact HAZ-4: Increase in Mosquito Breeding Habitat from Creation of Settling Ponds. This impact would be slightly less than Alternatives 2A–2C because fewer settling ponds would be required. The impact on public health is considered less than significant because of the distance of the ponds from urban areas and the environmental commitment of coordinating with the San Joaquin County Mosquito Abatement District. No mitigation is required.

Impact HAZ-5: Increases in Water Quality Degradation, Resuspension of Contaminants, and Exposure to Hazardous Materials from Dredging Activities. This impact is similar to the impact under Alternatives 2A–2C, except there would be slightly less dredging because one fewer gate would be constructed. This impact is less than significant. No mitigation is required.

2020 Conditions

Risks to public health and safety associated with implementation of Alternative 3B under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar to those described above. All impacts are less than significant and no mitigation is required.

Stage 2 (Operational Component)

There would be no impacts as a result of the implementation of the operational component because increased diversions would have no effects on public health and environmental safety.

2020 Conditions

There would be no operation-related effects to public health and safety under 2020 conditions.

Alternative 4B

Stage 1 (Structural/Physical Component)

Fish Control Gate and Flow Control Gates

Impact HAZ-1: Exposure to or Release of Hazardous Materials during Construction. This impact would be similar to that described under Alternatives 2A, 2B, and 2C, but to a lesser extent because only one gate would be constructed at head of Old River. The potential for accidental release hazardous material release is less because less material would be used during construction. The potential to expose workers to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The

program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Impact HAZ-2: Increase in Emergency Response Times. The impact on emergency response times would be similar to the impact described for Alternatives 2A, 2B, and 2C but to a lesser extend because only one gate would be constructed. The gate would slightly increase emergency response times in the event the channels crossed by the gate are used as access routes. It is estimated that passing through the boat lock would take approximately five minutes longer compared to the existing method of trailering boats around the temporary barriers. The gate would not impede emergency access provided by levee roads. The location and operation of the gate would not significantly impact emergency response times or services. No mitigation is required.

Impact HAZ-3: Exposure to or Release of Hazardous Materials during Operation. Operating and maintaining the gate may include the use of fuels, lubricants and other hazardous materials. Accidental releases of these products could contaminate soils and degrade surface water and groundwater quality, resulting in a worker or public safety hazard. The potential to expose workers or the public to hazardous materials will be minimized by implementing the provisions of a spill prevention and control plan. This plan will include measures for responding to and remediating spills. The program will be an element of the SWPPP, as described in the Environmental Commitments section of Chapter 2, "Project Description." The impact on worker safety is considered less than significant. No mitigation is required.

Dredging

Impact HAZ-4: Increase in Mosquito Breeding Habitat from Creation of Settling Ponds. This impact would be slightly less than Alternatives 2A–2C because fewer settling ponds would be required. The impact on public health is considered less than significant because of the distance of the ponds from urban areas and the environmental commitment of working with the San Joaquin County Mosquito Abatement District. No mitigation is required.

Impact HAZ-5: Increases in Water Quality Degradation, Resuspension of Contaminants, and Exposure to Hazardous Materials from Dredging Activities. This impact is similar to the impact under Alternatives 2A–2C, except there would be slightly less dredging because only one gate would be constructed. This impact is less than significant. No mitigation is required.

2020 Conditions

Risks to public health and safety associated with implementation of Alternative 4B under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar to those described above. All impacts are less than significant and no mitigation is required.

Stage 2 (Operational Component)

There would be no impacts as a result of the implementation of the operational component because increased diversions would have no effects on public health and environmental safety.

2020 Conditions

Risks to public health and safety associated with implementation of Alternative 4B under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar to those described above. All impacts are less than significant, and no mitigation is required.

Cumulative Evaluation of Impacts

Cumulative impacts on public health are analyzed in Chapter 10, "Cumulative Impacts." This chapter also summarizes the other foreseeable future projects that may contribute to these impacts.

7.9 Environmental Justice

Introduction

This section describes the existing environmental conditions and any issues related to environmental justice resulting from the project. Specifically, it evaluates and discusses the consequences associated with construction and operation of the project on low-income and/or minority populations. Significance of impacts is determined by any disproportionate effects on these populations.

Summary of Significant Impacts

There are no significant environmental justice impacts as a result of implementation of any of the alternatives. The Environmental Consequences section contains a detailed discussion of all impacts and mitigation measures for Alternatives 2A, 2B, 2C, 3B, and 4B.

Affected Environment

Sources of Information

The primary information source for the Environmental Justice demographics information is the U.S. Census Bureau Census 2000. Information regarding Program effects and their severity was developed in other sections of this EIS/EIR.

Study Area Demographics

Local Setting

The project area is located in San Joaquin County and Contra Costa County. Alameda County is in sufficient proximity that project impacts may occur there. Therefore, the local setting is considered to be San Joaquin County, Contra Costa County, and Alameda County. In addition, the same information for the State of California is presented for comparison.

Of the total local area 2000 population, San Joaquin, Contra Costa, and Alameda Counties have minority percentages of 35.8%, 29.5%, and 45.4%, respectively (Table 7.9-1). For the State of California, 35.7% is considered to be of a minority race. For both San Joaquin County and the State of California, the largest percentage minority category within the study area was “some other race,” which included approximately 16.3% of the total population for both the county and the state. The “some other race” category includes all responses not

included in "White," “Black or African American,” “American Indian and Alaska Native,” “Asian” and "Native Hawaiian and Other Pacific Islander" race categories (U.S. Department of Commerce, Census Bureau 2003a). Census write-in entries such as Hispanic/Latino are included here; Hispanic/Latino is believed to constitute the majority of the “some other race” category. For Contra Costa County and Alameda County, the largest minority populations were categorized as Asian, at 11.0% and 20.4%, respectively.

Table 7.9-1. Race/Origin Characteristics by County, Census 2000 (%)

		San Joaquin County	Contra Costa County	Alameda County	State of California
Race	White	58.1	65.5	48.8	59.5
	Black or African American	6.7	9.4	14.9	6.7
	American Indian and Alaska Native	1.1	0.6	0.6	1.0
	Asian	11.4	11.0	20.4	10.9
	Native Hawaiian, other Pacific Islander	0.3	0.4	0.6	0.3
	Some Other Race	16.3	8.1	8.9	16.8
	Two or more races	6.0	5.1	5.6	4.7
Origin	Hispanic	30.5	17.7	19.0	32.4

Percentages may add to more than 100% because individuals may report more than one race. “Hispanic is considered an origin by the Census Bureau. Therefore, those of Hispanic Origin are also counted in one of the race categories.

Source: U.S. Department of Commerce, Census Bureau 2003a

As an added measure to ensure the study area minority populations are adequately identified census data was gathered for Hispanic origin. Hispanic is considered an origin not a race by the U.S. Census Bureau. An origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person’s parents or ancestors before their arrival in the United States (U.S. Department of Commerce, Census Bureau 2003b). People that identify their origin as Spanish, Hispanic, or Latino may be of any race. Therefore, those who are counted as Hispanic are also counted under one or more race categories. San Joaquin County had the highest percentage of Hispanic origin population at 30.5% (Table 7.9-1). Contra Costa County and Alameda County had a 17.7% and 19.0% Hispanic origin population respectively. The State of California had a Hispanic origin population of 32.4%.

As shown in Table 7.9-2 below, 13.5% of households within San Joaquin County were determined to have an income in 1999 below the poverty level. Contra Costa County and Alameda County had lower percentages with 5.4% and 7.7% of their households having incomes below the poverty level respectively. The State of California had 10.6% of households below the poverty level during the same period.

Table 7.9-2. Household Poverty Status in 1999 (%)

	San Joaquin County	Contra Costa County	Alameda County	State of California
Percent below poverty level	13.5	5.4	7.7	10.6

Source: U.S. Department of Commerce, Census Bureau 2003c.

Census poverty thresholds are the same for all parts of the country and reflect the national Consumer Price Index. However, due the high cost of living in the Bay Area a higher poverty threshold is needed to accurately characterize the number of low-income households. As part of their 2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report, the Metropolitan Transportation Commission (MTC) used the criteria of 30% of households at or below the poverty level to determine a Community of Concern. Analysis from the 2001 MTC study identified communities that have high shares of low-income residents. While both Contra Costa County and Alameda County have Communities of Concern related to poverty level, none of these areas are in the vicinity of the SDIP project improvements. The nearest Community of Concern is approximately 10 miles northwest of project improvements, in the community of Brentwood (Metropolitan Transportation Commission 2001). San Joaquin County is not in the MTC service area, and was not included in the study.

Regional Setting

The regional setting is defined by those SWP service areas affected by the project: the South Bay service area (eastern portion of Alameda County and all of Santa Clara County), the Central Coast service area (all of San Luis Obispo and Santa Barbara counties), the San Joaquin Valley service area (all of Kings County and western Kern County), and the Southern California service area (almost all of Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties and portions of Kern, Imperial and Ventura counties). Additionally, the same information for the State of California is presented for comparison.

The service area with the highest minority percentage of population is the South Bay service area, which has a 48.5% minority population (Table 7.9-3). The service area with the lowest minority population is the Central Coast service area, with a 22.7% minority population. For comparison, the State of California had a 40.5% minority population in the same year.

The service areas with the largest Hispanic origin population are the San Joaquin Valley service area and the Southern California service area, which had 39.2% and 38.5% Hispanic origin populations, respectively. The lowest Hispanic origin population was in the South Bay service area, with 21.7%. During the same year, the State of California had a 32.4% Hispanic origin population.

Table 7.9-3. Race/Origin Characteristics 2000 by Service Area[a] (%)

		South Bay Service Area	Central Coast Service Area	San Joaquin Valley Service Area	Southern California Service Area	State of California
Race	White	51.5	77.3	60.3	56.9	59.5
	Black or African American	8.4	2.2	6.4	7.3	6.7
	American Indian and Alaskan Native	0.7	1.1	1.5	0.9	1.0
	Asian	23.2	3.5	3.3	9.9	10.9
	Native Hawaiian and Other Pacific Islander	0.5	0.2	0.2	0.3	0.3
	Some other race	10.7	11.8	24.0	20.1	16.8
	Two or more races	5.1	4.0	4.2	4.7	4.7
Origin	Hispanic	21.7	27.4	39.2	38.5	32.4

Note:

Percentages may add to more than 100% because individuals may report more than one race. "Hispanic is considered an origin by the Census Bureau. Therefore, those of Hispanic Origin are also counted in one of the race categories.

[a] Statistics are for the entire county, even if only a portion is included in the service area.

Source: U.S. Department of Commerce, Census Bureau 2003a.

The service areas with the highest poverty levels were the San Joaquin service area and the Southern California service area, which both had a higher percentage of households below the poverty level than the State as a whole. The South Bay service area and the Central Coast service area had poverty levels below the State as a whole. (See Table 7.9-4.)

Table 7.9-4. Household Poverty Status in 1999 (%)

	South Bay Service Area	Central Coast Service Area	San Joaquin Valley Service Area	Southern California Service Area	State of California
Percent below poverty level	6.2	7.8	16.6	11.9	10.6

Source: U.S. Department of Commerce, Census Bureau 2003c.

Environmental Consequences

Assessment Methods

The following methodology is based on the EPA's Environmental Justice Guidance (U.S. Environmental Protection Agency 1998). The EPA's Environmental Justice Guidance states that, "Minority populations should be identified where either (a) the minority population of the affected area exceeds 50%, or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of analysis." As such, demographic data for each County in the local setting and each service area in the regional setting was compared to demographic data from the next highest unit of analysis, the State of California, to determine whether that specific area had a "meaningfully greater" percentage of minority or low-income population.

Demographic information was gathered for the local setting counties, the regional setting service area, and the State of California. The proposed SDIP alternatives Environmental Justice impacts were analyzed by comparing census data from the local setting and regional setting with data for the State of California. Data was primarily collected from the U.S. Department of Commerce, Census Bureau 2000 Census. The population data that are key to the analysis of Environmental Justice include the following race, income, and age characteristics:

- percent of minority population (Black or African American; American Indian and Alaskan Native; Asian; Native Hawaiian and Other Pacific Islander; some other race; and two or more races),
- percent persons of Hispanic origin, and
- percent of population below the poverty level.

These data are presented in the previous sections.

Significant adverse effects from the alternatives were identified through the analysis process for the environmental disciplines in this EIS/EIR. For this analysis the EIS/EIR sections were reviewed, and the areas affected by each significant unmitigated impacts were identified using maps or text from the technical sections. The following questions are then used:

- Is there a significant, adverse, unmitigable effect?
- Does the potentially affected population include minority or low-income populations?
- Would the significant, adverse environmental or human health effects be likely to fall disproportionately on minority or low-income populations?

Regulatory Setting

Executive Order (EO) 12898, Environmental Justice, includes the requirement that, to the greatest extent practicable and permitted by law, "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 charges each cabinet department to "make achieving environmental justice part of its mission," with the EPA responsible for implementation of EO 12898. The CEQ has oversight of the Federal government's compliance with EO 12898 and NEPA.

Following the lead of EO 12898, the State of California passed a series of environmental justice regulations in 2001. These laws define environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." The Bay-Delta Public Advisory Committee has an Environmental Justice Subcommittee comprised of federal and state agency representatives, tribal members, community-based organizations, advocacy groups, and others. The Environmental Justice Subcommittee has developed an Environmental Justice Workplan that outlines a two-tiered approach to addressing environmental justice in the program. A Draft Workplan was completed in January 2003.

Significance Criteria

Significance criteria for environmental justice effects were developed in the CALFED Final Programmatic EIS/EIR (2000b). The following significance criteria were used to determine if adverse human health effects are disproportionately high:

- Whether the health effects, which may be measured in risks and rates, are above the generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death.
- Whether the risk or rate of hazard exposure by a minority population or low-income population to an environmental hazard exceeds or is likely to exceed the risk or rate to the general population or appropriate comparison group.
- Whether health effects occur in a minority population or low-income population affected by cumulative or multiple adverse exposures from environmental hazards.

The following factors were considered when determining whether adverse environmental effects are disproportionately high:

- Whether there is or will be an impact on the natural or physical environment that adversely affects a minority or low-income population.

- Whether environmental effects are significant and may result in an adverse effect on minority or low-income populations that appreciably exceeds or is likely to appreciable exceed the effect on the general population or other appropriate comparison group.
- Whether the environmental effects occur or would occur in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards.

CALFED Programmatic Mitigation Measures

Environmental justice effects are related to adverse human health or environmental impacts from the project, which are disproportionately felt by minority or low-income populations. The most effective mitigation for environmental justice effects is to avoid or mitigate the human health or environmental impact to a less-than-significant level. If this occurs, then the environmental justice impact would also be mitigated, because the significant, adverse effect would no longer exist for any population, including minority or low-income populations.

Alternative 1 (No Action)

With the No Action Alternative, the SDIP would not be implemented. The SWP would continue to operate under its currently permitted pumping capacity of 6,680 cfs. No environmental justice impacts would occur.

2020 Conditions

Under Future No Action (2020 conditions) the SDIP would not be implemented and the SWP would continue to operate under its current permits and restrictions. No environmental justice impacts would occur.

Alternative 2A, 2B, and 2C

Under Alternatives 2A–2C, there would be a slight increase in pumping capacity for the SWP. All environmental or human health impacts for this alternative have been determined to be less than significant or have been mitigated to a level that is less than significant, as described in previous sections of this EIS/EIR. No population, including minority or low-income populations, would bear a significant environmental or human health impact. Therefore, no environmental justice impacts would occur.

2020 Conditions

Implementation of Alternatives 2A–2C under 2020 conditions would be similar to implementation under existing conditions. There would be no impact.

Alternative 3B

Impacts would be similar to Alternatives 2A–2C. Environmental justice impacts are not anticipated.

2020 Conditions

Implementation of Alternative 3B under 2020 conditions would be similar to implementation under existing conditions. There would be no impact.

Alternative 4B

Impacts would be similar to Alternatives 2A–2C. Environmental justice impacts are not anticipated.

2020 Conditions

Implementation of Alternative 4B under 2020 conditions would be similar to implementation under existing conditions. There would be no impact.

Cumulative Evaluation of Impacts

The SDIP would not result in any impacts on environmental justice and therefore would not contribute to any cumulative impacts.

7.10 Indian Trust Assets

Introduction

This section describes the existing environmental conditions and the consequences of the SDIP alternatives on Indian Trust Assets (ITAs) such as real property, physical assets, or intangible property rights. Specifically, it evaluates and discusses the consequences associated with construction and operation of the project. Significance of impacts is determined by the presence of an ITA within the project area, or potential effects of a project on ITAs, regardless of the project's proximity to the ITAs in question.

Reclamation's ITA policy states that Reclamation will carry out its activities in a manner that protects ITAs and avoids adverse impacts when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation.

ITAs are legal interests in assets held in trust by the federal government for Indian tribes or individual Indians. The trust relationship usually stems from a treaty, executive order, or act of Congress. ITAs are anything that holds monetary value, which can include real property, physical assets, or intangible property rights. Examples of trust assets are lands, minerals, hunting and fishing rights, and water rights.

Summary of Significant Impacts

There are no significant impacts on ITAs as a result of implementation of any of the alternatives. All impacts are discussed in detail under the Environmental Consequences section.

Affected Environment

Sources of Information

The following key sources of information were used in the preparation of this section:

- geographic information systems (GIS) coverage of Indian reservations, and rancherias for the State of California maintained by Reclamation;
- maps of ITAs and their proximity to the project area;
- assessment of potential effects on tribal fisheries as a result of SDIP implementation; and
- technical evaluation of upstream and downstream effects of the project on ITAs.

Indian Trust Assets

There are no ITAs in the vicinity of the proposed fish control gate, flow control gates, or channel dredging sites. Impacts on south-of-Delta ITAs were not considered because the project could result in a more reliable water supply within the SWP service area and therefore could not adversely affect ITAs south of the Delta.

The nearest ITA to the project area, in the north-of-Delta-area, is the Colusa Rancheria, which lies adjacent to the Sacramento River approximately 90 air miles north of the project area. In the north-of-Delta area, the Hoopa Valley Tribe has fishing rights on the Trinity River. The Hoopa Valley Indian Reservation was established along the Trinity River in the late 1800s. Historically, Trinity River fisheries provided the primary dietary staple and also supported commercial and subsistence fishing for Indians in the area. The fisheries also played a significant role in the tribes' religious beliefs (U.S. Department of the Interior 2000). The Environmental Consequences subsection below concludes there are no adverse effects on the trust assets of the Hoopa Valley Tribe, and the Colusa Rancheria.

Environmental Consequences

Assessment Methods

Reclamation maintains GIS coverage of Indian reservations and rancherias for the state of California. Impact assessments for ITAs were based on this GIS coverage, maps of ITAs for the area, and a technical evaluation of upstream and downstream effects of the project on ITAs.

Significance Criteria

The presence of an ITA within the project area or the potential effects of a project on an ITA (regardless of the project's proximity to it) triggers evaluation of potential impacts on ITAs. If during the course of this evaluation an impact on ITAs is determined, consultation with the potentially affected tribes would ensue to ensure that the affected tribe(s) may fully evaluate the potential impact of the proposed SDIP alternatives on ITAs. Project effects that could conceivably affect ITAs, such as water rights or other assets that might be located off reservation, also trigger further evaluation and consultation with affected tribes.

Alternative 1 (No Action)

The No Action Alternative would not result in any construction-related or operations-related impacts on ITAs.

2020 Conditions

Under the Future No Action Conditions (2020 Conditions) SDIP would not be implemented. It is expected that the temporary barriers program would continue to be implemented and that no significant impacts on ITAs would result. Conditions would be similar to those described under existing conditions.

Alternatives 2A, 2B, and 2C

Stage 1 (Physical/Structural Component)

Because there are no ITAs in or near the project area, no impacts on ITAs are expected from construction-related activities.

2020 Conditions

There would be no construction-related effects on ITAs under 2020 conditions.

Stage 2 (Operational Component)

Under Alternatives 2A–2C, none of the operational scenarios would have an effect on the Trinity River flows or Shasta Reservoir storage according to CALSIM II modeling results (See Section 5.1, 6.1 and <http://modeling.water.ca.gov> for details). Specific detail is also provided in Appendix Q. Therefore, there would be no adverse effects on Hoopa Valley Tribe fishery as a result of implementation of the SDIP. There is no impact and no mitigation is required.

Although the Colusa Rancheria is located adjacent to the Sacramento River, the river flows are not expected to fluctuate outside of the normal range with the implementation of the SDIP alternatives. Natural patterns of erosion and sedimentation along the river are expected to stay the same with the implementation of Alternatives 2A–2C. There is no impact and no mitigation is required.

Alternatives 2A–2C each call for a different pumping scenario. However, the water that is proposed for pumping has already been contracted for, and all of the water used for the SDIP has been previously allocated. This project does not result in any new allocation of water. There is no impact. No mitigation is required.

2020 Conditions

Risks to ITAs associated with implementation of Alternatives 2A–2C under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar as those described above. All impacts are less than significant and no mitigation is required.

Alternative 3B

Stage 1 (Physical/Structural Component)

Because there are no ITAs in or near the project area, no impacts on ITAs are expected from construction-related activities.

2020 Conditions

There would be no structural/physical effects on ITAs under 2020 conditions.

Stage 2 (Operational Component)

Alternative 3B, would not have an effect on the Trinity River flows or Shasta Reservoir storage according to CALSIM II modeling results (See Section 5.1, 6.1 and <http://modeling.water.ca.gov> for details). Therefore, there would be no adverse effects on Hoopa Valley Tribe fishery as a result of implementation of the SDIP. There is no impact and no mitigation is required.

Although the Colusa Rancheria is located adjacent to the Sacramento River, the river flows are not expected to fluctuate outside of the normal range with the implementation of Alternative 3B. Natural patterns of erosion and sedimentation along the river are expected to stay the same with the implementation of Alternative 3B. There is no impact and no mitigation is required.

The water that is proposed for pumping has already been contracted for, and all of the water used for the SDIP has been previously allocated. This project does not result in any new allocation of water. There is no impact and no mitigation is required.

2020 Conditions

Risks to ITAs associated with implementation of Alternative 3B under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar as those described above. All impacts are less than significant and no mitigation is required.

Alternative 4B

Stage 1 (Physical/Structural Component)

Because there are no ITAs in or near the project area, no impacts on ITAs are expected from construction-related activities.

2020 Conditions

There would be no structural/physical effects on ITAs under 2020 conditions.

Stage 2 (Operational Component)

Alternative 4B would not have an effect on the Trinity River flows or Shasta Reservoir storage according to CALSIM II modeling results (See Section 5.1, 6.1 and <http://modeling.water.ca.gov> for details). Therefore, there would be no adverse effects on Hoopa Valley Tribe fishery as a result of implementation of the SDIP. There is no impact and no mitigation is required.

Although the Colusa Rancheria is located adjacent to the Sacramento River, the river flows are not expected to fluctuate outside of the normal range with the implementation of Alternative 4B. Natural patterns of erosion and sedimentation along the river are expected to stay the same with the implementation of Alternative 4B. There is no impact and no mitigation is required.

The water that is proposed for pumping has already been contracted for, and all of the water used for the SDIP has been previously allocated. This project does not result in any new allocation of water. There is no impact and no mitigation is required.

2020 Conditions

Risks to ITAs associated with implementation of Alternative 4B under 2020 conditions would be similar to risks that would occur under 2001 conditions. Therefore, the impacts under 2020 conditions would be similar as those described above. All impacts are less than significant and no mitigation is required.

Cumulative Evaluation of Impacts

The SDIP would not result in any impacts on ITAs and therefore would not contribute to any cumulative impacts.