Chapter 14
Agricultural Resources

14.1 Environmental Setting/Affected Environment

This section discusses the agricultural resources study area (the area in which impacts may occur) which consists of the Plan Area (the area covered by the BDCP); which is largely formed by the statutory borders of the Delta, along with areas in Suisun Marsh and the Yolo Bypass; and the Areas of Additional Analysis (see Chapter 3, *Description of Alternatives,* Section 3.3.1). Chapter 5, *Water Supply,* discusses potential additional changes to upstream areas. Effects to State Water Project (SWP) and Central Valley Project (CVP) Export Service Areas region are described in Chapter 30, *Growth Inducement and Other Indirect Effects*.

The agriculture industry is an economically important industry in California and one of the state's largest employers. California has fewer than 4% of the nation's total number of farms and ranches, yet produces 12.3% of the total United States agricultural production value. According to the California Department of Food and Agriculture (CDFA), the state exports agricultural products to more than 190 countries and the value of its export commodities reached $12.4 billion in 2009 (California Department of Food and Agriculture 2010a, 2010b). California farmers produce nearly half the nation's fruits, nuts, and vegetables; generate more than $30 billion in gross receipts annually; employ 1.1 million people; and create $60 billion in personal income each year (when considering direct, indirect, and induced contributions). The CVP provides enough water to irrigate one-third of the state's farmlands (Bureau of Reclamation 2011). Central Valley farms produced 8% of the nation's agricultural output on 1% of the total farmland in the United States (California Farm Water Coalition 2008).

Of the top 20 agricultural products of California, at least 11 are grown in the Delta. Although the Delta represents less than 1% of California's land area, the land devoted to agriculture in the Delta represents approximately 2% of California's agricultural land. The Delta's agricultural industry represents approximately 2% of agricultural production in the state (California Department of Food and Agriculture 2010a).

Many topics related to agricultural resources in the Plan Area are also discussed in other chapters. Chapter 16, *Socioeconomics*, discusses the economic importance of agricultural production in the five Delta counties (Section 16.1.1.7); as mentioned above, Chapter 30, *Growth Inducement and Other Indirect Effects,* also discusses the potential of the BDCP to affect agricultural resources within the SWP/CVP Export Service Areas region. Chapter 9, *Geology and Seismicity* (Section 9.1.1), and Chapter 10, *Soils* (Section 10.1), delve into the characteristics and issues surrounding soils in the Plan Area, including subsidence. Additional effects related to agricultural water supplies and quality are discussed in Chapter 5, *Water Supply;* Chapter 6, *Surface Water;* Chapter 7, *Groundwater;* and Chapter 8, *Water Quality*. Conflicts with local land use regulations related to agricultural resources are discussed specifically below and in Chapter 13, *Land Use.* Effects related to agricultural wildlife habitat are discussed in Chapter 12, *Terrestrial Biological Resources.* Chapter 24, *Hazards and Hazardous Materials*, Section 24.1.2.2, provides information on pesticide leaching; Chapter 25, *Public Health*, Section 25.1.1, describes the effects of chemical contaminants on human health. Issues

surrounding agricultural infrastructure and labor are described in Chapter 16, *Socioeconomics* and Chapter 28, *Environmental Justice*.

14.1.1 Potential Environmental Effects Area

The study area for this chapter is comprised of the Plan Area and Areas of Additional Analysis, which encompass over 872,000 acres within Alameda, Contra Costa, Sacramento, San Joaquin, Solano, Sutter, and Yolo Counties.

Lands used for agricultural purposes according to Farmland Mapping and Monitoring Program (FMMP) classifications comprise more than 585,000 acres of the study area and are a substantial economic factor within the region (California Department of Conservation 2008–2010). The study area is described below to support later discussions of environmental consequences associated with potential agricultural land use changes resulting from the temporary and permanent footprints of disturbance associated with construction of project water conveyance and related facilities (CM1) and the other conservation measures (CM2–CM22), as well as other indirect effects on agricultural resources stemming from the long-term operations and existence of facilities and restored areas.

14.1.1.1 Statutory Delta

The Delta stretches generally from Sacramento in the north to Lathrop in the south, with its rivers and sloughs eventually emptying into Suisun Bay near Pittsburg. The Delta's specific boundaries are legally defined by Section 12220 of the California Water Code. Historically, the Delta has been characterized by the presence of rich sedimentary and organic soils that are highly productive and a unique climate influenced by the Central Valley and ocean and coastal conditions. This combination of highly productive soils, a climate conducive to agricultural production, and readily available good quality irrigation water supply results in a region that supports a broad range of crops that produce relatively higher value crops than those grown in other regions. The distribution of agricultural resources within the Delta, by agricultural crop classification, is shown in Figure 14-1. Six counties lie partially within the statutory Delta: Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties. Each of these counties supports agricultural production in the Delta.

14.1.1.2 Restoration Opportunity Areas (ROAs)

BDCP Conservation Measures 4–11 were developed to restore, create, enhance, and manage physical habitat to expand the extent and quality of intertidal, floodplain, and other habitats across defined conservation zones (CZs) and Restoration Opportunity Areas (ROAs) (see Figure 3-1). The Plan Area is subdivided into 11 CZs within which conservation targets for natural communities and covered species' habitats have been established. The ROAs, including the Cache Slough, Cosumnes/Mokelumne, Suisun Marsh, West Delta, and South Delta, encompass those locations considered most appropriate for the restoration of tidal habitats and within which restoration goals for tidal and associated upland natural communities will be achieved. While the Yolo Bypass also represents an ROA, it is not being targeted specifically for tidal restoration activities but rather, those activities described individually by *CM2 Yolo Bypass Fisheries Enhancement*. Most of the other ROAs, described below, have a majority of their area within the statutory Delta. The majority of the Suisun Marsh ROA, however, is outside of the statutory Delta with only a portion of the marsh within the western area of the statutory Delta. Agricultural resources represent a portion of each of these ROAs that may be impacted from activities associated with these conservation measures, as shown in Table 14-1. Each ROA is discussed below and depicted in Figure 3-1. Detailed discussion of the

activities associated with conservation measures, as well as potential acreages to be restored within each ROA, is provided in the BDCP, Chapter 3, *Conservation Strategy*[1].

Table 14-1. Farmland Mapping and Monitoring Program Categories in Restoration Opportunity Areas

FMMP Category	Cache Slough ROA	Cosumnes-Mokelumne ROA	South Delta ROA	Suisun Marsh ROA	West Delta ROA	Total
Prime Farmland	12,930	6,854	34,240	577	2,189	56,791
Farmland of Statewide Importance	3,726	96	988	182	270	5,261
Unique Farmland	2,062	307	77	116	27	2,590
Farmland of Local Importance		40	134		1,070	1,244
Grazing Lands	15,279	1	108	17,755	533	33,676
Urban Built-up Land	15	16	17	869	368	1,285
Other Land	7,594	16		58,858	647	67,116
Rural Residential Land		53	11			64
Semi-Agricultural and Rural Commercial Land		15	244			259
Confined Animal Agriculture			27			27
Nonagricultural and Natural Vegetation			678			678
Water	7,558	2		4,610	654	12,824
Total	49,166	7,399	36,524	82,967	5,759	181,814

Note: For San Joaquin County, "Other Land" is divided into the four categories listed below it in the table (Rural Residential Land, Semi-Agricultural and Rural Commercial Land, Confined Animal Agriculture, and Nonagricultural and Natural Vegetation), as part of the Rural Land Mapping Project.

Cache Slough Restoration Opportunity Area

The Cache Slough ROA is located in the western region of the statutory Delta, west of the Sacramento Deep Water Ship Channel. It consists of approximately 49,000 acres, nearly 34,000 acres of which are used for agricultural purposes. Primary crops grown are alfalfa and pastureland, with substantial acreages of mixed agriculture and native classes (this refers to classes of native vegetation). The BDCP has set a general target of 5,000 acres of freshwater tidal habitat restoration in this area (BDCP Chapter 3, *Conservation Strategy,* CM4, Section 3.4.4.3.1). Details regarding the phased implementation of restoration activities are provided in BDCP Chapter 6, *Plan Implementation.*

Cosumnes/Mokelumne Restoration Opportunity Area

Agriculture within this ROA is primarily located in the western area, which produces some specialty crops. Within the eastern area of the ROA in the Grizzly Slough area, a project began in 1993 to

[1] As described in Chapter 1, *Introduction*, Section 1.1, the full Draft EIR/EIS should be understood to include not only the EIR/EIS itself and its appendices but also the proposed BDCP documentation including all appendices.

convert much of the slough area to floodplain habitat (California Department of Fish and Game 1995). Nearly all of this area's 7,400 acres are dedicated to agricultural production and the primary crops grown are tomatoes, corn, and grapes. The BDCP has set a general target of 1,500 acres of freshwater tidal habitat restoration in this area (BDCP Chapter 3, *Conservation Strategy,* CM4, Section 3.4.4.3.1). Details regarding the phased implementation of restoration activities are provided in BDCP Chapter 6, *Plan Implementation.*

Suisun Marsh Restoration Opportunity Area

The Suisun Marsh, located in Solano County, is primarily an estuary (with 6,300 acres of existing tidal wetlands), but the area does support some vegetable and fruit crops (California Department of Water Resources 2010). Of the area's 83,000 acres, agricultural activities occur on more than 18,000 acres and include production of turf and safflower with substantial acreage of native vegetation and mixed agriculture. The Suisun Marsh Habitat Management, Preservation, and Restoration Plan would restore between 2,000 and 9,000 acres of tidal habitat within the marsh while reducing the acreage of managed wetlands currently subject to managed wetland activities from 52,000 acres to between 42,000 and 48,000 acres (California Department of Fish and Game 2010). The BDCP has set a general target of 7,000 acres of freshwater tidal habitat restoration in this area (BDCP Chapter 3, *Conservation Strategy,* CM4, Section 3.4.4.3.1). It is anticipated that there will be some overlap between the Suisun Marsh Habitat Management, Preservation, and Restoration Plan and BDCP. Details regarding the phased implementation of restoration activities are provided in BDCP Chapter 6, *Plan Implementation.*

West Delta Restoration Opportunity Area

The West Delta ROA is along the western boundary of the Delta. Within the 6,000-acre West Delta ROA, 4,000 acres are used for agricultural production. The primary crops grown are corn, grain, hay, alfalfa, and pasture with significant amounts of native vegetation. The BDCP has set a general target of 2,100 acres of freshwater tidal habitat restoration in this area (BDCP Chapter 3, *Conservation Strategy,* CM4, Section 3.4.4.3.1). Details regarding the phased implementation of restoration activities are provided in BDCP Chapter 6, *Plan Implementation.*

South Delta Restoration Opportunity Area

The South Delta ROA lies in the southern part of the Delta and is bordered by the San Joaquin River to the east and the Old River to the south. Within this ROA, agricultural activities occur across more than 35,500 acres of the 36,500-acre area. Leading crop types in the area include field truck, nursery, and berry crops. Another large area of land is devoted to pasture. The BDCP has set a general target of 5,000 acres of freshwater tidal habitat restoration in this area (BDCP Chapter 3, *Conservation Strategy,* CM4, Section 3.4.4.3.1). Details regarding the phased implementation of restoration activities are provided in BDCP Chapter 6, *Plan Implementation.*

14.1.1.3 Study Area Climate and Soils

Delta temperatures tend to be lower than the surrounding areas during the summer because of periodic and diurnal cooling that is a result of its proximity to the Pacific Ocean and the San Francisco Bay. Locally, the marine cooling influence is referred to as the "Delta breeze," which creates unique growing conditions (National Weather Service 2003). These conditions are reflected in the character of the wine grapes grown in the region and the suitability for certain crops (e.g.,

pears). The Delta breeze also influences the timing of harvest to increase the value and marketability of crops by allowing growers to harvest their crops during market windows of relatively low product availability elsewhere in the State and nation. This specialized harvest timing is practiced for pears, cherries, apricots, peaches, and nectarines. Further, the Delta breeze influences the timing of harvest to optimize the temporal distribution of food processing harvest volumes (e.g., processing tomatoes). More detailed discussion of the climate in the study area is in Chapter 22, *Air Quality and Greenhouse Gas Emissions*, Section 22.1.1.

Prior to agricultural development, much of the soil in the Delta was waterlogged as a result of frequent flooding, which caused anaerobic (oxygen-poor) soil conditions that led to the formation of peat soils (U.S. Geological Survey 2000a) (Chapter 10, *Soils,* Section 10.1.2). As the region developed its agricultural industry, local growers and reclamation districts constructed levees to allow soils to drain and become aerobic (oxygen-rich) and available for agricultural production. As the peat soils became more aerobic, the rate of peat soil oxidation and volatilization increased. Continuous organic decomposition has kept soils in the Delta nutrient-rich. However, this has also resulted in land subsidence throughout the Delta (U.S. Geological Survey 2000b). The effects of subsidence—the lowering of land-surface elevation due to decomposition of organic carbon in peat soil—on crops and crop production is discussed below. In addition, the fine particles of peat soil can often be a source of poor air quality as tillage operations for agricultural production cause these particles to be disturbed and become airborne (for further discussion of Particulate Matter and its sources, see Chapter 22, *Air Quality and Greenhouse Gas Emissions*, Section 22.1.2.4).

Peat soils comprise a substantial portion of soils in the study area. Their high nutrient and organic content is beneficial for crops, and peat soils warm quickly because of their heat-absorbing dark color. This characteristic is beneficial for crop management as planting can begin earlier if soils warm earlier in the season. The water retention capability of peat soils is high. Subsurface irrigation is a common means to irrigate crops in peat soils (Section 14.1.1.6, *General Crop Production Practices and Characteristics*, *Irrigation and Drainage*). However, weeds are particularly problematic in peat soils and measures must be commonly taken to reduce them. In drier conditions peat soils may dry at the surface and cause adverse dusty conditions (Prichard 1979). The Storie Index Rating System uses soil characteristics to determine the relative ranking and crop suitability of potential agricultural land. Peat soils receive a high ranking in the Natural Resources Conservation Service (NRCS) Soil Capability Classification System and the Storie Index Rating System. Further discussion of the Storie Index Rating System, along with ratings for the soil types found in the study area, is provided in Appendix 10C, *Soil Chemical and Physical Properties and Land Use Suitability*.

Crop Production Interactions with Soil Subsidence

Land in the Delta is subject to subsidence because organic carbon in peat soils is continually decomposing (U.S. Geological Survey 2000a). While this is the principal cause of subsidence, processes such as mechanical compaction, wind erosion, groundwater overdraft, and tectonic movements have also been cited as significant factors in subsidence (Prokopovich 1985; U.S. Geological Survey 2000b). Within the Delta, the primary influences of subsidence associated with crop production are organic carbon decomposition and mechanical compaction and disturbance-caused wind erosion created in part by crop tillage.

Organic carbon decomposition in peat soils began when the peat soils in the Delta were drained to create agricultural land. During decomposition, most of the carbon lost is emitted as carbon dioxide (CO_2) to the atmosphere (Deverel and Rojstaczer 1996). Carbon loss can also occur through crop

uptake of carbon in the soils. Agricultural production accelerates oxidation of peat soils when plants remove CO_2, water, and nutrients. This, in conjunction with mechanical compaction and wind erosion from agricultural machinery, accelerates subsidence of soils in the Delta. Land subsidence poses risks to the long-term sustainability of agriculture in the study area because it affects the levee system that protects the Delta from flooding. Subsidence increases the hydraulic gradient between agricultural land and channels, leading to more seepage through levees and the resultant need to continually deepen drainage ditches. Additionally, where adjacent lands lie below sea level, levees must be strengthened and maintained to successfully hold back water year-round. Potential sea level rise and seismic activity compound issues of subsidence. Some recent estimates, including those developed as part of the California Department of Water Resources' (DWR's) Delta Risk Management Strategy, predict that 3–4 feet of additional subsidence will occur in the central portion of the Delta by 2050 (California Department of Water Resources 2007). Chapter 6, *Surface Water,* Section 6.1.4.1, further discusses the relationship between subsidence and the levee system.

14.1.1.4 Study Area Crop Types and Distribution

Lands within and surrounding the Delta contain soil types that, along with the regional climate, allow the region to grow a wide variety of crops. Historical flooding of the Sacramento and San Joaquin Rivers and their tributaries resulted in high concentrations of peat soils and the deposition of large quantities of minerals. Both of these elements contribute to the nutrient-rich soils that make the region highly productive for agriculture. Over 30 types of crops are grown in the study area's approximately 585,000 acres of agricultural land. This estimate is not all cultivated land, but includes pasture, fallow, idle, and abandoned land as well as semi-agricultural land and land that is used for confined animal agriculture. Leading crops within the Delta include those grown for livestock feed, in addition to other field and row crops (Sumner and Rosen-Molina 2011). The top five Delta crops in terms of acreage are corn, alfalfa, processing tomatoes, wheat and wine grapes (Delta Protection Commission 2011). While corn and alfalfa cover the widest acreage in the Delta, the DPC's Economic Sustainability Plan for the Delta has identified tomatoes and wine grapes as those crops that create the most economic value through their sales and in their linkages to manufacturing in the area. This study also notes the important contributions of asparagus and pears and the presence of crops like pumpkins and blueberries, which reflect the diversity of crops grown in the area (Delta Protection Commission 2011). DWR's land use surveys (California Department of Water Resources 1994–2007) provide the most current acreage data for specific crops. Crops include: alfalfa, almonds, apples, apricots, asparagus, cherries, corn, cucurbits (squashes and melons), dry beans, grain and hay, wine grapes, miscellaneous truck crops (vegetable crops grown for commercial sale), olives, peaches, pears, rice, safflower, subtropical trees, Sudan grass, sunflowers, tomatoes, turf, walnuts, and uncommon crops (e.g., Dichondra). Crop acreages are also defined as deciduous crops (crops that lose their foliage during winter such as almonds), mixed-agriculture (more than one crop grown on specified acreage), or non-irrigated crops (crops that do not receive irrigation water). Each crop is also grouped by similar growing needs as either annual, perennial, or pasture. Annual crops are replanted each season, perennial crops provide produce for multiple seasons after planting, and pasture is made up of grasses for either harvest or cattle grazing.

Table 14-2 provides the acreages of crops grown in the Plan Area by county. To most appropriately show the agricultural acreages in the Plan Area, the class "mixed agriculture, urban and native classes" is included in the crop acreages. This class includes urban and agriculture acreage, urban and native classes acreage, and urban, agriculture, and native classes acreage. The acreages

presented in Table 14-2 are used as estimates because annual and semi-annual crop rotation and long-term crop change are based on a variety of outside influences including economic and climatic conditions.

Table 14-2. Crop Acreages in the Plan Area

		County						
Type	Crops	Alameda	Contra Costa	Sacramento	San Joaquin	Solano	Yolo	Total
Farmland and Row Crop								
Annual	Asparagus		1,480	990	21,590		5	24,064
Annual	Cucurbits (e.g., melons)		220	23	5,360	3	810	6,424
	Dairy		100	43	1,040			1,187
	Fallow and Idle		5,070	2,880	2,760	850	2,850	14,409
	Farmstead	20	720	690	1,650	630		3,710
Permanent	Feed Lot	3	14		62	16		95
Pasture	Grain and Hay	360	4,830	9,850	24,360	6,870	5,070	51,343
Annual	Miscellaneous Truck Crops	58	550	1,050	4,890	1	180	6,729
Permanent	Poultry Farm			1	76			77
Annual	Tomatoes		4,070	4,260	23,580	530	5,410	37,850
Field Crops								
Pasture	Alfalfa	370	3,870	3,570	42,800	13,530	5,730	69,868
Annual	Beans		380	470	8,960	250	85	10,140
Annual	Corn	200	8,690	27,260	60,860	4,250	12,830	114,108
Annual	Miscellaneous Field Crops			930	450	420	530	2,326
Annual	Safflower		2,860	4,840	17,650	6,650	18,160	50,157
Pasture	Sudan		420	310	930	1,250	1,850	4,753
Annual	Sunflowers				1,570	270	9	1,850
Orchards								
	Almonds		280		2,190			2,472
	Apples		1,470	490	240	100	140	2,435
	Apricots		990		1,060			2,041
	Cherries		430	240	34		30	739
	Miscellaneous Deciduous		660	20	180	21	47	929
Permanent	Mixed Deciduous Trees		14		98	19		131
	Peaches		160	45	98	9		309
	Pears		180	6,500	170	390	390	7,621
	Walnuts		1,130		3,980	8	54	5,170
	Grapes	44	690	7,270	7,100	1,470	5,530	22,095

Type	Crops	County						Total
		Alameda	Contra Costa	Sacramento	San Joaquin	Solano	Yolo	
	Mixed Agriculture		50	8	580	39		674
	Mixed Agriculture, Urban, and Native Classes	240	45,930	21,240	53,260	20,940	13,730	155,341
Uncommon Crops								
	Native and Mixed Native Classes	2,160	19,710	16,670	20,050	91,110	21,240	170,935
	Non-Irrigated Crops	1,110	300	97	51	2,070	1	3,633
Pasture	Pasture	68	7,010	6,290	4,190	20,380	4,930	42,863
Annual	Rice			580	13		6,710	7,298
Permanent	Subtropical Trees		4	24	50	3		81
Annual	Turf			140	1,110	310	65	1,630

Source: California Department of Water Resources 1994–2007 (dataset comprising county-specific land use survey data from 1994, 1995, 1996, 1997, 2000, 2006, and 2007).

Note: Crop acreages have been rounded to the nearest 10 acres for crops with more than 100 acres and the nearest 1 acre for crops with less than 100 acres.

Permanent Crops

Permanent crops account for a major proportion of the revenue generated by agriculture in the Delta. They include almonds, apples, apricots, cherries, grapes, olives, peaches and nectarines, pears, and walnuts, which account for approximately 7.3% of the agricultural land in the Delta. Northern California, including the Delta, is well known for its vineyards and wine production. Between 2007 and 2009, wine had the second highest export value of all commodities grown in California (California Department of Food and Agriculture 2010a). Figure 14-1 depicts the distribution of crop classes throughout the study area. Wine appellations are located in Clarksburg and Lodi, which are in the north and east Delta, respectively. Revenue generated by agricultural production in the Delta is described in Chapter 16*, Socioeconomics,* Section 16.1.1.7.

Annual Crops

Annual crops in the Delta include corn, cucurbits, dry beans, grain and hay, rice, safflower, Sudan grass, tomatoes, and turf. In addition to their economic value, agricultural lands provide resources for a variety of biological resources. Chapter 12, *Terrestrial Biological Resources*, Section 12.1.1.2, provides discussion of agricultural lands as habitat.

Uncommon Crops

Uncommon crops are those that are either not typically grown in large acreages or those that are grown in the Delta because the area supports their unique production economics as well as market

timing. An example of an uncommon crop is Dichondra, a plant used for groundcover (predominantly in southern Europe and Japan). Dichondra is grown in the Delta by two farmers and fewer than 1,000 acres are devoted to Dichondra production nationwide. Other Delta-grown uncommon crops include vegetables such as broccoli, cauliflower, cucumbers, peas and other seed crops (seed onions and others), and nursery crops (ornamental trees and shrubs). Production of seed crops in the Delta benefits from the geographic isolation from potential contamination from varieties of the same crop (University of Wisconsin 2010).

Pasture

Agricultural lands are typically selected to produce pasture (as opposed to other crop choices) because of lower productivity soils, such as hard pan, high water tables, poor drainage, or a combination of these characteristics that limit the use of such lands for higher value agricultural crops. Dairy cow pastures are often irrigated pasture, and the proximity to dairy facilities is another factor that could determine the selection of pasture production. Cattle operations use Delta pastures as seasonal range, which complements high Sierra Nevada grazing ranges. Pasture locations within the Delta are depicted in Figure 14-1.

Aquaculture

Aquaculture, the cultivation of aquatic organisms for commercial gain, ranges from the production of aquatic plants and invertebrates to fish production, which has become a profitable and popular practice in many regions. Although aquaculture is practiced in California, no registered aquaculturists are identified within the study area (California Department of Fish and Game 2011). Therefore, no further discussion of potential effects on aquaculture is provided.

Typical Crop Yields, Destinations, and Tonnages

Crops grown in the study area, and agricultural products made from those crops are shipped statewide, nationally, and internationally. Crop destinations and tonnages vary depending on crop yield, quality, and market during the specific harvest season. Specific crop destinations likely would not be affected by implementation of the BDCP, and therefore are not discussed in detail. However, potential impacts on crop production could alter the economics of crop production in the Delta and the subsequent crop selection by Delta growers. Table 14-3 shows the typical ranges of crop yield by type for crops grown in the Delta.

Table 14-3. Crop Yield by Type

Crop	Yield (tons per acre)
Alfalfa	6.51
Almonds	0.80
Apples	13.98
Apricots	7.82
Asparagus	1.41
Cherries	2.10
Corn	4.62
Cucurbits [a]	14.76
Dry Beans	1.00
Grain and Hay [b]	2.29
Grapes	5.34
Miscellaneous Field Crops [c]	2.16
Miscellaneous Truck Crops [d]	80.54
Miscellaneous Deciduous [e]	1.58
Pasture	N/A
Peaches and Nectarines	20.32
Pears	18.34
Rice [f]	3.76
Safflower	1.18
Subtropical Trees [g]	13.75
Sudan	1.26
Sunflowers	0.21
Tomatoes	37.39
Turf [h]	N/A
Walnuts	1.58

Source: California Department of Food and Agriculture 2010c.

[a] Pumpkins are used as the example crop in this category.

[b] Wheat is used as the example crop in this category.

[c] Grain sorghum is used as the example crop in this category.

[d] Bell peppers are used as the example crop in this category.

[e] Plums are used as the example crop in this category.

[f] Medium grain rice is used as the example crop in this category.

[g] Citrus price and yield from the San Joaquin Valley is used in this category.

[h] Turf prices and values are not reported for Delta counties. The statewide average for all counties reporting both acreage and value is used.

14.1.1.5 Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

The study area includes a large area of land uses designated for agricultural or specified compatible open space uses under the provisions of the California Land Conservation Act of 1965, more commonly known as the Williamson Act.

The study area encompasses more than 872,000 acres, of which nearly 432,000 acres are subject to Williamson Act contracts or in Farmland Security Zones, including land subject to contract non-renewal (California Department of Conservation 2007–2009).

These areas are identified in Figure 14-2 and further discussion of the Williamson Act can be found in Section 14.2.2.2.

A substantial portion of agricultural land in the study area is designated Important Farmland by the DOC's FMMP. Under this program, lands are categorized into one of eight categories. In the study area, there are more than 512,000 acres of Important Farmland, including approximately 395,000 acres of Prime Farmland, 34,000 acres of Farmland of Statewide Importance, 40,000 acres of Unique Farmland, and 44,000 acres of Farmland of Local Importance. Additionally, there are more than 77,000 acres of Grazing land, Semi-Agricultural and Rural Commercial Land, and Farmland of Local Potential, categories that are not included in estimates of Important Farmland (California Department of Conservation 2008–2010). These areas are identified in Figure 14-3. For further discussion of these agricultural designations and the FMMP, see Section 14.2.2.2.

14.1.1.6 General Crop Production Practices and Characteristics

The Delta's Mediterranean climate makes crop production possible year-round. In general, farmers cultivate and till during the winter and early spring, and harvest through the summer and early fall. However, crop production practices and timelines vary with each crop type, depending on soil, microclimate, irrigation practices, and other factors. Therefore, although many farms across the Delta may grow the same crops, each farm may have unique cultural practices and harvest timing that best suit the local conditions and the farmer's target market (e.g., fresh market tomatoes versus processing tomatoes, or apples for juice versus fresh market).

Irrigation and Drainage

Delta agricultural production relies heavily on irrigation because there is high rainfall during the winter and low rainfall during the majority of the growing season. Irrigation and drainage practices vary with each crop; methods include drip, sprinkler, furrow, flood, border strip, basin, sub-irrigation or a combination of these. Subsurface irrigation, or sub-irrigation, is a common irrigation method for peat soils. Peat soil sub-irrigation is conducted by applying water into a system of narrow and deep unlined ditches which raises the water table in the porous peat soils to be within several inches of the surface. After the water table drops again from crops drawing water, the ditches can be refilled to once again raise the water table and fill the root zone with water. Sub-irrigation is particularly dependent upon good water quality as this method does not push salts down below the root zone. Higher salinity irrigation water will tend to concentrate salts at the surface and in the root zone. This is particularly problematic for salt-sensitive crop growth stages such as germination and seedling. Annual row crops are often sprinkler-irrigated for crop germination and furrow-irrigated for the rest of the season. As noted above, many crops are also irrigated through sub-surface methods. Permanent crops are drip-, sprinkler-, furrow-, or flood-irrigated. Irrigated pasture and alfalfa are typically sprinkler- or flood-irrigated.

All applied irrigation water is subject to either being leached below the root zone, transpired by plant tissue, and/or to evaporation or runoff from the soil surface (Edinger-Marshall and Letey 1997). Sprinkler and drip systems decrease leaching and runoff and offer greater control over the amount and distribution of water to the root zone in comparison to flood or furrow irrigation. This control translates to maximized yields and protection of groundwater. However, capital costs are

higher for drip irrigation systems. Flood and furrow irrigation have a higher incidence of water evaporation or runoff from the soil surface. These methods increase the initial amount of water needed for irrigation and can increase irrigation runoff. Since the advent of drip irrigation between 1969 and 1970 (Marsh 1977), drip, and sprinkler irrigation use have risen as the use of furrow or flood irrigation has decreased across the state (Edinger-Marshall and Letey 1997).

Pre-irrigation (irrigation prior to crop planting) is not widely practiced in the Delta because winter rains provide for full soil moisture profiles, and pre-irrigation leaching, which is typically used to mobilize salts out of the crop root zone, is not needed because relatively high quality irrigation water in the Delta results in low soil salt concentrations. Most crops produced in the Delta require weekly or biweekly irrigation throughout the crop-growing season until a few weeks before harvesting. In-season irrigation quantities depend on crop type, stage of crop growth, soil moisture profile, management of plant pests and diseases, and weather conditions. Areas in the south Delta may be the exception because, during some water year types and oftentimes late into the growing season, irrigation water can become more saline, which may require modification to irrigation practices to avoid crop salt burning (University of California Cooperative Extension 1986). Table 14-4 provides water requirements for each crop. This data represents the combined practices of San Joaquin and Sacramento Valleys and is representative of general requirements for the study area (University of California Cooperative Extension 2008).

In general, irrigation water is diverted directly from Delta waterways and transported to agricultural lands via irrigation and drainage canals. In some cases, however, water is pumped directly into field furrows. Irrigation and drainage canals are operated and maintained in the Delta by reclamation districts, irrigation districts, and water agencies. Because irrigation water is diverted directly from surface water resources, little groundwater is pumped for surface irrigation purposes. See Chapter 5, *Water Supply*, Section 5.1.2.6, for more information regarding irrigation water diversion locations and Chapter 7, *Groundwater*, Section 7.1.1.2, for discussion of groundwater levels in the Delta. Some of the agricultural surface water diversions are screened to protect fish, but many are not (Chapter 11, *Fish and Aquatic Resources*, Section 11.1.5.1). Agricultural surface water diversion operations depend on sufficient water surface levels to keep the intakes submerged. Energy requirements for pumping, and therefore agricultural water costs in the Delta, also are affected by surface water levels. Currently, temporary control structures are installed in the south Delta to raise surface water elevations (Chapter 6, *Surface Water*, Section 6.1.2.3).

Agricultural runoff percolates into the water table or is discharged into Delta waterways. Within the Delta, reclamation district canals and ditches function as both water supply and drainage conveyance facilities. Canals and ditches are typically kept at low water levels during the drainage season and are pumped out by the reclamation districts to remove drainage and stormwater. During the crop irrigation season, water is diverted from tributaries into water supply ditches and irrigation drainage water is captured in the canals and ditches and reused in subsequent irrigation. The practice of reusing irrigation drainage water for subsequent irrigation is not currently constrained because the quality of agricultural drainage and supply water is relatively good. Discharge of agricultural runoff and drainage water is regulated and monitored (Chapter 8, *Water Quality*, Section 8.2).

Table 14-4. Applied Irrigation Requirements of Crops Grown in the Study Area by Acre

Crop	Water Requirements (acre-inches) [a, b]	Typical Irrigation Methods
Alfalfa	42	Flood and Sprinkler
Almonds–Flood	51	Flood
Almonds–Micro Sprinkler	38–42	Micro-Sprinkler
Asparagus	30	Furrow and Flood
Common Dry Beans, Double Cropped and Lima Beans (large and baby)	28–36	Furrow
Cherries	30	Micro-Sprinkler
Cucurbits	30	Furrow
Field Corn	42	Flood
Wine Grapes	16–30	Drip
Raisins-Tray Dried	28	Drip
Cling Peaches	42	Furrow
Pecans	56	Flood
Rice	4–6 (continuously)	Flood
Safflower	6	Sprinkler
Sunflowers	29	Furrow
Tomatoes–Processing	42 (2–3 acre-inches by sprinkler, 36–40 acre-inches by furrow)	Sprinkler and Furrow
Walnuts	42	Micro-Sprinkler
Wheat	6	Furrow

Sources: University of California Cooperative Extension 2008; University of California, Davis 2008.

[a] Values are for established crops on a per-acre basis.

[b] No assumption is made for rainfall.

General Fertilizer, Pesticide, and Herbicide Use

Fertilizers, pesticides, and herbicides are commonly used for crop yield optimization and crop quality protection. The term "pesticides" encompasses natural and chemically synthesized insecticides, fungicides, herbicides, and fumigants used to stabilize the crop cultivation environment against floral and faunal pests (U.S. Environmental Protection Agency 2009). More than 25 different types of pesticides are commonly applied to crops in the study area. See Chapter 24, *Hazards and Hazardous Materials*, Section 24.1.2.2, for more information about pesticide use in the area.

Fertilizers are used in agricultural production to replenish soil nutrients lost during the growing season and to replace nutrients removed from the field by crop harvest. Fertilizers may be composed of natural and/or synthetic materials with varying concentrations of plant nutrients. Soil amendments are similar in make-up, although they are intended to supplement soils with nutrients lost during the previous growing season. Generally, amendments are applied to soil prior to planting and fertilizers are applied at the same time as planting and as needed throughout the growing season. Fertilizer application practices, needs, and timing vary among crops. Pre-planting application of pesticides is generally done in a broadcast application by applying the pesticide to the

entire area. After sprouting (post-emergent), fertilizer and pesticide applications can be done by applying to the leaves or by adding to irrigation water. The application of fertilizers to irrigation water can lead to fertilizers leaching to the groundwater or being discharged into agricultural drainage water. Pesticides and herbicides are designed to naturally break down to innocuous compounds; however, leaching of these chemical compounds into groundwater or surface water can be problematic for wildlife and water quality.

Application methods of fertilizers, pesticides, and herbicides vary by crop and chemical type and include: chemigation (application through the irrigation system), orchard spray rigs, spray booms, brush brooms, broadcast spreaders, chemically coated seeds, and aerial applicators (crop dusters). Best management practices (BMPs) such as integrated pest management; pesticide selection; timing of application; weather conditions before, during, and after spraying; sprayer calibration; on-farm runoff; sediment transport control; and spray buffers around open water and sensitive areas are used within the agricultural industry to reduce the potential for contamination from chemical applications. Application method and timing varies with crop type and materials being applied. Environmental setting can affect the amount and type of pesticides applied. For instance, crops in close proximity to standing water may be subject to more or a greater variety of pests. Also, crops with inappropriate soil moisture could be more prone to root disease and would require an increased amount of pesticides or fungicides. Fertilizers, pesticides, and herbicides contaminating soils or ground or surface water become environmental stressors for humans, wildlife, aquatic organisms, and fish. Chapter 24, *Hazards and Hazardous Materials*, Section 24.1.2.2, provides information on pesticide leaching; Chapter 8, *Water Quality*, Section 8.1.3, describes the effects of chemical contaminants on aquatic organisms and fish; Chapter 25, *Public Health*, Section 25.1.1, describes the effects of chemical contaminants on human health.

Although pesticides are designed to break down after a period of time, spray drift and groundwater contamination are potential causes of problems of applied pesticides. However, the application requirements necessary for chemical registration are designed to minimize the mobilization of chemicals with restrictions on wind speed, humidity, and proximity to open water during application. Pesticide contamination of groundwater depends on the geological and hydrological conditions in the area (Chapter 7, *Groundwater*, Section 7.1.1.2). Soil type plays an important role in determining the extent to which pesticides leach into groundwater. Sandy soils increase the risk of pesticide leaching because the absorption capacity of the soil is limited (U.S. Environmental Protection Agency 2009).

To minimize the effects of spray drift, registration application condition requirements also specify the distance from which pesticides can be applied to a water or riparian area, if necessary.

Pesticide, herbicide, and fertilizer usage is regulated by the U.S. Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (CDPR) to ensure pesticide use does not degrade environmental resources and to protect public health. Regulatory agencies and enforcing regulations are discussed in Section 14.2, *Regulatory Setting*. Pesticides, herbicides, and fertilizers are expected to continue to be applied in compliance with federal and state regulations.

Crop Water Table Tolerances

Delta groundwater levels vary seasonally and are highly influenced by seasonal precipitation, drainage, soil texture, and profile, proximity to tributaries and open water, and surface water levels. Surface water levels in the Delta are determined by Delta inflows, tides, diversions, and water

exports. High water tables and poor drainage can limit crop selection options, lead to crop loss or damage, contribute to pest infestations (e.g., fungus and mildews), and changes in soil conditions (anaerobic). Drain tiles to control groundwater depth and to move drain water are installed for most permanent crops and some open ground throughout the Delta so soils are not oversaturated. The interaction between crops and the water table depends on the type of crop and the water-holding capabilities of the soil. The water table elevation must be below the crop root zone to maximize growth and yield and minimize root rotting from oversaturation (University of California Cooperative Extension 1986). Table 14-5 illustrates root depth of crops in the Delta.

Table 14-5. Crop Type Root Depths (in feet)

Crop Type	Lowlands	Uplands
Pasture	2.0	2.0
Alfalfa	4.0	6.0
Field	2.0	4.0
Grain	2.0	4.0
Rice	1.0	2.0
Truck	4.0	5.0
Tomatoes	4.0	5.0
Orchards	5.0	6.0
Vineyards	4.0	5.0
Safflower	4.0	5.0
Corn	3.0	4.0
Non-irrigated Pasture	2.0	2.0
Non-irrigated Vineyards	4.0	5.0
Non-irrigated Orchards	5.0	6.0
Dry Grass	2.0	2.0

Source: California Department of Water Resources 1995
Note: Assumptions developed for Delta Island Consumptive Use model.

Crop Salinity Tolerances

Crops have varying degrees of tolerance to changes in irrigation water salinity. Surface water and groundwater quality is determined by the natural, physical, and chemical properties of the land above or surrounding a water body (Chapter 7, *Groundwater*, Section 7.1.1.3, and Chapter 8, *Water Quality*, Section 8.1.1.4). Agricultural practices affect water quality as a result of the physical alterations to the land, as well as the chemical influences of agricultural production (e.g., pesticides, fertilizers, herbicides, and animal manure). In general, crops have varying degrees of tolerance to water salinity, which can vary by growth stage.

In addition to influencing surface and groundwater quality, application of irrigation water adds soluble salts such as sodium, calcium, magnesium, potassium, sulfate, and chloride that have dissolved from geologic materials. Evaporation and transpiration of irrigation water allow salts to concentrate in irrigation water and accumulate in soils unless adequate leaching and drainage are provided. Excessive soil salinity can affect soil structure, impede water and root penetrations, and result in seedling mortality, reduced plant growth rates, and reduced yields (Grattan 2002).

The concentration and composition of dissolved constituents in water determines whether the water quality is suitable for irrigation. Electrical conductivity (EC) is measured in deciSiemens (dS) and is used to indicate the total salt content or total dissolved salt content. The strength of the electrical current depends on the water temperature, types of ions, and salt concentrations. Water with a higher salt content is more conductive than water with lower salt content. For more information on agricultural irrigation water quality suitability, see Chapter 8, *Water Quality*.

Irrigation can be used to control salt levels in the soil by over-irrigating, careful drainage, or maintaining high moisture levels to dilute salt (Hagood 1977). Soil salinity is measured in EC_e, which is the electrical conductivity of the soil in deciSiemens per meter (dS/m) at 25°C, and EC_w is the electrical conductivity of water in dS/m. Crop tolerances for soil and water salinities vary. Some crop varieties have the ability to withstand higher salt concentrations, such as sugar beets, which tolerate 26 dS/m, and Sudan grass, which can tolerate 24 dS/m before crop yield loss occurs.

The effects of salts or salinity on agricultural production depend upon the texture of the soil, the distribution of salt in the soil profile, the composition of the salt, irrigation practices, cultural practices, soils moisture content management, the plant species, transpirational load, and the growth stage of the plant (Ayers 1985). Salinity problems in irrigation water supply in the Delta are uncommon, but areas of the south Delta (e.g., Old River) and west Delta can be affected depending on water year type, time of year, and flow conditions. Areas of the south Delta that grow processing tomatoes, which are particularly salt-sensitive in seedling and blooming growth stages, have been documented to exhibit seedling mortality and bloom loss resulting from salt burning during irrigation that have resulted in reduced yields and crop quality during certain years. Most salinity problems in the Delta result from intrusion of saline drainage water from the San Joaquin Valley and from intrusion of saline water from the San Francisco Bay, a situation likely to worsen with any increases in sea level (Sumner and Rosen-Molina 2011).

Table 14-6 shows the crop tolerance and yield potential of certain crops grown in the Delta. The table shows the EC_e and EC_w salinity content at which crops would have a 100, 75, 50, or 0% crop yield. Additional discussion of water quality and, specifically salinity, is provided in Chapter 8, *Water Quality*, Section 8.1.3.7.

Agriculture-Related Infrastructure

Agricultural production always requires supporting industry, related industry, and infrastructure. Supporting industry, related industry, and infrastructure ranges from road access, irrigation and drainage facilities, electrical power, fuel suppliers, agri-chemical and seed suppliers, equipment supply and repair operations, and post-harvest facilities. Levees, irrigation facilities, and drainage infrastructure are particularly important in supporting agriculture within the study area. After crops are harvested they may be stored, processed, and shipped to other parts of the state, country, or world, depending on the crop and market. Post-harvest infrastructure examples in the study area include packing houses and cold storage plants for apples and pears, wineries for wine grapes, packing sheds for vegetables and melons, and hay barns for alfalfa. The prevalence and distribution of agricultural infrastructure directly and indirectly affects labor requirements, economics, and environmental justice. These issues are discussed in Chapter 16, *Socioeconomics*, and Chapter 28, *Environmental Justice*.

Table 14-6. Crop Tolerance and Yield Potential of Selected Crops as Influenced by Irrigation Water Salinity (EC_w) or Soil Salinity (ECe)[a, b]

	100%	75%	50%	0%[c]	100%	75%	50%	0%[c]
Field Crops	EC_e	EC_e	EC_e	EC_e	EC_w	EC_w	EC_w	EC_w
Alfalfa	2.0	5.4	8.8	16.0	1.3	3.6	5.9	10.0
Almond[d]	1.5	2.8	4.1	6.8	1.0	1.9	2.8	4.5
Apricot[d]	1.6	2.6	3.7	5.8	1.1	1.8	2.5	3.8
Bean	1.0	2.3	3.6	6.3	0.7	1.5	2.4	4.2
Corn (Maize)	1.7	3.8	5.9	10.0	1.1	2.5	3.9	6.7
Corn (Forage) (Maize)	1.8	5.2	8.6	15.0	1.2	3.5	5.7	10.0
Corn, Sweet (Maize)	1.7	3.8	5.9	10.0	1.1	2.5	3.9	6.7
Cucumber	2.5	4.4	6.3	10.0	1.7	2.9	4.2	6.8
Grape[e]	1.5	4.1	6.7	12.0	1.0	2.7	4.5	7.9
Peach	1.7	2.9	4.1	6.5	1.1	1.9	2.7	4.3
Rice (Paddy)	3.0	5.1	7.2	11.0	2.0	3.4	4.8	7.6
Squash, Zucchini (Courgette)	4.7	7.4	10.0	15.0	3.1	4.9	6.7	10.0
Squash, Scallop	3.2	4.8	6.3	9.4	2.1	3.2	4.2	6.3
Sudan Grass	2.8	8.6	14.0	26.0	1.9	5.7	9.6	17.0
Sugar Beet[e]	7.0	11.0	15.0	24.0	4.7	7.5	10.0	16.0
Tomato	2.5	5.0	7.6	13.0	1.7	3.4	5.0	8.4

Source: Ayers 1985.

[a] Adapted from Maas and Hoffman (1977) and Maas (1984). These data should only serve as a guide to relative tolerances among crops. Absolute tolerances vary depending upon climate, soil conditions, and cultural practices. In soils with high concentrations of gypsum, plants will tolerate about 2 dS/m higher EC_e than indicated; however, the EC_w will remain the same as shown in this table.

[b] EC_e means average root zone salinity as measured by EC of the saturation extract of the soil, reported in dS/m at 25°C. EC_w means EC of the irrigation water in dS/m. The relationship between soil salinity and water salinity (EC_e = 1.5 EC_w) assumes a 15–20% leaching fraction and a 40-30-20-10% water use pattern for the upper to lower quarters of the root zone. These assumptions were used in developing Table 14-6.

[c] The zero yield potential or maximum EC_e indicates the theoretical EC_e at which crop growth ceases.

[d] Tolerance evaluations are based on tree growth and not on yield.

[e] Beets are more sensitive during germination; EC_e should not exceed 3 dS/m in the seeding area for garden beets and sugar beets.

14.2 Regulatory Setting

This section provides the regulatory setting for agriculture resources, including potentially relevant federal, state, and local requirements.

14.2.1 Federal Plans, Policies, and Regulations

14.2.1.1 Farmland Protection Policy Act

Under Federal law, the Farmland Protection Policy Act recognizes that the Nation's farmland is a unique natural resource and provides food and fiber necessary for the continued welfare of the people of the United States; that each year, a large amount of the Nation's farmland is irrevocably converted from actual or potential agricultural use to nonagricultural use; that the extensive use of farmland for nonagricultural purposes undermines the economic base of many rural areas; and that Federal actions, in many cases, result in the conversion of farmland to nonagricultural uses where alternatives actions would be preferred.

The Federal Farmland Protection Policy Act (FPPA) is subtitle I of Title XV, Section 1539-1549, Agriculture and Food Act of 1981 (Public Law 97-98). According to the NRCS,

> …the FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. The FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.
>
> For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.
>
> Assistance from a Federal agency includes:
>
> - Acquiring or disposing of land.
> - Providing financing or loans.
> - Managing property.
> - Providing technical assistance.

The rating process established under the FPPA was developed to help assess options for land use on an evaluation of productivity weighed against alternative proposed uses. Because the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) is a federal agency and is a National Environmental Policy Act (NEPA) co-lead agency for the EIR/EIS, it is required to coordinate with the NRCS to comply with the FPPA.

14.2.1.2 Other NRCS Programs

The Natural Resources Conservation Service manages a number of programs that assist producers in conserving natural resources while sustaining agricultural productivity. These programs include those that provide technical assistance to growers and those that share costs with farmers in exchange for the adoption of conservation practices on agricultural land. Other programs protect continued agricultural production through the purchase of easements. These programs are primarily geared toward individual landowners and are voluntary and incentive-based.

14.2.1.3 U.S. Environmental Protection Agency Pesticide Regulatory Program

Pesticide use is regulated by EPA in conjunction with each state's Department of Agriculture. Each pesticide is registered or licensed for usage and a tolerance level is set for each pesticide. This tolerance, or maximum residue limit, limits the amount of pesticide that can be present on produce grown in the United States. Tolerances are set after determining the toxicity of the pesticide and the products of its break-down, how much pesticide remains in or on food by its market time, and the amount and frequency of pesticide application. Testing and enforcement of these tolerance levels is conducted by EPA and the CDPR. Licensing and registration of pesticides is primarily to protect environmental assets while tolerance levels for produce are designed to ensure a safe food supply for public consumption.

14.2.1.4 Agriculture Marketing Service

The Agriculture Marketing Service (AMS) of the U.S. Department of Agriculture (USDA) oversees programs to provide standardization, grading, scientific support, and collaboration of resources for the United States agriculture industry. The commodity programs for dairy, fruit and vegetable, livestock and seed, poultry, and cotton and tobacco oversee standardization and grading services in addition to supplying market news. Federal laws, such as the Federal Seed Act and the Perishable Agricultural Commodities Act, are enforced under these programs. Also within the AMS is the National Organic Program, which implements the national standards for organic products, the Science and Technology Program which provides scientific support to AMS programs, and the Transportation and Marketing Program which coordinates the cooperation of specialists to improve agricultural transportation and market access for growers.

14.2.2 State Plans, Policies, and Regulations

14.2.2.1 California Department of Pesticide Regulation

The Department of Pesticide Regulation (DPR) regulates pesticides under a comprehensive program that encompasses enforcement of pesticide use in agricultural and urban environments. DPR oversees a multi-tiered enforcement infrastructure and, and in addition to enforcing state pesticide laws, is vested by the U.S. Environmental Protection Agency with primary responsibility to enforce federal pesticide laws in California. DPR directs and oversees the County Agricultural Commissioners who carry out and enforce pesticide and related environmental laws and regulations locally.

Enacted in January 2008, the CDPR Strategic Plan is the 5-year plan to guide the CDPR in protecting human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management.

14.2.2.2 Farmland Mapping and Monitoring Program

The California Department of Conservation (DOC) established the FMMP in conjunction with the NRCS to establish categorical definitions of Important Farmland for land use inventory purposes. The definitions recognize the land's suitability for agricultural production rather than solely reflecting the physical and chemical characteristics of the soil. Land identified as Important Farmland is mapped into one of the following eight categories: prime farmland, farmland of

statewide importance, unique farmland, farmland of local importance, grazing land, urban and built-up land, other land, and water (California Department of Conservation 2007).

14.2.2.3 Delta Protection Act of 1992

The Delta Protection Act of 1992 recognizes the agricultural resource value of the Delta and declares that agricultural lands within the primary zone of the Delta should be "protected from the intrusion of nonagricultural uses." The bill created the Delta Protection Commission (DPC) and enabled it to promote, facilitate, and administer the acquisition of agricultural conservation easements. In addition, DPC was charged with protecting agricultural viability in the Delta while protecting the region from development that would result in a significant loss of agricultural land. Pursuant to this legislation, DPC created the *Land Use and Resource Management Plan for the Primary Zone of the Delta*. This plan identifies nine general policies in support of Delta agriculture. These include prioritizing low-value lands for conversion to nonagricultural uses, encouraging the acquisition of agricultural conservation easements, managing agricultural lands to maximize wildlife habitat, and supporting efforts to maintain a viable agricultural economy including educational programs, agricultural tourism, and value-added production activities (Delta Protection Commission 1995)). Under the 1992 legislation, counties with unincorporated land in the primary zone of the Delta must incorporate the policies of the *Land Use and Resource Management Plan for the Primary Zone of the Delta* into their General Plans. Where counties make land use decisions in the primary zone allegedly inconsistent with the *Land Use and Resource Management Plan for the Primary Zone of the Delta and* General Plan policies incorporating its contents, aggrieved parties can appeal such county decisions to the DPC for ultimate determinations of consistency or inconsistency.

14.2.2.4 Delta Reform Act and Delta Plan

In November 2009, the California Legislature enacted SB 1 X7, also known as the Sacramento–San Joaquin Delta Reform Act. The Act and related legislation on Delta activities contemplates that these activities will involve the conversion of agricultural land to other uses and requires consideration of the agricultural values of the Delta. Notably, in Public Resources Code section 29702, the Legislature declared that the "coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem … shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and *agricultural* values of the Delta as an evolving place." (Emphasis added.) [2] Echoing this concern for Delta agriculture, Public Resources Code section 32301[d] notes that "[t]he Delta contains more than 500,000 acres of agricultural land, with unique soils, and farmers who are creative and utilize innovative agriculture, such as carbon sequestration crops, subsidence reversal crops, wildlife-friendly crops, and crops direct for marketing to the large urban populations nearby."

The Delta bill created a new Delta Stewardship Council (DSC) and gave this body broad oversight of Delta planning and resource management. The DSC is tasked with developing, adopting, and commencing implementation of a long-term plan (the "Delta Plan") which will be a legally enforceable, comprehensive management plan The Delta Plan generally covers five topic areas and goals: increased water supply reliability, restoration of the Delta ecosystem, improved water quality, reduced risks of flooding in the Delta, and protection and enhancement of the Delta. The Delta Stewardship Council does not propose constructing, owning, or operating any facilities related to these five topic areas. Rather, the Delta Plan sets forth regulatory policies and recommendations

[2] Similar language is found in Water Code section 85020.

that seek to influence the actions, activities, and projects of cities and counties and state, federal, regional, and local agencies toward meeting the goals in the five topic areas.

The DSC adopted the Proposed Final Delta Plan, as well as the Final Delta Plan Program EIR and the Final Rulemaking Package, at its May 16, 2013 meeting. Once the State Office of Administrative Law and California Secretary of State approve the plan, the proposed policies in the Delta Plan will become enforceable regulations. The Proposed Final Delta Plan consists of 14 policies and 73 regulations (Delta Stewardship Council 2013).

14.2.2.5 California Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act (Williamson Act) is an agricultural land protection program enacted by the California Legislature in 1965 to help maintain the agricultural economy of the state by preserving its agricultural land. The act discourages premature and unnecessary conversion of agricultural land to urban uses. The legislation benefits landowners by allowing them to enter into long-term contracts (10 or 20 years) with the state of California to keep agricultural land in production. In return, the state reduces property taxes based on a complex calculation tied to agricultural income.

The program is authorized both by statute and by California's Constitution (Article XIII, Sec. 8). The Constitution provides that when land is "enforceably restricted" to certain enumerated uses, including the "production of food or fiber," it is to be valued for property tax purposes "only on a basis that is consistent with its restrictions and uses." Land in the Williamson Act program is restricted, by means of a contract, to agricultural use and certain compatible uses.

The Williamson Act is implemented when a city or county creates an agricultural preserve. Once a preserve is established, the landowner enters into a contract with a city or county. The landowner and any successors-in-interest are obligated to adhere to the contract's enforceable restrictions, unless the contract is rescinded or cancelled. The minimum Williamson Act contract term is ten years and the contract is automatically renewed each year, adding an additional year to its term.

If a county agrees to establish a Farmland Security Zone (FSZ, or "Super-Williamson Act") program, landowners may choose to enter into a 20-year contract to establish an FSZ or include the land within an established FSZ. Except under limited circumstances, land subject to an FSZ contract cannot be annexed into a city, or a special district that provides non-agricultural services, or acquired by a school district for use as a public school. In return, FSZ contracts offer landowners greater property tax reduction than under a 10-year Williamson Act contract.

These Williamson Act and FSZ contracts may be terminated by non-renewal or by cancellation. If a 10- or 20-year contract is terminated through non-renewal, a 9- or 19-year non-renewal period must be initiated by either the landowner or the city or county, during which time the land is still under contract, and the property taxes rise by a statutory formula during the last nine years of either form of contract. If a contract is terminated through cancellation, a city or county must make findings specific to each type of contract to justify cancellation.

It is the policy of the State to avoid, whenever practicable, the location of any federal, state, or local public improvements and any improvements of public utilities, and the acquisition of land in agricultural preserves. However, under several provisions of the Act, land under contract may be removed from contract in order to convert land to a non-agricultural use. Land may be acquired from a willing seller or by public acquisition for a public improvement project.

The Act requires that no public agency can locate a public improvement within an agricultural preserve unless it first finds that: (a) the location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve; and (b) there is no other land within or outside of the preserve on which it is reasonably feasible to locate the public improvement. However, the Act provides some exemptions and appears to exempt DWR from having to make these findings for a conveyance because the conveyance right-of-way would qualify as a "State Water Facility" as defined by §12934(d) (2) of the California Water Code. Applicable exemptions from these findings are identified in §51293 of the California Government Code and are listed below.

(d) The acquisition of either (1) temporary construction easements for public utility improvements, or (2) an interest in real property for underground public utility improvements. This subdivision shall apply only where the surface of the land subject to the acquisition is returned to the condition and use that immediately predated the construction of the public improvement, and when the construction of the public utility improvement will not significantly impair agricultural use of the affected contracted parcel or parcels.

(e) The location or construction of the following types of improvements, which are hereby determined to be compatible with or to enhance land within an agricultural preserve [not a contract]:

(1) Flood control works, including channel rectification and alteration.

(2) Public works required for fish and wildlife enhancement and preservation.

(3) Improvements for the primary benefit of the lands within the preserve.

(h) All facilities which are part of the State Water Facilities as described in subdivision (d) of Section 12934 of the Water Code, except facilities under paragraph (6) of subdivision (d) of that section.

(j) The acquisition of a fee interest or conservation easement for a term of at least 10 years, in order to restrict the land to agricultural or open space uses as defined by subdivisions (b) and (o) of Section 51201.

In 2008, Assembly Bill 2921 was enacted, providing for a mechanism to rescind Williamson Act agricultural contracts in order to enter into either an open space contract under the Williamson Act, or an open space easement. Under the new provisions, the resulting agreement must be at least as restrictive as the contract it replaced, and the affected parcel large enough to provide open space benefits. This mechanism may be applicable to preservation or restoration activities associated with the implementation of BDCP conservation measures.

According to the *Williamson Act 2010 Status Report*, approximately 15 million acres were enrolled under the Williamson Act statewide as of January 1, 2009 (California Department of Conservation 2010). This represents about half of California's 30 million acres of farmland, which accounts for nearly one-third of the state's privately owned land. In recent years, though, some counties have removed lands from Williamson Act contracts as a result of reductions to State subvention funds, which compensate counties for property tax revenue foregone through contracts. For fiscal year 2009–2010, the subvention payments budget was cut to $1,000 statewide; in 2010, Senate Bill 863 restored funding to a statewide level of $10 million for the 2010–2011 fiscal year. However, in 2011, Senate Bill 80 terminated this fund while Assembly Bill 1265 created a means by which participating counties receiving subvention aids less than half of the previous year's foregone revenue may shorten the term of the active Williamson Act contracts in the county and recoup 10% of participating landowners' property tax savings (California Department of Conservation 2011).

14.2.2.6 State Water Resources Control Board and Central Valley Regional Water Quality Control Board

The State Water Board allocates water rights, adjudicates water rights disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine Regional Boards located in the major watersheds of the state. The Regional Boards serve as the frontline for state and federal water pollution control efforts. The study area is almost exclusively within the boundaries of the Central Valley Regional Board. In 2003, the Central Valley Regional Board initiated the Irrigated Lands Regulatory Program with the adoption of Conditional Waiver of Waste Discharge Requirements. The 2003 Conditional Waiver expired in 2006, and a Revised Conditional Waiver was adopted and has been amended to continue until July 2013. The Irrigated Lands Regulatory Program is designed to restore and/or maintain the highest reasonable quality of state waters considering all the demands being placed on the water; minimize waste discharge from irrigated agricultural lands that could degrade the quality of state waters; maintain the economic viability of agriculture in California's Central Valley; and ensure that irrigated agricultural waste discharge to water designated as municipal/domestic supply is of sufficient quality to provide Central Valley communities a sustainable source of drinking water. As part of the Irrigated Lands Regulatory Program, farmers and ranchers are to join a coalition to manage and monitor water quality or obtain an individual discharge permit with a monitoring program. The monitoring programs support the use of alternative methods in farmer and rancher operations to prevent fertilizers and pesticides from reaching streams.

14.2.2.7 California Natural Resources Agency

In an October 27, 2004 memorandum, the Secretaries of the Resources Agency and the Department of Food and Agriculture stated that the two agencies were "committed to working together to ensure that the policies of each agency are, to the fullest extent possible, complementary, rather than conflicting." In a May 4, 2005 memorandum to Resources Agency departments, boards and commissions, the Secretary stated "in selecting and developing resource related projects, departments under Resources Agency should consider ways to reduce effects on productive agricultural lands" and encouraged departments to incorporate, where appropriate, the strategies identified in the CALFED EIR to reduce the impact of the CALFED Ecosystem Restoration Program on agricultural land and water use. The Secretary recommended several steps departments should take in cases involving agricultural lands. These included (1) projects should include both restoration and agricultural preservation efforts; (2) CEQA documents involving resource-related projects that involve agricultural land should include a separate section that describes the social and economic consequences of a conversion; and (3) the lead agency should analyze each situation on a case-by-case basis to determine whether a project will have a significant effect on the environment. Socioeconomic issues are discussed in Chapter 16, *Socioeconomics*.

14.2.2.8 California Department of Food and Agriculture

CDFA implements programs to support California agriculture and food production with improved quality assurance, animal safety programs, production, and on-farm safety management practices, and programs for processors of farm products. CDFA also conducts pest and disease prevention activities and programs to respond to emergencies that threaten California's food and agriculture. The CDFA relies on the County Agricultural Commissioners to carry many of its programs.

14.2.3 Regional and Local Plans, Policies, and Regulations

14.2.3.1 General Plans

The respective general plans for Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties include policies and mitigation requirements regarding the conversion of agricultural land use within the Delta. These documents set forth policies and implementation strategies to preserve agricultural and open space land uses through varying combinations of the following mechanisms: creation of urban growth boundaries, designation of agricultural overlay zones and other agricultural protection areas, identification of a minimum parcel size for agricultural uses, requirement of buffers between agricultural and other uses, enactment of mitigation fees for conversion of agricultural land associated with development, support for or required purchase of agricultural easements, establishment of transfer of development rights programs, and support for agricultural-related educational or tourism programs. City general plans may also have some provisions dealing with agriculture and open space. Generally state and federal agencies, as well as some local or regional agencies involved with the location or construction of facilities for the production, generation, storage, treatment, or transmission of water are not subject to local land use regulations and inconsistency with a specific local land use regulation is not by itself an adverse effect on the environment.[3] However, this EIR/EIS, in assessing whether particular categories of environmental effects are adverse or beneficial (NEPA) or significant (CEQA), considers relevant local land use regulations that are adopted for the purpose of avoiding or mitigating an environmental impact. Provisions of these plans are discussed in more detail in Chapter 13, *Land Use,* Section 13.2.3.

14.2.3.2 County Right-to-Farm Ordinances

A right-to-farm ordinance is commonly adopted by counties with a prominent agricultural presence to protect agricultural operations from nuisance complaints and actions associated with adjacent residential uses. Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties have adopted right-to-farm ordinances.

14.3 Environmental Consequences

This section describes the potential effects of the alternatives on agricultural resources within the study area. Effects are evaluated for severity and, where appropriate, mitigation measures are identified. This section describes potential direct and reasonably foreseeable indirect effects on agriculture that would result with implementation of each alternative. This analysis separates effects relating to Important Farmland and conversion of land subject to Williamson Act contracts or in Farmland Security Zones into two categories: one related to the physical and structural components of water conveyance facilities (CM1), which are project-level features, and one related to other conservation measures (CM2 through CM22), which are program-level features. For other potential effects, these components are treated together, along with effects stemming from BDCP operations, where such discussion is appropriate. Direct or indirect effects on agricultural resources in areas Upstream of the Delta are not anticipated; thus, agricultural resources in these areas are not

[3] See, e.g., *Hall v. Taft* (1956), 47 Cal. 2d 177, 183; *Town of Atherton v. Superior Court* (1958) 159 Cal.App.2d 417 and *Lawler v. City of Redding* (1992) 7 Cal. App. 4th 778, 784.

discussed further in this section. Potential effects on upstream areas are discussed in Chapter 5, *Water Supply.* See Chapter 30, *Growth Inducement and Other Indirect Effects*, for a general discussion of potential effects on agricultural resources in the SWP/CVP Export Service Areas region.

Additionally, six of the proposed conservation measures related to supporting covered species and reducing effects from environmental stressors (listed below and described in Chapter 3, *Description of the Alternatives*, Section 3.6.3), which would be implemented under all action alternatives, are not anticipated to result in any meaningful effects on agricultural resources in the study area because the actions implemented under these conservation measures are not, for the most part, land-based or land-focused activities, nor would they be expected to result in any direct or indirect effects on agriculture in the study area. As such, these measures will not be addressed further in this analysis.

- Methylmercury Management (CM12)
- Stockton Deep Water Ship Channel Dissolved Oxygen Levels (CM14)[4]
- Illegal Harvest Reduction (CM17)
- Conservation Hatcheries (CM18)
- Urban Stormwater Treatment (CM19)
- Avoidance and Minimization Measures (CM22)

14.3.1 Methods for Analysis

Section 14.3.2, *Determination of Effects*, addresses the potential for effects associated with temporary construction activities, footprint of disturbance of new water conveyance facilities (CM1) and other conservation measures (CMs 2–11, 13, 15, 16, 20, 21), and operation of the BDCP alternatives within the study area. Relying on spatial data from the California Departments of Conservation and Water Resources, as well as project-specific data describing the location of project components, this section considers conversion of agricultural land designated as Important Farmland (Prime, Unique, Statewide Importance, and Local Importance) and subject to Williamson Act contracts or in Farmland Security Zones. Project-specific data also determined whether features would create footprint effects that would be temporary/short-term or permanent in nature. The section also describes potential changes to agricultural viability from the project as it relates to operational effects on water quality, groundwater elevation, and inundation frequency. Finally, the section considers several indirect consequences on agricultural resources that may result from implementation of the BDCP.

14.3.1.1 Project- and Program-Level Components

To evaluate effects stemming from the BDCP alternatives, this analysis uses a range of methodological approaches. First, geospatial data was used in a similar manner described above to quantify the number of acres of Important Farmland and land contracted under Williamson Act that would be affected by the footprint of all components of the proposed BDCP alternatives, including water conveyance facilities (CM1) and other conservation measures (CMs 2–11, 13, 15, 16, 20, 21). Because activities associated with these planned conservation measures are conceptual at this point,

[4] Implementation of this conservation measure would modify the existing aeration facility as necessary and, if necessary, additional aerators and associated infrastructure would be added to optimize oxygen delivery to the river.

this analysis took a programmatic approach to addressing effects on crops using similar analytical approaches and tools as for the placement of the water conveyance facilities. While these effects are included in Section 14.3, *Environmental Consequences*, they will also be discussed in greater detail and specificity in subsequent project-level environmental documentation once the specific locations for these BDCP conservation measures are determined.

Chapter 7, *Groundwater*, evaluates changes in groundwater levels due to the construction of the water conveyance facilities and the implementation of the other conservation measures, as well as effects on agricultural drainage patterns. Changes to groundwater elevation are discussed in terms of the interaction between crops and the water table. The water table elevation must be within the crop root zone to maximize growth and yield and minimize root rotting from oversaturation. This section assesses whether groundwater level changes due to new water conveyance facilities or the other conservation measures would occur at a magnitude or time period that would affect crop root zones, thereby affecting crop viability and/or irrigation practices. Because location-specific effects cannot be identified, this evaluation is qualitative in nature. Where location-specific information regarding changes to agricultural drainage patterns can be identified, these effects are discussed. For instance, geospatial data was used to quantify the total length of irrigation or drainage facilities that could be directly affected by the footprint of temporary or permanent features associated with construction of water conveyance facilities (CM1) for each alternative.

Potential changes in water quality, which could alter irrigation practices or economically viable crop choices (i.e., crop types or acreages), have been identified based on information from Chapter 8, *Water Quality* and proposed operational guidelines with respect to existing salinity standards in the study area. Modeling results were analyzed to identify and quantify, to the extent feasible, specific areas that could be affected by these changes. Salinity, as measured by electrical conductivity, is a primary indicator of water quality that could affect agricultural production in the study area. The magnitude, duration, and frequency of a salinity change in irrigation water were evaluated by analyzing the change in the number of days when electrical conductivity objectives for agricultural beneficial uses would be exceeded or out of compliance. Specifically, exceedance of crop salinity objectives was evaluated using DSM2 model output for eight representative nodes for agricultural beneficial use in the study area: Sacramento River at Emmaton/Three Mile Slough near Sacramento River (Emmaton for Existing Conditions and No Action Alternative and Three Mile Slough following the change in compliance point under each action alternative) and San Joaquin River at Jersey Point in the western Delta; South Fork Mokelumne River at Terminus and San Joaquin River at San Andreas Landing in the interior Delta; and San Joaquin River at Vernalis, San Joaquin River at Brandt Bridge, Old River near Middle River, and Old River at Tracy Bridge in the southern Delta. The differences in irrigation water salinity are described in Chapter 8, *Water Quality*. However, these events are discussed in relation to the water quality tolerances of agricultural crops grown in the study area in Section 14.3.3, *Effects and Mitigation Approaches*.

A final qualitative discussion relates to potential changes to management practices or production viability brought about by Conservation Measures 2–11 of the BDCP, including effects stemming from proximity to new restoration areas. Again, in many cases the specific locations and guidelines relating to these measures are forthcoming; thus, this document incorporates only programmatic discussion of this issue. However, the potential for increased frequency of inundation events in the Yolo Bypass differs from most other measures in its geographic certainty. Analysis of related effects on agricultural resources relies on a comparison between a geographic estimate of the area that would be more frequently inundated, along with data about the agricultural resources present in this area.

14.3.1.2 Timing of Effects

The analysis that follows assesses the potential for temporary (four or fewer years) or short-term (between four and ten years) construction activities associated with the BDCP to directly or indirectly impede agricultural production and operations. This section relies upon geospatial information identifying temporary ground-disturbing activities necessary for project construction, as well as the current distribution of important agricultural resources, including Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones in the study area. Permanent effects (lasting more than ten years) resulting from the physical footprints of water conveyance facilities and conservation areas, as well as operational effects on agricultural resources, are described separately. The extent of agricultural land that would be disturbed by construction activities determines the severity of each effect.

14.3.2 Determination of Effects

As discussed in the regulatory discussion above, both California and federal law and policy recognize that farmland is a unique resource and that conversion of farmland to other uses may have adverse economic and environmental impacts. Farmland is unique under CEQA and NEPA in that it represents both a natural resource and an economic resource. In general, under both CEQA and NEPA it is not legally necessary to mitigate for purely economic impacts unless they lead to reasonably foreseeable secondary environmental impacts. However, because of the complex nature of farmland as a natural and economic resource, it may be difficult to determine when an impact is an economic impact and when it is an environmental impact. To the extent that agricultural land provides habitat for species and/or open space for the enjoyment of humans, such land represents an environmental resource. In addition, agricultural land, itself, has unique physical characteristics that distinguish it from other land types. These physical characteristics are integral to the determination of whether land is Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. High quality soils are complex bio-geo-chemical systems and some of California's most valuable natural resources. The higher the quality of a soil type, the greater and more diverse options it provides to potential users. To the extent that agricultural land produces commodities for sale, such land represents an economic resource, much like lands with significant mineral resources.

In the California Environmental Quality Act (CEQA), California Public Resources Code section 21060.1, subdivision (a), defines Agricultural Land as "prime farmland, farmland of statewide importance, or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria as modified for California." These categories, and sometimes farmland of local importance, taken together, are commonly described as "Important Farmland." For purposes of this EIR/EIS, "Important Farmland" is defined as land designated under any of these four categories, and refers to land located in areas that can continue to be farmed economically and on a sustainable basis for an indefinite period of time absent a conversion to a different use under the BDCP.

The criteria used for determining the significance of an effect on agricultural resources are based on the above factors, Appendix G of the CEQA Guidelines (Environmental Checklist), and professional standards and practices. Effects on agricultural resources may be considered adverse for purposes of NEPA and significant for purposes of CEQA if an alternative would result in any one of the following conditions.

- Convert to nonagricultural use a substantial amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance (collectively "Important Farmland"), as shown on the most recent California Department of Conservation Important Farmland maps for each of the affected counties.
- Convert a substantial amount of land subject to Williamson Act contracts or in Farmland Security Zones to a non-agricultural use incompatible with contract restrictions or local preserve rules or ordinances, or conflict with surrounding land uses or the terms of the applicable Farmland Security Zone.
- Involve other changes in the existing environment, which, because of their location or nature, would result in the conversion of substantial amounts of Important Farmland to nonagricultural use.

For the purposes of assessing both the severity of impacts and the need for mitigation, this EIR/EIS does not use a numerical approach. Rather, this document identifies different degrees of impacts and different mitigation measures depending in part on the nature, duration, and permanence of the impacts. Thus, where impacts are temporary or short-term in nature and the impacted land can be restored to productive agricultural status after the completion of construction, impacts are considered less severe than those that will be permanent in character, and mitigation obligations would be diminished accordingly.

For program-level activities, some may have adverse environmental impacts, others may have beneficial environmental impacts, and others may have no impacts at all. The extent of impacts and any required mitigation shall be addressed on a case-by-case basis as the footprint and impact of each activity is developed. At the time such program-level activities are proposed and subjected to project-specific environmental review, the Lead Agencies shall assess whether a significant adverse environmental impact would result from one or more such activities.

Where appropriate, BDCP proponents should work with local agencies and other State agencies, (including the California Department of Conservation, the California Department of Food and Agriculture, the U.S. Department of Food and Agriculture, including the Natural Resources Conservation Service, and federal and state fishery and wildlife agencies) to identify design features of the project that will benefit both agricultural and natural resources.

As noted above, effects related to incompatibilities with local agricultural policies and land use designations are discussed in Chapter 13, *Land Use* (Impacts LU-1 and LU-4). Effects to individual crop types were calculated and are presented in Appendix 14A, *Individual Crop Effects as a Result of BDCP Water Conveyance Facility Construction*. However, their evaluation is incorporated in Chapter 16, *Socioeconomics* (Impacts ECON-6, ECON-12, and ECON-18), as changes in crop selection and crop yield are considered primarily economic effects, rather than changes to the physical environment.

14.3.3 Effects and Mitigation Approaches

14.3.3.1 No Action Alternative

Under the No Action Alternative, agricultural production would continue largely as it has under Existing Conditions. This alternative includes continued implementation of SWP/CVP operations, maintenance, enforcement, and protection programs by federal, state, and local agencies and non-profit groups, as well as projects that are permitted or assumed to be constructed by 2060. This

includes implementation of the 2008 and 2009 Biological Opinions issued by NMFS and USFWS, which establish certain RPAs requiring habitat restoration that may result in conversion of agricultural land to nonagricultural uses (National Marine Fisheries Service 2009, U.S. Fish and Wildlife Service 2008). The effects of climate change that would occur with or without the BDCP are also part of the No Action Alternative. A complete list and description of programs, plans, and other assumptions considered under the No Action Alternative is provided in Chapter 3, *Description of Alternatives*, Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*.

Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland and of Land Subject to Williamson Act Contracts or in Farmland Security Zones

A selection of the programs, plans, and projects included under the No Action Alternative that are relevant to the discussion of agricultural resources are summarized in Table 14-7, along with anticipated effects on agricultural resources that have been identified. In total, the ongoing programs and plans under the No Action Alternative would result in the permanent conversion of at least 230 acres of farmland to nonagricultural uses and would temporarily affect approximately 500 acres of farmland. Of these total acres, at least 65 acres of Important Farmland (i.e., as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance) have been identified for conversion, along with temporary or short-term effects on 40 acres of Important Farmland. At least 30 acres of land subject to Williamson Act contracts would be converted and 415 acres would be temporarily affected. Habitat restoration activities, including 8,000 acres of restoration associated with the 2008 and 2009 Biological Opinions (BiOps) issued by NMFS and USFWS, may require the conversion of additional acreage of Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones. However, locations and the resultant magnitude of effects of these programs are not yet known. Additionally, some of the programs would also result in indirect effects on agriculture, as described in Table 14-7. Because the amount of Important Farmland that could be converted to nonagricultural uses under the No Action Alternative is substantial in the context of the study area, these plans, policies, and programs would be deemed to have adverse effects upon agricultural resources. If species and habitat conservation requires the conversion of farmland, it would necessitate its own environmental review process to determine the potential for adverse effects on agriculture.

Table 14-7. Effects on Agricultural Resources from Selected Plans, Policies, and Programs for the No Action Alternative based on Geography and Relevance to Resource Area

Agency	Program/Project	Status	Description of Program/Project	Effects to Agricultural Resources
Contra Costa Water District	Contra Costa Canal Fish Screen Project (Rock Slough)	Under construction as of July 2011	Installation of a fish screen at Rock Slough Intake.	Contra Costa Water District provides water to 20 agricultural customers. Construction activities may affect intake operations.
Contra Costa Water District, Bureau of Reclamation, and California Department of Water Resources	Middle River Intake and Pump Station (previously known as the Alternative Intake Pump Station)	Completed in 2011	This project includes a potable water intake and pump station to improve drinking water quality for Contra Costa Water District customers.	Project resulted in permanent conversion to nonagricultural uses of 6–8 acres of Prime Farmland and Farmland of Statewide Importance in San Joaquin County, on Victoria Island, at the intake and pump stations. Additionally, temporary construction easement impacts included approximately 25–40 acres identified as Prime Farmland and Farmland of Statewide Importance.
California Department of Water Resources	Federal Energy Regulatory Commission (FERC) License Renewal for Oroville Project	Final EIR in 2008. FERC license will be issued in accordance with NMFS BO and final FERC license	The renewed federal license will allow the Oroville Facilities to continue providing hydroelectric power and regulatory compliance with water supply and flood control.	No effects on agricultural acreages are anticipated. A slight change in water temperatures, however, may affect rice production.
Freeport Regional Water Authority and Bureau of Reclamation	Freeport Regional Water Project	Project was completed late 2010.	Project includes an intake/pumping plant near Freeport on the Sacramento River and a conveyance structure to transport water through Sacramento County to the Folsom South Canal.	Project resulted in permanent conversion of approximately 50–70 acres of farmland to nonagricultural uses. Approximately 35–45 acres of farmland and 415 acres of land subject to Williamson Act contracts were temporarily affected.
City of Stockton	Delta Water Supply Project (Phase 1)	The project is currently under construction.	This project consists of a new intake structure and pumping station adjacent to the San Joaquin River; a water treatment plant along Lower Sacramento Road; and water pipelines along Eight Mile, Davis, and Lower Sacramento Roads.	This will result in permanent conversion of 56 acres of economically viable Prime (6 acres) and Farmland of Statewide Importance (50 acres) to nonagricultural uses.

Agency	Program/Project	Status	Description of Program/Project	Effects to Agricultural Resources
Bureau of Reclamation and State Water Resources Control Board	Battle Creek Salmon and Steelhead Restoration Project	Project is ongoing.	This project includes restoration of approximately 48 miles of habitat in Battle Creek and its tributaries to improve passage, growth, and recovery for anadromous fish populations.	This will result in a conversion of traditional farmland to aquaculture farming. Because the land will be used for agriculture, this would not constitute a conversion of farmland. However, the change would constrain crop selection, and change crop yields and production costs.
Tehama Colusa Canal Authority and Bureau of Reclamation	Red Bluff Diversion Dam Fish Passage Project	Completed in 2012	Proposed improvements include modifications made to upstream and downstream anadromous fish passage and water delivery to agricultural lands within CVP	Project provides beneficial effects on agricultural water deliveries within the CVP and increased pumping capacity during irrigation season. Therefore, no adverse effects on agriculture would occur.
Bureau of Reclamation, California Department of Fish and Wildlife, and Natomas Central Mutual Water Company	American Basin Fish Screen and Habitat Improvement Project	Completed in 2012	This three-phase project includes consolidation of diversion facilities; removal of decommissioned facilities; aquatic and riparian habitat restoration; and installing fish screens in the Sacramento River. Total project footprint encompasses about 124 acres east of the Yolo Bypass	The project will result in the permanent conversion of 70 acres of farmland (including 60 acres of rice) during Phases I and II
Yolo County	General Plan Update	General plan was adopted November 10, 2009	Anticipated implementation of policies and programs such as the Farmland Conversion Mitigation Program would minimize conversion of agricultural land to nonagricultural uses through mitigation	While buildout of the Yolo County General Plan would likely result in some conversion of farmland to nonagricultural uses, the Farmland Conversion Mitigation Program would minimize the occurrence of conversion and mitigate the effects
Zone 7 Water Agency and California Department of Water Resources	South Bay Aqueduct Improvement and Enlargement Project	Completed in 2012	The project includes construction of the Dyer Reservoir, Altamont Water Treatment Plant, and a pipeline to transport the water from the enlarged South Bay Aqueduct	During Stage 3 of the project, Brushy Creek and Dyer Reservoir will permanently convert 27 acres of grazing land and Williamson Act contract land

Agency	Program/Project	Status	Description of Program/Project	Effects to Agricultural Resources
National Marine Fisheries Service, U.S. Fish and Wildlife Service	2008 and 2009 Biological Opinions	Ongoing	The Biological Opinions issued by NMFS and USFWS establish certain RPAs and RPMs to be implemented. Some of the RPAs require habitat restoration which may require conversion of agricultural land to nonagricultural uses.	Habitat restoration actions required under the RPAs could result in up to 8,000 acres of agricultural land conversion. Agricultural land uses could also be periodically affected by changes in operation of the Yolo Bypass.

Other Effects on Agriculture

As described in Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions,* SWP/CVP operations identified as continuing actions under the No Action Alternative include repair, maintenance, or protection of imperiled infrastructure such as levees, and may also include actions for water quality management, habitat and species protection, or flood management. While these continuing actions could result in indirect effects on agriculture depending on the type of construction needed for repairs, or adjustments to potential irrigation water and drainage needed for water quality and flood management, these effects would be temporary in nature and would not be anticipated to result in the conversion of Important Farmland, land subject to Williamson Act contracts or in Farmland Security Zones, or otherwise substantially restrict agricultural uses.

Water Quality Effects

The potential effects of the No Action Alternative on agriculture due to changes in salinity were evaluated by comparing the No Action water quality analysis for salinity to those for Existing Conditions. Relative to Existing Conditions, the No Action Alternative would result in a fewer number of days when Bay-Delta WQCP compliance locations in the western, interior, and southern Delta would exceed EC objectives or be out of compliance with the EC objectives, with the exception of the Sacramento River at Emmaton. Complete discussion of salinity under the No Action Alternative is included in Chapter 8, *Water Quality*, Section 8.3.3.1.

Future of Agriculture in the Delta

The future of agricultural activities in the study area is uncertain. Over time, subsidence places greater stress on levees, and it will continue to increase the already high costs of continued levee maintenance and repair. Should the breach of a levee surrounding a Delta island devoted to agriculture occur, it is possible that the island might be permanently lost to agricultural production. Seismic risks and the effects of a changing climate also represent uncertainty with respect to the future of agricultural production in the study area. The No Action Alternative assumes that levee failures would be repaired under ongoing programs and does not include changes in land use to accommodate climate change or adverse impacts associated with climate change. These issues are discussed further in Appendix 3E, *Potential Seismic And Climate Change Risks to SWP/CVP Water Supplies,* and Chapter 29, *Climate Change*.

Continuing activities related to operation of SWP and CVP facilities, changes in water quality, and other indirect effects are not changes in the existing environment that would result in the conversion of substantial amounts of Important Farmland to nonagricultural use. However, because Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones in the study area would be converted to nonagricultural uses under existing plans and programs, the No Action Alternative would have direct and adverse effects upon agricultural resources in the study area.

***CEQA Conclusion*:** Continuing activities related to operation of SWP and CVP facilities, changes in water quality, and other indirect effects are not changes in the existing environment that would result in the conversion of substantial amounts of Important Farmland to nonagricultural use. However, because Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be converted to nonagricultural uses under existing plans and programs, the No Action Alternative would have significant impacts upon agricultural resources in the study area. In total, the ongoing programs and plans under the No Action Alternative would result in the permanent conversion of at least 230 acres of farmland to nonagricultural uses and would temporarily affect at least 500 acres of farmland. Of these total acres, at least 65 acres of Important Farmland (i.e., as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance) would be permanently converted and 40 acres of Important Farmland would be temporarily affected. At least 30 acres of land subject to Williamson Act contracts would be converted and 415 acres would be temporarily affected. Habitat restoration activities, including 8,000 acres of restoration associated with the 2008 and 2009 BiOps issued by NMFS and USFWS, may require the conversion of additional acreage of Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones. Therefore, the effects of these programs and plans are considered significant.

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

Alternative 1A would result in temporary effects on agricultural land in the study area associated with construction of five intakes and intake pumping plants, and other associated facilities; two forebays; conveyance pipelines; and tunnels. Nearby areas would be altered as work or staging areas, concrete batch plants, fuel stations, or be used for spoils storage areas. Transmission lines, access roads, and other incidental facilities would also be needed for operation of the project and construction of these structures would have temporary or short-term effects on agricultural lands.

Implementation of Alternative 1A would also result in permanent conversion of agricultural lands to nonagricultural uses associated with the five intakes and intake pumping plants and other associated facilities; an intermediate pumping plant; two forebays, and tunnel shafts. Other project features that would result in conversion of agricultural lands include soil borrow, spoil, and reusable tunnel material (RTM) storage areas, transmission line structures, and access roads.

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term construction of water conveyance facilities associated with Alternative 1A would convert existing agricultural land to construction-related uses, directly precluding agricultural use for the duration of construction. This alternative would convert approximately 1,329 acres of Important Farmland to other uses, including 1,126 acres of Prime Farmland, 13 acres of Farmland of Statewide Importance, 48 acres of Unique Farmland, and 143 acres of Farmland of Local Importance.

Of these acres of Important Farmland, intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 500 acres near the east bank of the Sacramento River between Freeport and Courtland. Work areas associated with the construction of conveyance pipelines would require approximately 180 acres and would be located primarily between Intakes 1 and 2 and between Intake 3 and the proposed intermediate forebay, south of Hood and between the Sacramento River and Stone Lakes National Wildlife Refuge. Other temporary work areas, including those necessary for the construction of tunnels and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-1 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Table 14-8. Estimated Conversion of Important Farmland as a Result of Construction of Water Conveyance Facilities, by Alternative (Acres)
Alternative(s)

	Permanent Surface Impacts					Temporary and Short-term Surface Impacts						
	Farmland of Local Importance	Farmland of Statewide Importance	Prime Farmland	Unique Farmland	Subtotal	Farmland of Local Importance	Farmland of Statewide Importance	Prime Farmland	Unique Farmland	Subtotal	Grand Total	Percent of Total in Study Area
Alternatives 1A and 6A	173	330	3,427	1,054	4,984	143	13	1,126	48	1,329	6,313	1.23%
Alternatives 1B and 6B	513	530	15,800	2,031	18,875	99	61	1,769	214	2,144	21,019	4.10%
Alternatives 1C and 6C	690	291	11,124	909	13,014	466	165	2,380	160	3,170	16,184	3.16%
Alternative 2A[a]	133	330	3,473	1,056	4,992	131	13	1,634	48	1,826	6,818	1.33%
Alternative 2B[a]	473	530	15,833	2,032	18,868	89	61	2,282	236	2,669	21,537	4.20%
Alternative 2C	690	291	11,127	912	13,019	466	165	2,380	160	3,170	16,189	3.16%
Alternative 3	124	330	3,331	1,053	4,838	59	11	863	20	953	5,791	1.13%
Alternative 4	197	158	4,281	339	4,975	237	70	955	53	1,315	6,290	1.23%
Alternative 5	124	330	3,267	1,049	4,770	59	11	747	17	833	5,603	1.09%
Alternatives 7 and 8	111	330	3,388	1,054	4,883	64	13	979	48	1,105	5,987	1.17%
Alternative 9	41	307	2,104	7	2,459	97	71	388	3	559	3,018	0.59%

[a] Assumes Intakes 1–3, 6, and 7; otherwise, effects would be the same as Alternatives 1A and 1B, respectively.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Physical structures associated with construction of water conveyance facilities and borrow, spoils, and RTM areas would occupy agricultural lands designated as Important Farmland, directly precluding future agricultural use. The facilities associated with this alternative could convert approximately 4,984 acres of Important Farmland to project uses, including 3,427 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,054 acres of Unique Farmland, and 173 acres of Farmland of Local Importance.

Of these acres of Important Farmland, the forebays constructed under this alternative would, together, convert more than 1,600 acres to nonagricultural uses. The intermediate forebay would be located south of Hood, between the Sacramento River and South Stone Lake. The Byron Tract Forebay would be located adjacent to, and south of, Clifton Court Forebay. RTM areas would require more than 1,500 acres and would be located adjacent to main tunnel shafts and would be located just north of Scribner Road, east of the Sacramento River, on northern Brannan-Andrus Island, on southeastern Tyler Island, on eastern Bacon Island, and on northwestern Victoria Island. Activities associated with tunneling are likely to occur across multiple years at RTM storage areas. Additional time would then be required for dewatering, chemical characterization, and material storage. However, through implementation of an environmental commitment to reuse the material or dispose of it at appropriate facilities, as described in Appendix 3B, *Environmental Commitments*, it is anticipated that the material would be removed from these areas and applied, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Following removal of material, stockpiled topsoil at RTM storage areas would be reapplied, and disturbed areas will be returned as near as feasible to preconstruction conditions by carefully grading to re-establish surface conditions and reconstructing features such as irrigation and drainage facilities. Over 1,000 acres would be converted to borrow or spoil areas. The largest of these areas would be adjacent to the forebays, and a third would be located between Intakes 1 and 2. Mapbook Figure M14-1 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary or short-term construction activities related to building the physical components of Alternative 1A would directly convert land subject to Williamson Act contracts or in Farmland Security Zones. This alternative could convert approximately 787 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Much of the land subject to Williamson Act contracts or in Farmland Security Zones is also considered Important Farmland. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 190 acres near the east bank of the Sacramento River between Freeport and Courtland. Barge unloading facilities would require short-term conversion of approximately 100 acres and would be located on northern Upper Andrus Island, southern Tyler Island, southwest Venice Island, northeast Bacon Island, southern Woodward Island, and northeast Victoria Island. Other temporary work areas, including those necessary for the construction of tunnels and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-2 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Physical components of Alternative 1A would directly and permanently convert land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses. This alternative could convert approximately 2,857 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, RTM areas would require more than 1,500 acres and would be located adjacent to main tunnel shafts and would be located just north of Scribner Road, east of the Sacramento River, on northern Brannan-Andrus Island, on southeastern Tyler Island, on eastern Bacon Island, and on northwestern Victoria Island. While these are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described above and in Appendix 3B, *Environmental Commitments*. Over 500 acres would be converted to borrow or spoil areas. The largest of these areas would be adjacent to the forebays, and a third would be located between Intakes 1 and 2. The forebays constructed under this alternative would, together, convert approximately 280 acres to nonagricultural uses. The intermediate forebay would be located south of Hood, between the Sacramento River and South Stone Lake. The Byron Tract Forebay would be located adjacent to, and south of, Clifton Court Forebay. Mapbook Figure M14-2 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Table 14-9. Estimated Conversion of Williamson Act and Farmland Security Zone Farmland as a Result of Construction of Water Conveyance Facilities (acres)

	Permanent Surface Impacts			Temporary and Short-term Surface Impacts				
Alternative(s)	Farmland Security Zone	Other Williamson Act	Subtotal	Farmland Security Zone	Other Williamson Act	Subtotal	Grand Total	Percent of Total in Study Area
Alternatives 1A and 6A	643	2,215	2,857	77	710	787	3,645	0.84%
Alternatives 1B and 6B	3,788	10,292	14,080	233	1,093	1,326	15,406	3.57%
Alternatives 1C and 6C		7,647	7,647		1,243	1,243	8,890	2.06%
Alternative 2A[a]	643	2,267	2,910	77	1,195	1,272	4,182	0.97%
Alternative 2B[a]	3,788	10,337	14,125	233	1,644	1,877	16,003	3.71%
Alternative 2C		7,646	7,646		1,243	1,243	8,890	2.06%
Alternative 3	643	2,170	2,813	77	645	722	3,536	0.82%
Alternative 4	19	3,061	3,080	115	722	837	3,917	0.91%
Alternative 5	643	2,110	2,753	77	554	632	3,385	0.78%
Alternatives 7 and 8	643	2,204	2,847	77	667	744	3,592	0.83%
Alternative 9	919	1,428	2,347	132	659	790	3,137	0.73%

[a] Assumes Intakes 1–3, 6, and 7; otherwise, effects would be similar to 1A and 1B, respectively.

NEPA Effects: The temporary and short-term and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Mitigation Measure AG-1 would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 1,329 acres of Important Farmland and 787 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,984 acres of Important Farmland and 2,857 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. As described above and in Appendix 3B, *Environmental Commitments*, it is anticipated that the RTM would be removed from RTM storage areas (which represent a substantial portion of the permanent impact areas) and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Because these activities would convert a substantial amount of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, however, they are considered significant impacts on the environment. Implementation of Mitigation Measure AG-1 would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued

agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

The BDCP proponents shall develop Agricultural Lands Stewardship Plans (ALSPs) (i) prior to the commencement of any construction activities or other physical activities associated with Conservation Measure 1 that would involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones, and (ii) as part of the site-specific environmental review for all other conservation measures or other site-specific project activities that could involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones. For each conservation measure or site-specific project activity other than Conservation Measure 1 that would cause such effects, a draft ALSP shall be included with any publicly circulated environmental document for the proposed conservation measure or project activity in order to obtain public input. The Plans shall contain the three elements identified below for this measure. If a programmatic ALSP is developed for the BDCP, parts of the BDCP, the Delta or parts of the Delta, BDCP proponents may rely on these plans to the extent that they include all the elements in this measure.

Mitigation Measure AG-1a: Promote Agricultural Productivity of Important Farmland

The BDCP proponents shall ensure that the following measures are implemented to reduce adverse effects and/or significant effects as described above if the measures are applicable and feasible. Not all measures listed below may be feasible or applicable to each conservation measure or to individual parts of each conservation measure. Rather, these measures serve as an overlying mitigation framework to be used for mitigation of impacts caused by the implementation of specific conservation measures. The applicability of measures listed below would vary based on the location, timing, nature, and feasibility of each measure.

- Early Planning
  - Describe the current land use in the project area and identify acreage of all land devoted to agricultural use, including farmland of local importance, grazing land, and confined animal agriculture.
  - Describe the extent to which the project can be part of or complement existing or planned land uses for the Delta. For BDCP, this means consulting with county governments, the Delta Protection Commission, the Delta Conservancy and other individuals and organizations that are considering plans or activities designed for agricultural use; flood management; mitigation and enhancement relating to aquatic and terrestrial habitat; recreation; and tourism. This consultation is particularly important when there are multiple uses being considered for one specific area of land, but it is also important to look at how the project affects or fits into other plans for the region or sub-regions where the project is located.
  - Project proponents should consult with farmers, local agencies and other State and federal agencies, including the California Natural Resources Agency, the California Department of Water Resources, the Central Valley Flood Protection Board, the California Department of Conservation, the California Department of Food and Agriculture, the California Department of Fish and Wildlife, the Delta Stewardship Council, the California Delta Protection Commission, the Delta Conservancy, the United States Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Department of Agriculture, including the Natural Resources Conservation Service, to identify design features of the project, if any, that will benefit flood management, agricultural and natural resources.
  - Consider whether the proposed land use is consistent with State, regional and local plans. For the BDCP, this could include local General Plans, the Delta Protection Commission's Land Use and Resource Management Plan and Economic Strategy, the Delta Stewardship Council's Delta Plan, the California Water Plan Agriculture Strategy, the Delta Conservancy Strategy, the California Department of Food and Agriculture's Ag Vision; the California Natural Resources Agency's California Climate Adaptation Plan, and the California Fish and Wildlife Strategic Vision;
  - Consider whether agriculture and/or habitat management activities undertaken pursuant to the proposed land use are consistent with State and local policies relating to flood protection and whether they might provide additional protection because, for example, they (i) provide flood management activities that provide additional protection for agricultural activities or (ii) prevent or divert potential higher groundwater levels that would thwart flood control efforts
- Site Related Avoidance and Mitigation
  - Site projects and project footprints to minimize the permanent conversion of Important Farmland, to nonagricultural uses.
  - When identifying and selecting project areas, give priority to public lands and existing conservation lands.
  - Where choices are possible among or between particular parcels or lands that are available for a project, project proponents should look at the characteristics of the

different parcels or lands to determine whether one choice would be better from an agricultural resource perspective. If choices can be made regarding different locations for a project and still achieve the project purposes, it may be possible to avoid areas that may have more value from an agricultural resources perspective such as whether the property is (1) "high quality" farmland. (2) unique or has special values, (3) important to maintaining viability of agriculture in a certain area, (4) important to maintaining habitat lands in agriculture in a certain area.

  - Manage project operations to minimize the introduction of invasive species or weeds that may affect agricultural production on adjacent agricultural land.

- Mitigate on Site
  - Design projects so as to optimize contiguous parcels of agricultural land of a size sufficient to support their efficient use for continued agricultural production.
  - Where the construction or operation of a facility could limit access to ongoing agricultural operations, maintain a means of convenient access to these agricultural properties as part of project design, construction, and implementation.
  - At borrow sites to be returned to agricultural production, remove and stockpile, at a minimum, the upper 2 feet of topsoil and replace the topsoil after project completion as part of borrow site reclamation.
  - In areas permanently disturbed by project activities, and where topsoil is removed as part of project construction (e.g., stripping topsoil under a levee foundation) and not reused as part of the project, make the topsoil available to less productive agricultural lands that could benefit from the introduction of good-quality soil.
  - Relocate and/or replace wells, pipelines, power lines, drainage systems, and other infrastructure that are needed for ongoing agricultural uses and would be adversely affected by project construction or operation.
  - Minimize disturbance of Important Farmland and continuing agricultural operations during construction by (1) locating construction laydown and staging areas on sites that are fallow, already developed or disturbed, or are to be discontinued for use as agricultural land and (2) using existing roads to access construction areas.
  - Consult with landowners and agricultural operators to develop appropriate construction practices to minimize construction-related impairment of agricultural productivity. Practices may include coordinating the movement of heavy equipment and implementing traffic control measures.
  - Consult with landowners and agricultural operators with the goal of sustaining existing agricultural operations, at the landowners' discretion, until the individual agricultural parcels are needed for project construction.
- Consult with landowners and agricultural operators on what role they can take if they wish be involved in project development. Issues to consider include whether:
  - Owner(s) or operator(s) could carry out project activities on their land. To the extent that Important Farmland is part of the project, consideration should be given to providing flexibility to the farmer. To the extent that Important Farmland is part of the

project, consideration should also be given to developing working landscapes[5] on project lands

- Some or all of the ownership interests on any project land could remain in private hands or in the hands of a private conservancy in order to keep the property in nongovernmental ownership and thereby on the County tax base;
- Owner(s) and/or operator(s) of land displaced by project facilities and activities could maintain or obtain full or partial ownership of the land on which project activities will be carried out or could be compensated to manage said land;
- Existing agricultural operations on lands could be modified, through such things as crop change, new integrated pest management strategies, altered water usage, or full or partial conversion to habitat uses, in a manner that renders such operations consistent with the goals and objectives of the project by enhancing environmental outcomes in a manner beneficial to species covered by the project;
- Limited agriculture could take place within areas identified for habitat restoration under the project without undermining the achievement of the project goals and objectives;
- Subsidies to allow economically viable rice farming on particular lands could be justified due to the environmental benefits of such rice farming such as the stabilization of subsiding areas or the creation of sinks for greenhouse gases and methylmercury;
- Subsidies to assist the owner(s) and/or operator(s) to make a viable living managing wetlands or other habitat areas could be justified due to the environmental benefits of wetlands or habitat such as the stabilization of subsiding areas or the safer accumulation and isolation of greenhouse gases and methylmercury;

- Implementation
  - The plans should include a framework that encourages adaptive management with regard to agricultural land management.
  - The plans should include reporting and monitoring actions necessary to show that the actions agreed to were being carried out.

[5] The Cal-Fed Working Landscapes Subcommittee of the Bay Delta Public Advisory Committee defined a working landscape as "*a place where agriculture and other natural resource-based economic endeavors are conducted with the objective of maintaining the viability and integrity of its commercial and environmental values. On a working landscape, both private production, as well as public regulatory decisions account for the sustainability of families, businesses and communities, while protecting and enhancing the landscape's ecological health. The working landscape is readily adaptable to change according to economic and ecosystem needs. With respect to CALFED, a working landscape is both an objective and a means to achieve it. A working landscape is efficiently managed largely by private agricultural landowners and managers who are supported and encouraged to manage their lands in ways that fulfill CALFED goals, allowing them to pursue ecological health goals while yielding economic returns on investments, and generating tax revenues that support their local governments"* (California Bay-Delta Public Advisory Committee 2002).

Mitigation Measure AG-1b: Minimize Impacts on Land Subject to Williamson Act Contracts or in Farmland Security Zones

The BDCP proponents shall ensure that the following measures are implemented as applicable to reduce effects and preserve agricultural uses on land subject to Williamson Act contracts or in Farmland Security Zones.

- The BDCP proponents shall comply with applicable provisions of California Government Code Sections 51290–51295 with regard to acquiring land subject to Williamson Act contracts. Sections 51290(a) and 51290(b) specify that State policy, consistent with the purpose of the Williamson Act to preserve and protect agricultural land, is to avoid locating public improvements and any public utilities improvements in agricultural preserves, whenever feasible. If it is infeasible to locate such improvements outside of a preserve, they shall be located on land that is not under contract, if feasible.
- More specifically, the BDCP proponents shall comply with the following basic requirements stated in the California Government Code.
    - Whenever it appears that land within a preserve or under contract may be required for a public improvement, the DOC and the city or county responsible for administering the preserve must be notified (Section 51291(b)).
    - Within 30 days of being notified, DOC and the city or county must forward comments, which will be considered by the proponents of the public improvement (Section 51291(b)).
    - A public improvement generally may not be located within an agricultural preserve unless the BDCP proponents make findings to the effect that (1) the location is not based primarily on the lower cost of acquiring land in an agricultural preserve and (2) for agricultural land covered under a contract for any public improvement, no other land exists within or outside the preserve where it is reasonably feasible to locate the public improvement (Sections 51921(a) and 51921(b)). Findings do not need be made if the action falls within one of the exemptions in Section 51293. The contract is normally terminated when land is acquired by eminent domain or in lieu of eminent domain (Section 51295).
    - DOC must be notified within 10 working days upon completion of the acquisition (Section 51291(c)).
    - DOC and the city or county must be notified before completion of any proposed work of any significant changes related to the public improvement (Section 51291(d)).
    - If, after acquisition, the acquiring public agency determines that the property would not be used for the proposed public improvement, DOC and the city or county administering the involved preserve must be notified before the land is returned to private ownership. The land will be reenrolled in a new contract or encumbered by an enforceable restriction at least as restrictive as that provided by the Williamson Act (Section 51295).
    - Work with the county where Williamson Act land is located to expand Williamson Act authorized uses to include open space/habitat lands in Williamson Act Preserves.

Mitigation Measure AG-1c: Consideration of an Optional Agricultural Land Stewardship Approach or Conventional Mitigation Approach

Where project proponents have determined that compliance with Mitigation Measures AG-1a and AG-1b is not sufficient to mitigate to a less than significant or adverse level the impacts from the conversion of Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, they shall undertake additional feasible mitigation pursuant to this measure (AG-1c).

Exceptions to this requirement shall apply where the mitigation already being required for the biological resource values for the land at issue (e.g., for its value as habitat for Swainson's hawk) pursuant to the cultivated lands natural community strategy of Conservation Measure 3 already requires the equivalent of 1:1 mitigation (based on the net area of land remaining in agriculture) for impacts to Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, provided that the easements for biological values also incorporate agricultural preservation.

The BDCP proponents shall determine the nature and form of any necessary additional mitigation after consultation with, at least, all of the following: (i) the County in which the affected property is located; (ii) the owner(s) and/or operator(s) of said property; (iii) the California Natural Resources Agency; (iv) the California Department of Water Resources; (v) the Central Valley Flood Protection Board; (vi) the California Department of Conservation; (vii) the California Department of Food and Agriculture; (viii) the California Department of Fish and Wildlife; (ix) the Delta Stewardship Council; (x) the California Delta Protection Commission; and (xi) the Delta Conservancy; (xii) the United States Fish and Wildlife Service; (xiii) the National Marine Fisheries Service; and (xiv) the U.S. Department of Agriculture, including the Natural Resources Conservation Service. After consulting with these agencies, entities, and/or individuals, the BDCP proponents shall determine whether or not, under the circumstances surrounding the conversion of particular agricultural lands, the best overall approach to the additional required mitigation is the conventional use of agricultural land conservation property interests (see discussion below on Conventional Mitigation Approach). In making this determination, the BDCP proponents shall give considerable weight to the willingness of the County in which the affected property is located and the owner(s) and/or operator(s) of said property to participate in an Optional Agricultural Land Stewardship Approach, which would seek opportunities to protect and enhance agriculture in the Delta as part of the project landscape and focus on maintaining economic activity on agricultural lands instead or in conjunction with the Conventional Mitigation Approach for purposes of CEQA/NEPA mitigation. Where the County and the owner(s) and/or operator(s) have a preference for participating in an Optional Agricultural Land Stewardship Approach, the BDCP proponents shall attempt to develop a feasible Optional Agricultural Land Stewardship alternative mitigation program acceptable not only to the County and the owner(s) and/or operator(s), but also to the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and the National Marine Fisheries Service. Where the BDCP proponents, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they shall undertake instead a Conventional Mitigation Approach, where necessary and feasible, based on the use of agricultural conservation property interests or other measures requiring the preservation or, enhancement of other land of similar agricultural quality in areas that are threatened with encroaching urban development.

Specific strategies that could be used in formulating an Optional Agricultural Land Stewardship Approach are described in Appendix 14B, *Agricultural Land Stewardship Strategies*. In determining the potential nature and form of an Optional Agricultural Land Stewardship Approach, the BDCP proponents shall, at a minimum, consider the following, as applicable:

- whether there is Important Farmland in the Delta reasonably accessible to the BDCP proponents and/or to the owner(s) and/or operators for use for agriculture and/or habitat management in a manner consistent with the goals and objectives of the BDCP;
- whether there is Important Farmland that might not remain in agriculture if it was not protected by means of an agricultural conservation property interest because of threats of urban development (e.g. in the secondary zone in the Delta) or wind/solar and other non-renewable energy projects, or the productive value of which is so high, it should remain in agriculture instead of being used for restoration or other open-space projects because, for example, it is:
    - unique or has special values
    - important to maintaining viability of agriculture in the region
    - critical to prevent a "tipping" point that could lead to elimination of a crop in the region
    - important to maintaining habitat lands in agriculture in the region
- whether Agricultural Land Stewardship Strategies[6] benefit agricultural lands by providing feasible CEQA/NEPA mitigation (or providing funding for such mitigation) for potential significant environmental agricultural impacts at both the farm and the regional level. In determining whether the funds necessary to make an Optional Agricultural Land Stewardship Approach feasible are available, the BDCP proponents shall be guided by the principle that funds that might otherwise be used for off-site preservation or another form of compensation may be made available instead to assist with making the Optional Agricultural Land Stewardship Approach work. Such strategies could include:
    - Potential strategies to help maintain farming in the Delta
        - Improve flood protection (Strategy 1)
        - Provide technical and financial assistance to help farmers maintain or improve agricultural production (Strategy 2)
        - Provide technical and financial assistance to help farmers comply with regulatory requirements for water quality (Strategy 3)
        - Control terrestrial weeds (Strategies 6a, 6b, and 6c)
        - Reduce conflict between agriculture and nearby habitat lands by creating a "good neighbor" policy (Strategy 7)
        - Work with other interests to explore the value of reinstating state funding of Williamson Act subventions (Strategy 8)

[6] Strategies developed so far, and other materials relating to their development and implementation, can be found at https://bdcpdfl.water.ca.gov/home. These are given as examples to consider at this time. It is expected that existing strategies will evolve and change over time and that additional strategies will be developed.

- Work with counties to expand Williamson Act authorized uses to include open space/habitat lands in Williamson Act Preserves (Strategy 9)
- Investigate options for *in lieu* tax revenue for counties and payments for local districts (Strategy 10)
- Provide for Agricultural Conservation Easements (Strategy 11)

- Potential strategies that provide incentives for conservation on farmland
  - Partner with others to maintain and enhance environmental quality on farmland (Strategy 12)
  - Compensate farmers to manage agricultural land as habitat for wildlife (Strategy 13)
  - Provide incentives for farmers to take part in a market-based conservation program (Strategy 14)
- Potential strategies to manage land for purposes other than conventional crop production
  - Provide technical and financial assistance to stabilize or reverse land subsidence on Delta island (Strategy 15)
  - Assist landowners to produce and sell greenhouse gas offset credits in the AB 32 Cap-and-Trade program (Strategy 16)
  - Compensate farmers to manage habitat lands (Strategy 17)
  - Designate carbon sequestration and subsidence reversal crops as agricultural production for regulatory and incentive programs (Strategy 18)
- Potential strategies that provide for economic development and other benefits
  - Provide technical and financial assistance to develop an economic study of agricultural activity and related infrastructure (Strategy 19)
  - Provide technical and financial assistance for to promote economic development (Strategy 20)
  - Provide technical and financial assistance to promote transportation infrastructure improvements (Strategy 21)
  - Provide technical assistance to farmers to help in complying with the regulatory framework present in the Delta (Strategy 22)
  - Provide technical, risk reduction, promotion, and financial assistance for farmers to manage land to incorporate recreation and tourism (Strategy 23)
  - Work with others to better align the regulatory system to help farmers who engage in ecological restoration and enhancement projects (Strategy 24)
  - Develop Agricultural Land Stewardship Plans (Strategy 25)

- In addition, the BDCP proponents shall explore the following funding sources to implement strategies that are in addition to those required under CEQA/NEPA in order to maintain agriculture In the Delta. These strategies include those listed above for CEQA/NEPA mitigation.

- Work with the California Air Resources Board (CARB) to establish a greenhouse gas offset market using credits created through the development and restoration of wetlands.
- Seek available funding from CARB's "Cap and Trade" program developed pursuant to the Global Warming Act Solutions Act of 2006 (AB 32).
- Work with others to explore the value of reinstating state funding for Williamson Act subventions from Cap and Trade Funding or other sources
- Consider recommending to the Governor and Legislature that funds for be included in any bond measure(s) placed on the statewide ballot (e.g. the Delta Investment Fund authorized by the Delta Reform Act).
- Work with other governmental and private entities to identify other funds that can be used for the Optional Agricultural Land Stewardship Approach.

Strategy for implementing a Conventional Mitigation Approach. Where the BDCP proponents, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they shall undertake instead, where necessary and feasible, a Conventional Mitigation Approach based on the purchase of property interests in agricultural lands (e.g., conservation easements) or other compensation arrangements (collectively referred to hereinafter as "agricultural conservation property interests"), requiring the preservation and/or enhancement of other land of similar agricultural quality. The standard ratio for purchase of agricultural conservation property interests to mitigate for permanently converted Important Farmland not included, as discussed above, as part of mitigation for biological resources, shall be at a ratio of 1:1 for similar types of Important Farmland.

Where feasible, mitigation shall generally result in the purchase of agricultural conservation property interests, such as easements on other agricultural lands of the same overall quality and acreage either directly or indirectly. The two preferred forms of mitigation in this context shall be (i) the inclusion of sufficient acreages within agricultural preserves within BDCP lands to satisfy CEQA and NEPA agricultural resource mitigation in addition to meeting BDCP objectives under the Endangered Species Act and California's Natural Community Conservation Planning Act and (ii) reliance on the California Farmland Conservancy Program or on other established programs in the Delta supported by the county where the project is located, the Delta Stewardship Council, the Delta Planning Commission, or the Delta Conservancy. Where the BDCP proponents choose to rely on the latter strategy, they shall confirm, prior to submitting funds into any program both (a) that the program meets the standards under CEQA case law for a "reasonable mitigation plan" and (b) that they can spend the funds at issue for the preservation and, where appropriate, the enhancement, of land that is reasonably proximate to the land being impacted and of a similar quality or extent. Where these two preferred options are unavailable or infeasible, the BDCP proponents shall be responsible for purchasing agricultural conservation property interests on their own.

Where feasible, agricultural land conservation interests should be acquired in the county in which the conversion will take place, provided that any such land either would be at-risk for conversion from agricultural uses in the absence of such long-term protection, unless such purchases would undermine the overall BDCP conservation strategy by potentially putting off-limits lands that may be needed for habitat purposes during the permit duration of the BDCP

(i.e., up until 2060), or is not necessary for other habitat conservation plans. Thus, acquisition of such agricultural land conservation interests cannot be located in areas targeted for habitat restoration if doing so would thwart implementation of the long-term habitat restoration objectives of the BDCP.

Where a property identified for purchase of an agricultural land conservation interest serves non-agricultural purposes such as providing wildlife habitat or flood control or flood management benefits, the terms of the agricultural land conservation interest shall require the farm operator to continue to use the property in a manner that preserves these benefits (e.g., by continuing to support certain crop types known to provide, or be consistent with, such benefits) unless similar benefits are provided through some other means. The value of the agricultural land conservation interest would need to take such limitations on agricultural practices into account.

Where Important Farmland of the same caliber as the Important Farmland being converted is not available within the county in which the conversion will take place, the agricultural land conservation interest may occur in another county, with a preference for counties within the greater Sacramento metropolitan area, as long as the property to be purchased or encumbered is at-risk for conversion from agricultural uses to developed uses from encroaching urban development in the absence of such long-term protection, and as long as such purchase does not undermine the overall BDCP conservation strategy by potentially putting off-limits lands that may be needed for habitat purposes during the permit duration of the BDCP (i.e., up until 2060).

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. Localized effects related to dewatering activities in the vicinity of intake pump stations and the Byron Tract Forebay would temporarily lower groundwater levels by up to 10 feet and 20 feet, respectively. The pumping plants would be located just east of the Sacramento River, south of Freeport and north of Courtland. The Byron Tract Forebay would be adjacent and south of Clifton Court Forebay. Groundwater would return to pre-pumping levels over the course of several months. During long-term operations of the water conveyance, increases in the groundwater level of 10 feet or more could also occur in the vicinity of the intermediate and Byron Tract Forebays in the absence of design features to minimize seepage, due to groundwater recharge from these facilities (the intermediate forebay would be located south of Hood and west of South Stone Lake). However, the intermediate and Byron Tract Forebays would be constructed to comply with the requirements of the Division of Safety of Dams (DSD) which includes design provisions to minimize seepage. These design provisions would minimize seepage under the embankments and onto adjacent properties. Once constructed and placed in operation, the operation of the forebays would be monitored to ensure seepage does not exceed performance requirements. In the event seepage were to exceed these performance requirements, the BDCP proponents would modify the embankments or construct seepage collection systems that would ensure any seepage from the forebays would be collected and conveyed back to the forebay or other suitable disposal site. However, operation of Alternative 1A would result in local changes in groundwater flow patterns adjacent to the intermediate and Byron

Tract Forebays, where groundwater recharge from surface water would result in groundwater level increases. If agricultural drainage systems adjacent to these forebays are not adequate to accommodate the additional drainage requirements, operation of the forebays could interfere with agricultural drainage. Areas in which crop roots are exposed to a surplus of water could result in root rot, compromising the viability of certain crops, particularly those with deep roots (Refer to Section 14.1, *Environmental Setting/Affected Environment,* for root depths by crop type). These effects could prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 1A, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, operation of the water conveyance facility would generally result in fewer days when water at compliance locations relevant to agriculture would exceed or be out of compliance with electrical conductivity objectives. In these areas, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. There are three exceptions to this anticipated result. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 27%. Further, the percent of days out of compliance at Emmaton would increase from 11% under Existing Conditions to 39% under Alternative 1A. The San Andreas Landing objective in the interior Delta would increase from 1% to 2% of days in exceedance, and from 1% to 5% of days out of compliance with the EC objective. At Brandt Bridge in the Southern Delta, the increase in the percent of days of EC objective exceedance and days out of compliance would be less than 1%. Average EC levels would decrease at western and southern Delta compliance locations, except at Emmaton in the western Delta, and would increase at the two interior Delta compliance locations. At Emmaton, average EC would increase 16% for both the entire period modeled and the drought period modeled. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 4% and the San Joaquin River at San Andreas Landing average EC would increase 12% to 0.444 dS/m. Modeling of drought years estimates EC reaching as high as 1.675 dS/m at the Emmaton compliance location. These results suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. However, it is anticipated that agricultural activities could continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.2, Impact WQ-11 and Appendix 8H, Tables EC-1 and EC-12.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 38 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural

activities on the affected land. Thus, where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

In addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP, as set forth in EIR/EIS Appendix 3B, *Environmental Commitments*, a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Potential options for making use of this financial commitment include funding or providing other assistance towards acquiring alternative water supplies or towards modifying existing operations when levels of electrical conductivity at a particular location reduce opportunities to operate existing water supply diversion facilities. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-6: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Conversion of Important Farmland as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

While locations have not been selected, implementation of conservation measures for habitat restoration and channel margin habitat enhancement would likely occupy existing state-recognized Important Farmland, directly precluding agricultural use. Construction activities for the conservation measures associated with this alternative may also result in temporary conversion of Important Farmland.

Alternative 1A would restore approximately 83,800 acres under conservation measures geared toward the restoration of tidal wetland habitat (CM4), seasonally-inundated floodplain (CM5), riparian habitat (CM7), grassland communities (CM8), vernal pool complex habitat (CM9), and nontidal marsh areas (CM10). Additionally, 20 linear miles of channel margin habitat would be enhanced (CM6). Under this measure, setback levees could potentially encroach upon Important Farmland. Additionally, earthwork activities associated with restoration activities could remove land from agricultural production. To maintain these areas, access roads and other facilities may also be necessary. Implementation of these restoration activities would occur in phases over the 50-year permit period, as summarized in Table 3-4 in Chapter 3, *Description of the Alternatives*. Additionally, in selecting sites for seasonally-inundated floodplain restoration under CM5, compatibility with ongoing agricultural uses would be considered and agricultural production could continue on acquired lands so long as agricultural practices are compatible with the primary goal of

restoring habitat for covered fish and wildlife species (see Chapter 3, Section 3.4.5.3.2 of the BDCP for further detail).

Physical construction of facilities associated with other conservation measures may also occupy small areas of Important Farmland. For instance, installation of non-physical fish barriers may require an access road or storage facility on land under one of the Important Farmland designations. However, the effects of these measures on Important Farmland are anticipated to be minor, particularly when compared with the larger restoration actions described above.

Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the Conservation Zones designated as Important Farmland, it is anticipated that a substantial area of Important Farmland would be directly converted to habitat under this alternative.

Conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Conservation areas associated with the project would occupy land subject to Williamson Act contracts or in Farmland Security Zones, leading to the potential cancellation of existing contracts and the direct conversion of agricultural land to other uses.

As described above, Alternative 1A would restore approximately 83,800 acres under conservation measures intended to restore various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Under *CM6 Channel Margin Enhancement*, setback levees could potentially encroach on land subject to Williamson Act contracts or in Farmland Security Zones. Associated earthwork activities could also conflict with lands subject to contracts. To maintain these areas, access roads and other facilities may also be necessary.

Because locations have not been selected for these activities, the extent of this effect is unknown. However, based on the large proportion of the land in Conservation Zones that is subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that this alternative would convert a substantial area of land subject to Williamson Act contracts or in Farmland Security Zones.

Physical construction of facilities associated with other conservation measures may also occupy small areas of land subject to Williamson Act contracts or in Farmland Security Zones. For example, construction or expansion of a conservation fish hatchery under CM18 could potentially conflict with Williamson Act contracts. Similar effects may arise from conservation measures that would install non-physical fish barriers. However, the effects of these measures on land subject to Williamson Act contracts or in Farmland Security Zones are anticipated to be minor, particularly when compared with the larger restoration actions described above.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes under this alternative, resulting in an adverse effect on the environment. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measure AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of

Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area. Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation

on adjacent lands. Areas in which crop roots are exposed to a surplus of water could result in root rot, compromising the viability of certain crops, particularly those with deep roots (Refer to Section 14.1, *Environmental Setting/Affected Environment,* for root depths by crop type). Conversely, in areas where the project results in a larger vertical distance between the water table and crop roots, plants with shallow roots may not be able to extract enough water to maintain optimal growth without modifying irrigation or drainage infrastructure. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they would be anticipated to create an adverse effect on agricultural resources if they were to substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses within the study area.

Implementation of CM4 would increase the exchange of tidal water in restoration areas; however, consideration of this measure and its potential effects on electrical conductivity in the Delta has been incorporated in the assessment of CM1 under Impact AG-2.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Implementation of *CM21 Nonproject Diversions*, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. In particular, CM21 would fund programs to modify, remove, or consolidate diversions that serve as supplies of irrigation water within the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Restoration areas implemented under Alternative 1A would result in substantial changes in land use patterns in parts of the study area, which could indirectly affect some farmlands by causing changes to the microclimates surrounding sensitive agricultural crops. For example, large areas of tidal habitat could create a localized climate that would be less supportive of yields of certain crops adjacent to the areas. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass undertaken as part of Alternative 1A would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation. *CM2 Yolo Bypass Fisheries Enhancement*, which this EIR/EIS addresses at a program level, will require the preparation and implementation of a Yolo Bypass Fishery Enhancement Plan (YBFEP). The YBFEP would propose a number of actions, which would include modifications to Fremont Weir to manage timing, frequency, and duration of inundation of the Yolo Bypass. Modifications of Fremont Weir would include installing and operating a gated channel to inundate the floodplain to support covered fish species, primarily from mid-November through April. Opening these gates would result in inundation of the Yolo Bypass. Target inundation footprints would be up to 10,000

acres between November 10 and November 30. Between December 1 and February 28, operations would target up to 17,000 acres of inundation. Between March 1 and May 15, the target inundation area would return to a range of 7,000–10,000 acres. These operations are expected to be typical of, but not necessarily identical to, actual operational guidelines that would be developed in the course of subsequent project-specific design, planning, and environmental documentation.

Although this area currently experiences periodic inundation within the same footprint, if inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Table 14-10 shows typical crop production practices in the Yolo Bypass. After the flow ceases, it may take as many as four weeks for the waters to recede and for the land to dry sufficiently to start farming. While there is disagreement surrounding the time periods necessary to prepare land and for the Bypass to dry out, for this analysis, a four-week period is used as the amount of time required between the end of water inundation and the point when ground preparation activities can begin. Based on the agricultural practices outlined in Table 14-10, the anticipated dates at which inundation must end to allow planting to be completed are also presented.

As shown in Table 14-10, if the duration of inundation events extends beyond March 1, March 15, April 1, and April 15, the growing season for tomato; safflower; and corn and rice; and Sudan grass could be delayed. This delay may reduce the growing season to the point of changing crop yield and/or quality, or result in fallowing of agricultural land or the growing of less profitable crops on impacted farmlands. Depending on the frequency and duration of inundation events, crop selection may be constrained. However, short of substantially restricting agricultural use of land, these effects would be considered economic, rather than environmental, in nature. Conservation easements or fee-title acquisition would be required for all inundation on agricultural land.

The *Yolo Bypass Flood Date and Flow Volume Agricultural Impact Analysis*, a report created for Yolo County (Howitt et al. 2012), assesses the agricultural and economic impacts from BDCP-proposed flooding scenarios in the Yolo Bypass, including CM2. The CM2 scenario would only impose water flows through an operable gate at Fremont Weir for an additional 30 days in years when there is natural flooding (see Chapter 3, *Description of Alternatives,* Section 3.6.2, for further description of CM2). Minimal loss of irrigated acres is expected in the CM2 scenario, but losses are anticipated to occur in years when there is natural flooding. The largest losses would be anticipated during years when natural overtopping occurs late into the season. CM2 proposes an additional 30 days of flooding, through the middle of April, which is expected to result in crop yield losses and an increase in fallow acres, as well as agricultural revenue losses.

As farmers delay planting, crop yields decline, which leads to lower revenues and land fallowing. The report identified 9 major crop groups in areas affected by flooding in the Bypass: corn, irrigated pasture, non-irrigated pasture, rice, wild rice, safflower, sunflower, processing tomatoes, and vines (melons). Further discussion of socioeconomic effects of CM2 on agriculture can be found in Chapter 16, *Socioeconomics*, Impact ECON-16 and Impact ECON-18.

Table 14-10. Typical Crop Production Practices in Yolo Bypass

Crop	Ground Preparation	Planting	Harvest	Other	Plant By Date	End Inundation Date[c]
Corn[a]	March–April	April–May	Sept–Oct		June 1	April 1
Pasture[a]				Winter range feeding: Nov–Apr Summer Feeding: May–Oct Breeding: Dec–Feb		
Rice (wild/white)[a]	April–May	April–May	Sept–Nov		June 1	April 1
Safflower[a]	Aug–Oct (during year preceding planting)	Mar–May	Jul–Sept		May 15	March 15
Sudan Grass[b]	April–May	May–July	July–August		June 15	April 15
Tomato[a]	Mar–April	April–May	June–Sept		May 1	March 1

Sources: Crop production practices, all crops except Sudan grass: California Department of Fish and Game and Yolo Basin Foundation 2008.; Sudan grass production practices: U.C. Cooperative Extension 2009.

[a] These data are based on the 2004 Crop Year, which was considered relatively normal year with regard to flooding in the Bypass. There was some mid-winter inundation which receded and did not dramatically impact production.

[b] Data concerning Sudan grass is based on growing cultivation and cycles in South San Joaquin County. Growing conditions and crop cycles in the Yolo Bypass vary from these patterns. Different practices may result.

[c] Table assumes 4 weeks for Bypass to dry out and 4 weeks for ground preparation.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Mitigation Measure AG-1 is available to mitigate this effect.

Additionally, some benefits could result from an increased presence of water. An increase in potential groundwater recharge could raise the groundwater table to within the root zone of some crops (Section 14.1.1.6, *General Crop Production Practices and Characteristics*, discusses of the relationship between crop viability and groundwater table levels). This could also be a beneficial effect in parts of Yolo and Solano Counties that utilize groundwater from the aquifers underneath the Yolo Bypass.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Under the cultivated lands natural community goal and objectives of BDCP *CM3 Natural Communities Protection and Restoration*, the project proponents would acquire and protect approximately 48,100 acres of nonrice cultivated lands and manage them for specific habitat values corollary to agricultural use for species including Swainson's hawk, giant garter snake, greater

sandhill crane, white-tailed kite, and tricolored blackbird. Additionally, 3,500 acres of rice lands or similarly functioning habitat would be maintained annually for giant garter snake in Conservation Zones 4 and/or 5. Because crop selection is dynamic and predominantly influenced by economic forces, the acquisition approach for these goals would allow for a combination of permanent easements, agreements with other agencies, fee-title acquisition, and other methods, to ensure that habitat target acreages are consistently satisfied across the Plan Area. Management activities would maintain existing small patches of riparian woodland and scrub, wetlands, ponds, hedgerows, tree rows, and isolated native or nonnative trees. While these conservation measures would protect agricultural uses on the majority of these lands, specific management actions implemented under *CM11 Natural Communities Enhancement and Management* could reduce crop yields, restrict crop choices, and convert small portions of cultivated lands to nonagricultural uses. Where feasible, tilling would be deferred or some lands left unharvested to increase the amount of forage available to sandhill cranes. Shallow flooding of some lands during fall and winter months may also be adopted to support cranes and other species. While implementation of CM3 would protect agricultural uses on more than 48,000 acres of land, management actions under CM11 could directly convert small portions of this land to nonagricultural uses such as grassland edges or woodlots. Management techniques could also result in crop yield reductions following the minimization or cessation of pesticide use on acquired lands, as many agricultural operators are currently able to apply pesticides in a manner that causes such substances to "drift" onto neighboring properties. However, the agricultural use of this land would be preserved and any further restrictions on the continued agricultural use of the land are unlikely to be substantial.

Other conservation measures related to habitat restoration and enhancement could also indirectly affect agricultural production or management practices. For example, restored habitat areas adjacent to agricultural lands could increase crop predation by birds and could introduce invasive species onto agricultural lands, reducing yields and associated production value. A related concern is the introduction of a covered species into a new area, which may require adjustments to agricultural management practices or the initiation of Safe Harbor Agreements. Finally, other "important related actions" identified by the BDCP could further limit pesticide and herbicide discharge in the Plan Area, possibly leading to other reductions in crop yield or increases in operating costs. These effects would be considered primarily economic in nature.

Beneficial effects could result from efforts to control nonnative aquatic vegetation under *CM13 Invasive Aquatic Vegetation Control* and limit the spread of invasive species under *CM20 Recreational Users Invasive Species Program*. If successful, these measures could limit the spread of weeds and pests, while keeping irrigation infrastructure free from aquatic vegetation.

While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes, even though some neighboring operators might no longer be able to conduct operations in a way that causes chemicals to drift onto adjacent properties. Overall, these effects would not be anticipated to result in the substantial restriction of agricultural uses.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these

activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

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

Alternative 1B would result in temporary and short-term effects on agricultural land in the study area associated with construction of five intakes and intake pumping plants, one forebay, pipelines, canals, tunnels, siphons, and an intermediate pumping plant and require development of transmission lines, access roads, and other incidental structures that would result in temporary conversion of agricultural lands to nonagricultural uses. This alternative would differ from Alternative 1A primarily in that it would use a series of canals generally along the east section of the Delta to convey water from north to south, rather than long segments of deep tunnel through the central part of the Delta.

Implementation of Alternative 1B would also result in permanent conversion of agricultural lands associated with the five intakes and intake pumping plants, one forebay, pipelines, canals, tunnels, siphons, and an intermediate pumping plant; soils borrow, spoils, and RTM areas; and transmission line corridors and access roads.

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term construction of water conveyance facilities associated with Alternative 1B would convert existing agricultural land to construction-related uses, directly precluding agricultural use for the duration of construction. This alternative would convert approximately 2,144 acres of Important Farmland to other uses, including 1,769 acres of Prime Farmland, 61 acres of Farmland of Statewide Importance, 214 acres of Unique Farmland, and 99 acres of Farmland of Local Importance.

Of these acres of Important Farmland, siphon work areas would require the temporary or short-term conversion of more than 800 acres. These areas would be adjacent to proposed culvert siphons crossing Stone Lakes Drain, Beaver Slough, Hog Slough, Sycamore Slough, White Slough, Disappointment Slough, a BNSF railroad ROW near Holt, and Middle River. Intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 470 acres near the east bank of the Sacramento River between Freeport and Courtland. Work areas associated with the construction of conveyance pipelines would require approximately 110 acres and would be located primarily between Intake 5 and a canal segment west of South Stone Lake. Other temporary work areas, including those necessary for the construction of tunnel siphons, bridges, and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-3 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Physical structures associated with construction of water conveyance facilities and borrow, spoils, and RTM areas would occupy agricultural lands designated as Important Farmland, directly precluding future agricultural use. The facilities associated with this alternative could convert approximately 18,875 acres of Important Farmland to project uses, including 15,800 acres of Prime Farmland, 530 acres of Farmland of Statewide Importance, 2,031 acres of Unique Farmland, and 513 acres of Farmland of Local Importance.

Of these acres of Important Farmland, areas dedicated to borrow, spoils, or a combination would convert more than 10,500 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest areas identified on Union Island West, Drexler Tract, Rindge Tract, and west of the canal segment immediately south of Intake 5. Nearly 6,500 acres would also be converted to nonagricultural uses to accommodate the canal, which would run south from Intake 1, generally parallel to and two or fewer miles west of Interstate 5 until reaching its southern extent, when it would convey water southwest to the proposed Byron Tract Forebay. The forebay would convert about 650 acres to nonagricultural uses. Areas dedicated to RTM storage

(from tunnel siphons), bridges over the canal, intake pumping plant facilities, and culvert siphons would also require conversion to nonagricultural uses. While RTM storage areas are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described in Appendix 3B, *Environmental Commitments*. Mapbook Figure M14-3 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary or short-term construction activities related to building the physical components of Alternative 1B would directly convert land subject to Williamson Act contracts or in Farmland Security Zones. This alternative could convert approximately 1,326 acres of land subject to Williamson Act contracts, including 233 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, siphon work areas would require the temporary or short-term conversion of nearly 600 acres. These areas would be adjacent to proposed culvert siphons crossing Stone Lakes Drain, Beaver Slough, Hog Slough, Sycamore Slough, White Slough, Disappointment Slough, a BNSF railroad ROW near Holt, and Middle River. Intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 160 acres near the east bank of the Sacramento River between Freeport and Courtland. Work areas associated with the construction of bridges over proposed canal segments would require approximately 170 acres and would be located adjacent to proposed bridges over Scribner Road, Lambert Road, Dierssen Road, Twin Cities Road, West Barber Road, West Walnut Grove Road, West Peltier Road, West Woodbridge Road, State Route 12, North Guard Road, West 8 Mile Road, West McDonald Road, State Route 4, West Bacon Island Road, South Tracy Boulevard, Calpack Road, and Clifton Court Road. Approximately 120 acres would be converted during construction of tunnel siphons crossing Lost Slough/Mokelumne River, San Joaquin River, and Old River. Other temporary work areas, including those necessary for the construction of transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-4 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Physical components of Alternative 1B would directly and permanently convert land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses. This alternative could convert approximately 14,080 acres of land subject to Williamson Act contracts, including 3,788 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, areas dedicated to borrow, spoils, or a combination would convert more than 8,400 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest areas identified on Union Island West, Drexler Tract, Rindge Tract, and west of the canal segment immediately south of Intake 5. Nearly 5,000 acres would also be converted to nonagricultural uses to accommodate the canal, which would run south from Intake 1, generally parallel to and two or fewer miles west of Interstate 5 until reaching its southern extent, when it would convey water southwest to the proposed Byron Tract Forebay. Areas dedicated to RTM storage (from tunnel siphons), bridges over the canal, intake pumping plant facilities, and culvert siphons would also require conversion to nonagricultural uses. While RTM storage areas are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described in Appendix 3B, *Environmental Commitments*. Mapbook Figure M14-4 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Note that not all of these structures would be constructed under this alternative, since it displays all of the seven possible intakes that would be constructed with this alignment; only Intakes 1-5 would be constructed under this alternative. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Mitigation Measure AG-1 would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 2,144 acres of Important Farmland and 1,326 acres of land subject to Williamson Act contracts to other uses. Physical structures would also permanently convert approximately 18,875 acres of Important Farmland and 14,080 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. As described above and in Appendix 3B, *Environmental Commitments*, it is anticipated that the RTM would be removed from RTM storage areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. However, the overall effects are considered significant impacts on the environment. Implementation of Mitigation Measure AG-1

would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. Localized effects related to dewatering activities in the vicinity of intake pump stations, canal excavations, siphons, and the Byron Tract Forebay could temporarily lower groundwater levels by up to 20 feet (in the case of intakes and the forebay). The pumping plants would be located just east of the Sacramento River, south of Freeport and north of Courtland. The canal would run south from Intake 1, generally parallel to and two or fewer miles west of Interstate 5 until reaching its southern extent, when it would convey water southwest to the proposed Byron Tract Forebay. Culvert siphons would cross Stone Lakes Drain, Beaver Slough, Hog Slough, Sycamore Slough, White Slough, Disappointment Slough, a BNSF railroad ROW near Holt, and Middle River. The Byron Tract Forebay would be adjacent and south of Clifton Court Forebay. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal, due to groundwater recharge from this facility. In the northern portion of the canal between the intakes and the Mokelumne River, the rise in groundwater is predicted to be less than 5 feet. Between the Mokelumne River and the San Joaquin River, groundwater is forecasted to discharge into the canal, resulting in declines up to 10 feet. In the southern portion of the canal, groundwater recharge from the canal would be expected to result in a rise in the groundwater level up to 10 feet. In the southern portion of this alignment, recharge could result in

near-surface groundwater levels, which could compromise the viability of agricultural uses on land in these areas. While these facilities would not alter the regional drainage flow patterns, an unlined canal could benefit localized agricultural drainage in the segment of the canal projected to gain groundwater from both east and west sides. If a lined canal were constructed, canal-related seepage would be minimal. Local changes in groundwater flow patterns adjacent to the Byron Tract Forebay might occur due to groundwater recharge from surface water impoundment and would result in groundwater level increases. If agricultural drainage systems adjacent to this forebay are not adequate to accommodate the additional drainage requirements, operation of the forebay could interfere with agricultural drainage.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 1A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance with EC objectives would increase or decrease, depending upon the individual compliance point. Similarly, the average EC could increase or decrease, depending on location within the study area. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.2, Impact WQ-11 and Appendix 8H, Tables EC-1 and EC-12.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 136 miles of agricultural delivery canals and drainage ditches, including approximately 32 miles on Roberts Island, 28 miles on Union Island, 13 miles on New Hope Tract, 11 miles on Terminous Tract, and 10 miles on Rindge Tract. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural activities on the affected land. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 1B related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Potential variations could result from areas in which physical features associated with this alternative conflict with potential restoration areas thereby necessitating implementation elsewhere. Alternative 1B would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after

effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 1B would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 1B would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects are unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 1B would be similar to those described for Alternative 1A. Potential changes could result from areas chosen for protection based on the physical alignment of facilities under this alternative. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage,

disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

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

Alternative 1C would result in temporary and short-term effects on agricultural land in the study area associated with construction of five intakes and intake pumping plants, one forebay, conveyance pipelines, canals, a tunnel, culvert siphons, and an intermediate pumping plant. Transmission lines, access roads, and other incidental facilities would also be needed for operation of the project and construction of these structures would have temporary effects on agricultural lands.

Implementation of Alternative 1C would also result in permanent conversion of agricultural lands to nonagricultural uses associated with the five intakes and intake pumping plants, one forebay, pipelines, canals, a tunnel, culvert siphons, and an intermediate pumping plant. Other project features that would result in conversion of agricultural lands include soil borrow, spoil, and RTM storage areas; transmission line structures; and access roads.

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term construction of water conveyance facilities associated with Alternative 1C would convert existing agricultural land to construction-related uses, directly precluding agricultural use for the duration of construction. This alternative would convert approximately 3,170 acres of Important Farmland to other uses, including 2,380 acres of Prime Farmland, 165 acres of Farmland of Statewide Importance, 160 acres of Unique Farmland, and 466 acres of Farmland of Local Importance.

Of these acres of Important Farmland, siphon work areas would require the temporary or short-term conversion of more than 900 acres. These areas would be adjacent to proposed culvert siphons crossing Elk Slough, Duck Slough, Miner Slough, Rock Slough, a BNSF railroad ROW northwest of Discovery Bay, Main Canal, Kellogg Creek, Kendall Creek Overflow, and Italian Slough. Intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of nearly 500 acres near the west bank of the Sacramento River between Freeport and Courtland (but on the opposite bank). Work areas associated with the construction of conveyance pipelines would require nearly 400 acres and would be located primarily between Intake 1 and the beginning of the canal near Intake 2, north and west of Clarksburg. Other temporary work areas, including those necessary for the construction of tunnels, bridges, and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-5 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Physical structures associated with construction of water conveyance facilities and borrow, spoils, and RTM areas would occupy agricultural lands designated as Important Farmland, directly precluding future agricultural use. The facilities associated with this alternative would convert approximately 13,014 acres of Important Farmland to project uses, including 11,124 acres of Prime Farmland, 291 acres of Farmland of Statewide Importance, 909 acres of Unique Farmland, and 690 acres of Farmland of Local Importance.

Of these acres of Important Farmland, areas dedicated to borrow or spoils would convert approximately 6,500 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest areas identified between Intakes 2 and 3 west of the Sacramento River, adjacent to the proposed canal segment between Elk Slough and Duck Slough, on north Ryer Island, and north and west of the proposed Byron Tract Forebay, northwest of Clifton Court Forebay. Approximately 4,200 acres would also be converted to nonagricultural uses to accommodate canal segments. The northern segment of canal would run south from Intake 2 south of Clarksburg, then west along Courtland Road to the Sacramento Deep Water Ship Channel, where the canal would again turn south and run generally parallel to the Sacramento Deep Water Ship Channel to a point near the Channel's confluence with Miner Slough. Another canal segment would

start north of the Contra Costa Canal northeast of Knightsen and would be constructed to the south, passing to the west of Discovery Bay, until reaching the proposed Byron Tract Forebay northwest of Clifton Court Forebay. This proposed forebay would convert about 770 acres to nonagricultural uses. Areas dedicated to RTM storage would convert nearly 890 acres to nonagricultural uses. While RTM storage areas are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described in Appendix 3B, *Environmental Commitments*. Bridges over the canal, intake pumping plant facilities, tunnel shafts, and culvert siphons would also require conversion of lands to nonagricultural uses. Mapbook Figure M14-5 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary or short-term construction activities related to building the physical components of Alternative 1C would directly convert land subject to Williamson Act contracts. This alternative would convert approximately 1,243 acres of land subject to Williamson Act contracts. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1.

Of this land subject to Williamson Act contracts, siphon work areas would require the temporary or short-term conversion of more than 280 acres. These areas would be adjacent to proposed culvert siphons crossing Elk Slough, Duck Slough, and Miner Slough. Intake work areas, adjacent to proposed Intakes 1, 3, and 5, would require the short-term conversion of more than 150 acres near the west bank of the Sacramento River between Freeport and Courtland (but on the opposite bank). Work areas associated with the construction of conveyance pipelines would require approximately 200 acres and would be located primarily between Intake 1 and the beginning of the canal near Intake 2, north and west of Clarksburg. Nearly 130 acres west of Elkhorn Slough on Ryer Island would be converted to nonagricultural uses during construction of the proposed intermediate pumping plant. Other temporary work areas, including those necessary for the construction of tunnels, bridges, and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-6 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Physical components of Alternative 1C would directly and permanently convert land subject to Williamson Act contracts to non-agricultural uses. This alternative would convert approximately 7,647 acres of land subject to Williamson Act contracts. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1.

Of this land subject to Williamson Act contracts, areas dedicated to borrow or spoils would convert approximately 4,400 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest impact areas identified north of the proposed conveyance pipeline north of the Winchester Lake, adjacent to the proposed canal segment between Elk Slough and the Sacramento Deep Water Ship Channel, and on north Ryer Island. Approximately 2,500 acres would also be converted to nonagricultural uses to accommodate canal segments. The proposed canal would primarily cross land subject to Williamson Act contracts from Intake 3 south of Clarksburg, then west along Courtland Road to the Sacramento Deep Water Ship Channel, where the canal would again turn south and run generally parallel to the Sacramento Deep Water Ship Channel to a point near the Channel's confluence with Miner Slough. Areas dedicated to RTM storage on south Ryer Island, north Brannan-Andrus Island, and northeast of Knightsen would convert approximately 510 acres to nonagricultural uses. While RTM storage areas are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described in Appendix 3B, *Environmental Commitments*. Bridges over the canal, intake pumping plant facilities, tunnel shafts, and culvert siphons would also require conversion of lands to nonagricultural uses. Mapbook Figure M14-6 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Mitigation Measure AG-1 would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities could convert approximately 3,170 acres of Important Farmland and 1,243 acres of land subject to Williamson Act contracts to other uses. Physical structures would also permanently convert approximately 13,014 acres of Important Farmland and 7,647 acres of land subject to Williamson Act contracts to other uses. As described above and in Appendix 3B, *Environmental Commitments*, it is anticipated that the RTM would be removed from RTM storage areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. However, the overall effects are considered significant impacts on the environment. Implementation of Mitigation Measure AG-1 would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial

amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. Localized effects related to dewatering activities in the vicinity of intake pump stations, canal excavations, siphons, and the Byron Tract Forebay could temporarily lower groundwater levels by up to 20 feet (in the case of intakes and the forebay). The pumping plants would be located just west of the Sacramento River, south of Freeport and north of Courtland. The northern segment of canal would run south from Intake 2 south of Clarksburg, then west along Courtland Road to the Sacramento Deep Water Ship Channel, where the canal would again turn south and run generally parallel to the Sacramento Deep Water Ship Channel to a point near the Channel's confluence with Miner Slough. Another canal segment would start north of the Contra Costa Canal northeast of Knightsen and would be constructed to the south, passing to the west of Discovery Bay, until reaching the proposed Byron Tract Forebay northwest of Clifton Court Forebay. Culvert siphons would cross Elk Slough, Duck Slough, Miner Slough, Rock Slough, a BNSF railroad ROW northwest of Discovery Bay, Main Canal, Kellogg Creek, Kendall Creek Overflow, and Italian Slough. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal, due to groundwater recharge from this facility. In the northern portion of the canal between the intakes and the tunnel, a rise in groundwater is predicted to be up to 10 feet. In the southern portion of the canal, increases and decreases in the groundwater level would range up to 5 feet in either direction. Particularly in the northern portion of the unlined canal, agricultural drainage would be affected, which could compromise the viability of agricultural uses on land in these areas. If a lined canal were constructed, canal-related seepage would be minimal. Local changes in groundwater flow patterns adjacent to the Byron Tract Forebay might occur due to groundwater recharge from surface water impoundment and would result in groundwater level increases. If agricultural drainage systems adjacent to this forebay are not

adequate to accommodate the additional drainage requirements, operation of the forebay could interfere with agricultural drainage.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 1A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance with EC objectives would increase or decrease, depending upon the individual compliance point. Similarly, the average EC could increase or decrease, depending on location within the study area. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.2, Impact WQ-11 and Appendix 8H, Tables EC-1 and EC-12.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 124 miles of agricultural delivery canals and drainage ditches, including approximately 45 miles on Ryer Island, 37 miles on the Netherlands (north of Ryer Island), 20 miles on Byron Tract, and 12 miles on Merritt Island. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural activities on the affected land. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during

construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security

Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 1C related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Potential variations could result from areas in which physical features associated with this alternative conflict with potential restoration areas thereby necessitating implementation elsewhere. Alternative 1C would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural

economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 1C would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 1C would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 1C would be similar to those described for Alternative 1A. Potential changes could result from areas chosen for protection based on the physical alignment of facilities under this alternative. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these

measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.5 Alternative 2A—Dual Conveyance with Pipeline/Tunnel and Five Intakes (15,000 cfs; Operational Scenario B)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 2A would be similar to those described for Alternative 1A, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 1,826 acres of Important Farmland to other uses, including 1,634 acres of Prime Farmland, 13 acres of Farmland of Statewide Importance, 48 acres of Unique Farmland, and 131 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 2A would be similar to those described for Alternative 1A, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate conversion of approximately 4,992 acres of Important Farmland to other uses, including 3,473 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,056 acres of Unique Farmland, and 133 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term

acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2A would be similar to those described for Alternative 1A, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 1,272 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2A would be similar to those described for Alternative 1A, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate conversion of approximately 2,910 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 1,826 acres of Important Farmland and 1,272 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,992 acres of Important Farmland and 2,910 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other

stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. Over the short term, lower groundwater levels related to dewatering for pumping plant construction would apply to different locations if Intakes 6 and 7 were chosen. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 2A, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, operation of the water conveyance facility would result in an increase in the number of days when electrical conductivity objectives would be exceeded or out of compliance at certain locations. Locations where these frequencies would increase include Sacramento River at Emmaton, San Joaquin River at San Andreas Landing and Old River near Middle River and at Tracy Bridge. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 23%, and the percent of days out of compliance would increase from 11% under Existing Conditions to 35% under Alternative 2A. The San Andreas Landing EC objective would be exceeded on 4% of days, compared with 1% under Existing Conditions. The frequency at which this location would be out of compliance with the EC objective would increase from 1% of days to 6%. The increase in the frequency at which Old River

locations would exceed the EC objectives and be out of compliance would be 2% of days at Tracy Bridge and less than 1% at Middle River.

Average EC levels would decrease at western and southern Delta compliance locations, except at Emmaton in the western Delta, and would increase at the two interior Delta compliance locations. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 5% and the San Joaquin River at San Andreas Landing average EC would increase 1%. At Emmaton, average EC would increase 9% over drought period modeled. Modeling of drought years estimates EC reaching levels as high as 1.578 dS/m at the Emmaton compliance location. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.5, Impact WQ-11 and Appendix 8H, Tables EC-2 and EC-13.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 41 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural activities on the affected land. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas, increased levels of salinity, and disruption of drainage and irrigation facilities. In other areas, effects of this alternative related to water quality could be beneficial. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support

of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 2A related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Alternative 2A would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of tidal habitat, seasonally-inundated floodplain, grassland communities, vernal pool complex habitat, and nontidal marsh areas. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus

principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 2A would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural

uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 2A would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 2A would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation

interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.6 Alternative 2B—Dual Conveyance with East Alignment and Five Intakes (15,000 cfs; Operational Scenario B)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 2B would be similar to those described for Alternative 1B, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 2,669 acres of Important Farmland to other uses, including 2,282 acres of Prime Farmland, 61 acres of Farmland of Statewide Importance, 236 acres of Unique Farmland, and 89 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 2B would be similar to those described for Alternative 1B, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate conversion of approximately 18,868 acres of Important Farmland to other uses, including 15,833 acres of Prime Farmland, 530 acres of Farmland of Statewide Importance, 2,032 acres of Unique Farmland, and 473 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term

acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2B would be similar to those described for Alternative 1B, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 1,877 acres of land subject to Williamson Act contracts, including 233 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2B would be similar to those described for Alternative 1B, with the addition of an operable barrier at the head of Old River. If Intakes 6 and 7 were chosen instead of Intakes 4 and 5, however, construction of facilities under this alternative would necessitate conversion of approximately 14,125 acres of land subject to Williamson Act contracts, including 3,788 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 2,669 acres of Important Farmland and 1,877 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 18,868 acres of Important Farmland and 14,125 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other

stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1B. Over the short term, lower groundwater levels related to dewatering for pumping plant construction would apply to different locations if Intakes 6 and 7 were chosen. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal, due to groundwater recharge from this facility. In the southern portion of this alignment, recharge could result in near-surface groundwater levels, which could compromise the viability of agricultural uses on land in these areas. If a lined canal were constructed, canal-related seepage would be minimal.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 2A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance with EC objectives would generally increase, including those compliance points at Sacramento River at Emmaton, San Joaquin River at San Andreas Landing, and Old River near Middle River and at Tracy Bridge. The average EC could increase or decrease depending on location within the study area. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and

crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.5, Impact WQ-11 and Appendix 8H, Tables EC-2 and EC-13.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities would be similar to those described under Alternative 1B. Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 138 miles of agricultural delivery canals and drainage ditches, including approximately 32 miles on Roberts Island, 28 miles on Union Island, 13 miles on New Hope Tract, 11 miles on Terminous Tract, and 10 miles on Rindge Tract. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining

the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 2B related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1B. Alternative 2B would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or

cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A,

Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 2B would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 2B would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 2B would be similar to those described for Alternative 1B. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.7 Alternative 2C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario B)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 2C would be similar to those described for Alternative 1C, with the addition of an operable barrier at the head of Old River. This alternative would convert approximately 3,170 acres of Important Farmland to other uses, including 2,380 acres of Prime Farmland, 165 acres of Farmland of Statewide Importance, 160 acres of Unique Farmland, and 466 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 2C would be similar to those described for Alternative 1C, with the addition of an operable barrier at the head of Old River. The facilities associated with this alternative would convert approximately 13,019 acres of Important Farmland to project uses, including 11,127 acres of Prime Farmland, 291 acres of Farmland of Statewide Importance, 912 acres of Unique Farmland, and 690 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2C would be similar to those described for Alternative 1C, with the addition of an operable barrier at the head of Old River. This alternative would convert approximately 1,243 acres of land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 2C would be similar to those described for Alternative 1C, with the addition of an operable barrier at the head of Old River. This alternative would convert approximately 7,647 acres of land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to

Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and lands subject to Williamson Act contracts, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities could convert approximately 3,170 acres of Important Farmland and 1,243 acres of land subject to Williamson Act contracts to other uses. Physical structures would also permanently convert approximately 13,019 acres of Important Farmland and 7,647 acres of land subject to Williamson Act contracts to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in

Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1C. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal due to groundwater recharge from this facility. Particularly in the northern portion of the unlined canal, agricultural drainage would be affected, which could compromise the viability of agricultural uses on land in these areas. If a lined canal were constructed, canal-related seepage would be minimal.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 2A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance with EC objectives would generally increase, including those compliance points at Sacramento River at Emmaton, San Joaquin River at San Andreas Landing, and Old River near Middle River and at Tracy Bridge. The average EC could increase or decrease depending on location within the study area. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. However, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.5, Impact WQ-11 and Appendix 8H, Tables EC-2 and EC-13.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities would be similar to those described under Alternative 1C. Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 124 miles of agricultural delivery canals and drainage ditches, including approximately 45 miles on Ryer Island, 37 miles on the Netherlands (north of Ryer Island), 20 miles on Byron Tract, and 12 miles on Merritt Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11

will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 2C related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1C. Alternative 2C would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the land in conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in a Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural

economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 2C would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 2C would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 2C would be similar to those described for Alternative 1C. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one

ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.8 Alternative 3—Dual Conveyance with Pipeline/Tunnel and Intakes 1 and 2 (6,000 cfs; Operational Scenario A)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 3 would be similar to those described for Alternative 1A except that Intakes 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 953 acres of Important Farmland to other uses, including 863 acres of Prime Farmland, 11 acres of Farmland of Statewide Importance, 20 acres of Unique Farmland, and 59 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 3 would be similar to those described for Alternative 1A except that Intakes 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 4,838 acres of Important Farmland to other uses, including 3,331 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,053 acres of Unique Farmland, and 124 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 3 would be similar to those described for Alternative 1A except that Intakes 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 722 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 3 would be similar to those described for Alternative 1A except that Intakes 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 2,813 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 953 acres of Important Farmland and 722 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,838 acres of Important Farmland and 2,813 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one

ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. However, temporarily lower groundwater levels related to dewatering for pumping plant construction associated with Intakes 3, 4, and 5 would not apply to this alternative. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 3, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, operation of the water conveyance facility would generally result in a fewer number of days when water at compliance locations relevant to agriculture would exceed or be out of compliance with electrical conductivity objectives. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, the compliance point on the Sacramento River at Emmaton in the western Delta and San Joaquin River at San Andreas Landing in the interior Delta are two exceptions. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 27% under Alternative 3, and the days out of compliance with the EC objective would increase from 11% to 39%. The San Andreas Landing objective would increase from 1% to 2% of days in exceedance, and from 1% to 4% of days out of compliance with the EC objective. Average EC levels would decrease at western and southern Delta compliance locations, except at Emmaton in the western Delta, and would increase at the two interior Delta compliance locations. At Emmaton, average EC would increase by 14% for the entire period modeled and 12% for the drought period modeled. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 4% and the San Joaquin River at San Andreas Landing average EC would increase 12% to 0.444 dS/m. Modeling of drought years

estimates EC reaching as high as 1.621 dS/m at the Emmaton compliance location. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.8, Impact WQ-11 and Appendix 8H, Tables EC-3 and EC-14.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 37 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 3 related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Alternative 3 would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the land in conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource

would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain

restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 3 would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 3, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 3 would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 3 would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

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

Alternative 4 would result in temporary effects on agricultural land in the study area associated with construction of three intakes and intake pumping plants, and other associated facilities; two forebays; conveyance pipelines; and tunnels. Nearby areas would be altered as work or staging areas, concrete batch plants, fuel stations, or be used for spoils storage areas. Transmission lines, access roads, and other incidental facilities would also be needed for operation of the project and construction of these structures would have temporary or short-term effects on agricultural lands.

Implementation of Alternative 4 would also result in permanent conversion of agricultural lands to nonagricultural uses associated with the three intakes and intake pumping plants and other associated facilities; two forebays; and tunnel shafts. Other project features that would result in conversion of agricultural lands include soil borrow, spoil, dredged material, and RTM storage areas; power transmission structures; and access roads. Temporary and permanent features associated

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term construction of water conveyance facilities associated with Alternative 4 would convert existing agricultural land to construction-related uses, directly precluding agricultural use for the duration of construction. This alternative would result in the temporary or short-term conversion of approximately 1,315 acres of Important Farmland to other uses, including 955 acres of Prime Farmland, 70 acres of Farmland of Statewide Importance, 53 acres of Unique Farmland, and 237 acres of Farmland of Local Importance.

Of these acres of Important Farmland, intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 410 acres near the east bank of the Sacramento River between Freeport and Courtland. Other temporary work areas, including those necessary for the construction of tunnels and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-7 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Physical structures associated with construction of water conveyance facilities and borrow, spoils, and RTM areas would occupy agricultural lands designated as Important Farmland, directly precluding future agricultural use. The facilities associated with this alternative could convert approximately 4,975 acres of Important Farmland to project uses, including 4,281 acres of Prime Farmland, 158 acres of Farmland of Statewide Importance, 339 acres of Unique Farmland, and 197 acres of Farmland of Local Importance.

Of these acres of Important Farmland, the forebays constructed under this alternative would, together, convert more than 860 acres to nonagricultural uses. The intermediate forebay would be located north of Twin Cities Road, between the Sacramento River and Interstate 5. The Clifton Court Forebay would be expanded to the south of the existing water surface area. RTM areas would require nearly 3,160 acres and would be located adjacent to tunnel shafts including sites just north of Intake 2, several parcels west of Interstate 5 near the intermediate forebay, on northern Staten Island, on southern Staten Island, on southwestern Bouldin Island, and on Byron Tract west of Clifton Court Forebay. The site west of Clifton Court Forebay would also act as a storage area for dredged material. Activities associated with tunneling are likely to occur across multiple years at RTM storage areas. Additional time would then be required for dewatering, chemical characterization, and material storage. However, through implementation of an environmental commitment to reuse RTM and dredged material or dispose of it at appropriate facilities, as described in Appendix 3B, *Environmental Commitments*, it is anticipated that the material would be removed from these areas and applied, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Following removal of material, stockpiled topsoil at RTM storage areas would be reapplied, and disturbed areas will be returned as near as feasible to preconstruction conditions by carefully grading to re-establish surface conditions and reconstructing features such as irrigation and drainage facilities. Approximately 240 acres would be required for the intake pumping plant sites and about 200 acres would be converted to a borrow or spoil area north of Intake 2. Mapbook Figure M14-7 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary or short-term construction activities related to building the physical components of Alternative 4 would directly convert land subject to Williamson Act contracts or in Farmland Security Zones. The facilities associated with this alternative could convert approximately 837 acres of land subject to Williamson Act contracts, including 115 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, intake work areas, adjacent to the proposed intakes and pumping plants, would require the short-term conversion of approximately 150 acres near the east bank of the Sacramento River between Freeport and Courtland. Barge unloading facilities would require short-term conversion of approximately 20 acres and would be located on eastern Byron Tract on Italian Slough, northwestern Victoria Island on Old River, northern Bacon Island on Connection Slough, southwestern Bouldin Island on San Joaquin River, and southern Staten Island on South Mokelumne River. Other temporary work areas, including those necessary for the construction of tunnels, conveyance of RTM, and transmission lines, would be located throughout the conveyance alignment. Mapbook Figure M14-8 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent

acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Physical components of Alternative 4 would directly and permanently convert land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses. The facilities associated with this alternative could convert approximately 3,080 acres of land subject to Williamson Act contracts, including 19 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, RTM areas would require more than 2,200 acres and would be located adjacent to tunnel shafts including sites just north of Intake 2, several parcels west of Interstate 5 near the intermediate forebay, on northern Staten Island, on southern Staten Island, on southwestern Bouldin Island, and on Byron Tract west of Clifton Court Forebay. While these are considered permanent surface impacts for the purposes of impact analysis, it is anticipated that the RTM would be removed from these areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material, as described above and in Appendix 3B, *Environmental Commitments*. Approximately 150 acres would be converted to a borrow or spoil area north of Intake 2. The intermediate forebay and associated spillway area constructed under this alternative would, together, convert approximately 240 acres to nonagricultural uses. The intermediate forebay would be located north of Twin Cities Road, between the Sacramento River and Interstate 5. Mapbook Figure M14-8 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM and dredged material (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 1,315 acres of Important Farmland and 837 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,975 acres of Important Farmland and 3,080 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. As described above and in Appendix 3B, *Environmental Commitments*, it is anticipated that the RTM and dredged material would be removed from RTM storage areas (which represent a substantial portion of the permanent impact areas) and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat

restoration projects, or other beneficial means of reuse identified for the material. Because these activities would convert a substantial amount of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, however, they are considered significant impacts on the environment. Implementation of Mitigation Measure AG-1 would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use,* Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

The BDCP proponents shall develop ALSPs (i) prior to the commencement of any construction activities or other physical activities associated with Conservation Measure 1 that would involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones, and (ii) as part of the site-specific environmental review for all other conservation measures or other site-specific project activities that could involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones. For each conservation measure or site-specific project activity other than Conservation Measure 1 that would cause such effects, a draft ALSP shall be included with any publicly circulated environmental document for the proposed conservation measure or project activity in order to obtain public input. The Plans shall contain the three elements identified below for this measure. If a programmatic ALSP is developed for the BDCP, parts of the BDCP, the Delta or parts of the Delta, BDCP proponents may rely on these plans to the extent that they include all the elements in this measure.

Mitigation Measure AG-1a: Promote Agricultural Productivity of Important Farmland

The BDCP proponents shall ensure that the following measures are implemented to reduce adverse effects and/or significant effects as described above if the measures are applicable and feasible. Not all measures listed below may be feasible or applicable to each conservation measure or to individual parts of each conservation measure. Rather, these measures serve as an overlying mitigation framework to be used for mitigation of impacts caused by the

implementation of specific conservation measures. The applicability of measures listed below would vary based on the location, timing, nature, and feasibility of each measure.

- Early Planning
    - Describe the current land use in the project area and identify acreage of all land devoted to agricultural use, including farmland of local importance, grazing land, and confined animal agriculture.
    - Describe the extent to which the project can be part of or complement existing or planned land uses for the Delta. For BDCP, this means consulting with county governments, the Delta Protection Commission, the Delta Conservancy and other individuals and organizations that are considering plans or activities designed for agricultural use; flood management; mitigation and enhancement relating to aquatic and terrestrial habitat; recreation; and tourism. This consultation is particularly important when there are multiple uses being considered for one specific area of land, but it is also important to look at how the project affects or fits into other plans for the region or sub-regions where the project is located.
    - Project proponents should consult with farmers, local agencies and other State and federal agencies, including the California Natural Resources Agency, the California Department of Water Resources, the Central Valley Flood Protection Board, the California Department of Conservation, the California Department of Food and Agriculture, the California Department of Fish and Wildlife, the Delta Stewardship Council, the California Delta Protection Commission, the Delta Conservancy, the United States Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Department of Agriculture, including the Natural Resources Conservation Service, to identify design features of the project, if any, that will benefit flood management, agricultural and natural resources.
    - Consider whether the proposed land use is consistent with State, regional and local plans. For the BDCP, this could include local General Plans, the Delta Protection Commission's Land Use and Resource Management Plan and Economic Strategy, the Delta Stewardship Council's Delta Plan, the California Water Plan Agriculture Strategy, the Delta Conservancy Strategy, the California Department of Food and Agriculture's Ag Vision; the California Natural Resources Agency's California Climate Adaptation Plan, and the California Fish and Wildlife Strategic Vision;
    - Consider whether agriculture and/or habitat management activities undertaken pursuant to the proposed land use are consistent with State and local policies relating to flood protection and whether they might provide additional protection because, for example, they (i) provide flood management activities that provide additional protection for agricultural activities or (ii) prevent or divert potential higher groundwater levels that would thwart flood control efforts
- Site Related Avoidance and Mitigation
    - Site projects and project footprints to minimize the permanent conversion of Important Farmland, to nonagricultural uses.
    - When identifying and selecting project areas, give priority to public lands and existing conservation lands.

- Where choices are possible among or between particular parcels or lands that are available for a project, project proponents should look at the characteristics of the different parcels or lands to determine whether one choice would be better from an agricultural resource perspective. If choices can be made regarding different locations for a project and still achieve the project purposes, it may be possible to avoid areas that may have more value from an agricultural resources perspective such as whether the property is (1) "high quality" farmland. (2) unique or has special values, (3) important to maintaining viability of agriculture in a certain area, (4) important to maintaining habitat lands in agriculture in a certain area.
- Manage project operations to minimize the introduction of invasive species or weeds that may affect agricultural production on adjacent agricultural land.

- Mitigate on Site
  - Design projects so as to optimize contiguous parcels of agricultural land of a size sufficient to support their efficient use for continued agricultural production.
  - Where the construction or operation of a facility could limit access to ongoing agricultural operations, maintain a means of convenient access to these agricultural properties as part of project design, construction, and implementation.
  - At borrow sites to be returned to agricultural production, remove and stockpile, at a minimum, the upper 2 feet of topsoil and replace the topsoil after project completion as part of borrow site reclamation.
  - In areas permanently disturbed by project activities, and where topsoil is removed as part of project construction (e.g., stripping topsoil under a levee foundation) and not reused as part of the project, make the topsoil available to less productive agricultural lands that could benefit from the introduction of good-quality soil.
  - Relocate and/or replace wells, pipelines, power lines, drainage systems, and other infrastructure that are needed for ongoing agricultural uses and would be adversely affected by project construction or operation.
  - Minimize disturbance of Important Farmland and continuing agricultural operations during construction by (1) locating construction laydown and staging areas on sites that are fallow, already developed or disturbed, or are to be discontinued for use as agricultural land and (2) using existing roads to access construction areas.
  - Consult with landowners and agricultural operators to develop appropriate construction practices to minimize construction-related impairment of agricultural productivity. Practices may include coordinating the movement of heavy equipment and implementing traffic control measures.
  - Consult with landowners and agricultural operators with the goal of sustaining existing agricultural operations, at the landowners' discretion, until the individual agricultural parcels are needed for project construction.

- Consult with landowners and agricultural operators on what role they can take if they wish be involved in project development. Issues to consider include whether:
  - Owner(s) or operator(s) could carry out project activities on their land. To the extent that Important Farmland is part of the project, consideration should be given to

providing flexibility to the farmer. To the extent that Important Farmland is part of the project, consideration should also be given to developing working landscapes[7] on project lands

- Some or all of the ownership interests on any project land could remain in private hands or in the hands of a private conservancy in order to keep the property in nongovernmental ownership and thereby on the County tax base;
- Owner(s) and/or operator(s) of land displaced by project facilities and activities could maintain or obtain full or partial ownership of the land on which project activities will be carried out or could be compensated to manage said land;
- Existing agricultural operations on lands could be modified, through such things as crop change, new integrated pest management strategies, altered water usage, or full or partial conversion to habitat uses, in a manner that renders such operations consistent with the goals and objectives of the project by enhancing environmental outcomes in a manner beneficial to species covered by the project;
- Limited agriculture could take place within areas identified for habitat restoration under the project without undermining the achievement of the project goals and objectives;
- Subsidies to allow economically viable rice farming on particular lands could be justified due to the environmental benefits of such rice farming such as the stabilization of subsiding areas or the creation of sinks for greenhouse gases and methylmercury;
- Subsidies to assist the owner(s) and/or operator(s) to make a viable living managing wetlands or other habitat areas could be justified due to the environmental benefits of wetlands or habitat such as the stabilization of subsiding areas or the safer accumulation and isolation of greenhouse gases and methylmercury;

- Implementation
  - The plans should include a framework that encourages adaptive management with regard to agricultural land management.
  - The plans should include reporting and monitoring actions necessary to show that the actions agreed to were being carried out.

[7] The Cal-Fed Working Landscapes Subcommittee of the Bay Delta Public Advisory Committee defined a working landscape as "*a place where agriculture and other natural resource-based economic endeavors are conducted with the objective of maintaining the viability and integrity of its commercial and environmental values. On a working landscape, both private production, as well as public regulatory decisions account for the sustainability of families, businesses and communities, while protecting and enhancing the landscape's ecological health. The working landscape is readily adaptable to change according to economic and ecosystem needs. With respect to CALFED, a working landscape is both an objective and a means to achieve it. A working landscape is efficiently managed largely by private agricultural landowners and managers who are supported and encouraged to manage their lands in ways that fulfill CALFED goals, allowing them to pursue ecological health goals while yielding economic returns on investments, and generating tax revenues that support their local governments"* (California Bay-Delta Public Advisory Committee 2002).

Mitigation Measure AG-1b: Minimize Impacts on Land Subject to Williamson Act Contracts or in Farmland Security Zones

The BDCP proponents shall ensure that the following measures are implemented as applicable to reduce effects and preserve agricultural uses on land subject to Williamson Act contracts or in Farmland Security Zones:

- The BDCP proponents shall comply with applicable provisions of California Government Code Sections 51290–51295 with regard to acquiring land subject to Williamson Act contracts. Sections 51290(a) and 51290(b) specify that State policy, consistent with the purpose of the Williamson Act to preserve and protect agricultural land, is to avoid locating public improvements and any public utilities improvements in agricultural preserves, whenever feasible. If it is infeasible to locate such improvements outside of a preserve, they shall be located on land that is not under contract, if feasible.
- More specifically, the BDCP proponents shall comply with the following basic requirements stated in the California Government Code:
    - Whenever it appears that land within a preserve or under contract may be required for a public improvement, the DOC and the city or county responsible for administering the preserve must be notified (Section 51291(b)).
    - Within 30 days of being notified, DOC and the city or county must forward comments, which will be considered by the proponents of the public improvement (Section 51291(b)).
    - A public improvement generally may not be located within an agricultural preserve unless the BDCP proponents make findings to the effect that (1) the location is not based primarily on the lower cost of acquiring land in an agricultural preserve and (2) for agricultural land covered under a contract for any public improvement, no other land exists within or outside the preserve where it is reasonably feasible to locate the public improvement (Sections 51921(a) and 51921(b)). Findings do not need be made if the action falls within one of the exemptions in Section 51293. The contract is normally terminated when land is acquired by eminent domain or in lieu of eminent domain (Section 51295).
    - DOC must be notified within 10 working days upon completion of the acquisition (Section 51291(c)).
    - DOC and the city or county must be notified before completion of any proposed work of any significant changes related to the public improvement (Section 51291(d)).
    - If, after acquisition, the acquiring public agency determines that the property would not be used for the proposed public improvement, DOC and the city or county administering the involved preserve must be notified before the land is returned to private ownership. The land will be reenrolled in a new contract or encumbered by an enforceable restriction at least as restrictive as that provided by the Williamson Act (Section 51295).
    - Work with the county where Williamson Act land is located to expand Williamson Act authorized uses to include open space/habitat lands in Williamson Act Preserves.

Mitigation Measure AG-1c: Consideration of an Optional Agricultural Land Stewardship Approach or Conventional Mitigation Approach

Where project proponents have determined that compliance with Mitigation Measures AG-1a and AG-1b is not sufficient to mitigate to a less than significant or adverse level the impacts from the conversion of Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, they shall undertake additional feasible mitigation pursuant to this measure (AG-1c).

Exceptions to this requirement shall apply where the mitigation already being required for the biological resource values for the land at issue (e.g., for its value as habitat for Swainson's hawk) pursuant to the cultivated lands natural community strategy of Conservation Measure 3 already requires the equivalent of 1:1 mitigation (based on the net area of land remaining in agriculture) for impacts to Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, provided that the easements for biological values also incorporate agricultural preservation.

The BDCP proponents shall determine the nature and form of any necessary additional mitigation after consultation with, at least, all of the following: (i) the County in which the affected property is located; (ii) the owner(s) and/or operator(s) of said property; (iii) the California Natural Resources Agency; (iv) the California Department of Water Resources; (v) the Central Valley Flood Protection Board; (vi) the California Department of Conservation; (vii) the California Department of Food and Agriculture; (viii) the California Department of Fish and Wildlife; (ix) the Delta Stewardship Council; (x) the California Delta Protection Commission; (xi) the Delta Conservancy; (xii) the United States Fish and Wildlife Service; (xiii) the National Marine Fisheries Service; and (xiv) the U.S. Department of Agriculture, including the Natural Resources Conservation Service. After consulting with these agencies, entities, and/or individuals, the BDCP proponents shall determine whether or not, under the circumstances surrounding the conversion of particular agricultural lands, the best overall approach to the additional required mitigation is the conventional use of agricultural land conservation property interests (see discussion below on Conventional Mitigation Approach). In making this determination, the BDCP proponents shall give considerable weight to the willingness of the County in which the affected property is located and the owner(s) and/or operator(s) of said property to participate in an Optional Agricultural Land Stewardship Approach, which would seek opportunities to protect and enhance agriculture in the Delta as part of the project landscape and focus on maintaining economic activity on agricultural lands instead or in conjunction with the Conventional Mitigation Approach for purposes of CEQA/NEPA mitigation. Where the County and the owner(s) and/or operator(s) have a preference for participating in an Optional Agricultural Land Stewardship Approach, the BDCP proponents shall attempt to develop a feasible Optional Agricultural Land Stewardship alternative mitigation program acceptable not only to the County and the owner(s) and/or operator(s), but also to the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and the National Marine Fisheries Service. Where the BDCP proponents, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they shall undertake instead a Conventional Mitigation Approach, where necessary and feasible, based on the use of agricultural conservation property interests or other measures requiring the preservation or, enhancement of other land of similar agricultural quality in areas that are threatened with encroaching urban development.

Specific strategies that could be used in formulating an Optional Agricultural Land Stewardship Approach are described in Appendix 14B, *Agricultural Stewardship Strategies*. In determining the potential nature and form of an Optional Agricultural Land Stewardship Approach, the BDCP proponents shall, at a minimum, consider the following, as applicable:

- whether there is Important Farmland in the Delta reasonably accessible to the BDCP proponents and/or to the owner(s) and/or operators for use for agriculture and/or habitat management in a manner consistent with the goals and objectives of the BDCP;
- whether there is Important Farmland that might not remain in agriculture if it was not protected by means of an agricultural conservation property interest because of threats of urban development (e.g. in the secondary zone in the Delta) or wind/solar and other non-renewable energy projects, or the productive value of which is so high, it should remain in agriculture instead of being used for restoration or other open-space projects because, for example, it is:
    - unique or has special values
    - important to maintaining viability of agriculture in the region
    - critical to prevent a "tipping" point that could lead to elimination of a crop in the region
    - important to maintaining habitat lands in agriculture in the region
- whether Agricultural Land Stewardship Strategies[8] benefit agricultural lands by providing feasible CEQA/NEPA mitigation (or providing funding for such mitigation) for potential significant environmental agricultural impacts at both the farm and the regional level. In determining whether the funds necessary to make an Optional Agricultural Land Stewardship Approach feasible are available, the BDCP proponents shall be guided by the principle that funds that might otherwise be used for off-site preservation or another form of compensation may be made available instead to assist with making the Optional Agricultural Land Stewardship Approach work. Such strategies could include:
    - Potential strategies to help maintain farming in the Delta
        - Improve flood protection (Strategy 1)
        - Provide technical and financial assistance to help farmers maintain or improve agricultural production (Strategy 2)
        - Provide technical and financial assistance to help farmers comply with regulatory requirements for water quality (Strategy 3)
        - Control terrestrial weeds (Strategies 6a, 6b, and 6c)
        - Reduce conflict between agriculture and nearby habitat lands by creating a "good neighbor" policy (Strategy 7)
        - Work with other interests to explore the value of reinstating state funding of Williamson Act subventions (Strategy 8)

[8] Strategies developed so far, and other materials relating to their development and implementation, can be found at https://bdcpdfl.water.ca.gov/home. These are given as examples to consider at this time. It is expected that existing strategies will evolve and change over time and that additional strategies will be developed.

- Work with counties to expand Williamson Act authorized uses to include open space/habitat lands in Williamson Act Preserves (Strategy 9)
- Investigate options for in lieu tax revenue for counties and payments for local districts (Strategy 10)
- Provide for Agricultural Conservation Easements (Strategy 11)

- Potential strategies that provide incentives for conservation on farmland
  - Partner with others to maintain and enhance environmental quality on farmland (Strategy 12)
  - Compensate farmers to manage agricultural land as habitat for wildlife (Strategy 13)
  - Provide incentives for farmers to take part in a market-based conservation program (Strategy 14)
- Potential strategies to manage land for purposes other than conventional crop production
  - Provide technical and financial assistance to stabilize or reverse land subsidence on Delta island (Strategy 15)
  - Assist landowners to produce and sell greenhouse gas offset credits in the AB 32 Cap-and-Trade program (Strategy 16)
  - Compensate farmers to manage habitat lands (Strategy 17)
  - Designate carbon sequestration and subsidence reversal crops as agricultural production for regulatory and incentive programs (Strategy 18)
- Potential strategies that provide for economic development and other benefits
  - Provide technical and financial assistance to develop an economic study of agricultural activity and related infrastructure (Strategy 19)
  - Provide technical and financial assistance for to promote economic development (Strategy 20)
  - Provide technical and financial assistance to promote transportation infrastructure improvements (Strategy 21)
  - Provide technical assistance to farmers to help in complying with the regulatory framework present in the Delta (Strategy 22)
  - Provide technical, risk reduction, promotion, and financial assistance for farmers to manage land to incorporate recreation and tourism (Strategy 23)
  - Work with others to better align the regulatory system to help farmers who engage in ecological restoration and enhancement projects (Strategy 24)
  - Develop Agricultural Land Stewardship Plans (Strategy 25)

- In addition, the BDCP proponents shall explore the following funding sources to implement strategies that are in addition to those required under CEQA/NEPA in order to maintain agriculture In the Delta. These strategies include those listed above for CEQA/NEPA mitigation.

- Work with the California Air Resources Board (CARB) to establish a greenhouse gas offset market using credits created through the development and restoration of wetlands.
- Seek available funding from CARB's "Cap and Trade" program developed pursuant to the Global Warming Act Solutions Act of 2006 (AB 32).
- Work with others to explore the value of reinstating state funding for Williamson Act subventions from Cap and Trade Funding or other sources
- Consider recommending to the Governor and Legislature that funds for be included in any bond measure(s) placed on the statewide ballot (e.g. the Delta Investment Fund authorized by the Delta Reform Act).
- Work with other governmental and private entities to identify other funds that can be used for the Optional Agricultural Land Stewardship Approach.

Strategy for implementing a Conventional Mitigation Approach. Where the BDCP proponents, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they shall undertake instead, where necessary and feasible, a Conventional Mitigation Approach based on the purchase of property interests in agricultural lands (e.g., conservation easements) or other compensation arrangements (collectively referred to as "agricultural conservation property interests"), requiring the preservation and/or enhancement of other land of similar agricultural quality. The standard ratio for purchase of agricultural conservation property interests to mitigate for permanently converted Important Farmland not included, as discussed above, as part of mitigation for biological resources, shall be at a ratio of 1:1 for similar types of Important Farmland.

Where feasible, mitigation shall generally result in the purchase of agricultural conservation property interests, such as easements on other agricultural lands of the same overall quality and acreage either directly or indirectly. The two preferred forms of mitigation in this context shall be (i) the inclusion of sufficient acreages within agricultural preserves within BDCP lands to satisfy CEQA and NEPA agricultural resource mitigation in addition to meeting BDCP objectives under the Endangered Species Act and California's Natural Community Conservation Planning Act and (ii) reliance on the California Farmland Conservancy Program or on other established programs in the Delta supported by the county where the project is located, the Delta Stewardship Council, the Delta Planning Commission, or the Delta Conservancy. Where the BDCP proponents choose to rely on the latter strategy, they shall confirm, prior to submitting funds into any program both (a) that the program meets the standards under CEQA case law for a "reasonable mitigation plan" and (b) that they can spend the funds at issue for the preservation and, where appropriate, the enhancement, of land that is reasonably proximate to the land being impacted and of a similar quality or extent. Where these two preferred options are unavailable or infeasible, the BDCP proponents shall be responsible for purchasing agricultural conservation property interests on their own.

Where feasible, agricultural land conservation interests should be acquired in the county in which the conversion will take place, provided that any such land either would be at-risk for conversion from agricultural uses in the absence of such long-term protection, unless such purchases would undermine the overall BDCP conservation strategy by potentially putting off-limits lands that may be needed for habitat purposes during the permit duration of the BDCP

(i.e., up until 2060), or is not necessary for other habitat conservation plans. Thus, acquisition of such agricultural land conservation interests cannot be located in areas targeted for habitat restoration if doing so would thwart implementation of the long-term habitat restoration objectives of the BDCP.

Where a property identified for purchase of an agricultural land conservation interest serves non-agricultural purposes such as providing wildlife habitat or flood control or flood management benefits, the terms of the agricultural land conservation interest shall require the farm operator to continue to use the property in a manner that preserves these benefits (e.g., by continuing to support certain crop types known to provide, or be consistent with, such benefits) unless similar benefits are provided through some other means. The value of the agricultural land conservation interest would need to take such limitations on agricultural practices into account.

Where Important Farmland of the same caliber as the Important Farmland being converted is not available within the county in which the conversion will take place, the agricultural land conservation interest may occur in another county, with a preference for counties within the greater Sacramento metropolitan area, as long as the property to be purchased or encumbered is at-risk for conversion from agricultural uses to developed uses from encroaching urban development in the absence of such long-term protection, and as long as such purchase does not undermine the overall BDCP conservation strategy by potentially putting off-limits lands that may be needed for habitat purposes during the permit duration of the BDCP (i.e., up until 2060).

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. Localized effects related to dewatering activities in the vicinity of intake pump stations and the expanded Clifton Court Forebay would temporarily lower groundwater levels by up to 10 feet and 20 feet, respectively. The pumping plants would be located just east of the Sacramento River, south of Freeport and north of Courtland. The area of expansion for the Clifton Court Forebay would be adjacent and south of the existing forebay. Groundwater would return to pre-pumping levels over the course of several months. During long-term operations of the water conveyance, increases in the groundwater level of 10 feet or more could also occur in the vicinity of the intermediate forebay and expanded area of the Clifton Court Forebay in the absence of design features to minimize seepage, due to groundwater recharge from these facilities (the intermediate forebay would be located on Glannvale Tract near Twin Cities Road). However, the forebays would be constructed to comply with the requirements of the DSD which includes design provisions to minimize seepage. These design provisions would minimize seepage under the embankments and onto adjacent properties. Once constructed and placed in operation, the operation of the forebays would be monitored to ensure seepage does not exceed performance requirements. In the event seepage were to exceed these performance requirements, the BDCP proponents would modify the embankments or construct seepage collection systems that would ensure any seepage from the forebays would be collected and conveyed back to the forebay or other suitable disposal site. However, operation of Alternative 4 would result in local changes in shallow groundwater flow patterns adjacent to the expanded Clifton Court Forebay, where

groundwater recharge from surface water would result in groundwater level increases. If existing agricultural drainage systems adjacent to the forebay are not adequate to accommodate the additional drainage requirements, operation of the forebay could interfere with agricultural drainage. Areas in which crop roots are exposed to a surplus of water could result in root rot, compromising the viability of certain crops, particularly those with deep roots (Refer to Section 14.1, *Environmental Setting/Affected Environment,* for root depths by crop type). These effects could prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 4, Scenarios H1-H4, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to the No Action Alternative, operation of the water conveyance facility would result in an increase in the number of days when electrical conductivity objectives would be exceeded or out of compliance in some locations. Locations where these frequencies would increase include Sacramento River at Emmaton, San Joaquin River at San Andreas Landing, San Joaquin River at Jersey Point, Old River near Middle River, and Old River at Tracy Bridge.

The Sacramento River at Emmaton EC objective would be exceeded on 23–25% of days, compared with 12% under the No Action Alternative. The frequency at which this location would be out of compliance with the EC objective would increase from 22% of days (under the No Action Alternative) to 35–38% of days, depending on which operational scenario is implemented. The San Andreas Landing EC objective would be exceeded on 3–4% of days, compared with 1% under the No Action Alternative. The frequency at which this location would be out of compliance with the EC objective would increase from 1% of days (under the No Action Alternative) to 5–7% of days, depending on which operational scenario is implemented. The Old River at Tracy Bridge objective would be exceeded on 5–6% of days, compared with 4% of days under the No Action Alternative. The frequency at which this location would be out of compliance with the EC objective would increase from 8% of days (under the No Action Alternative) to 11–12% of days, depending on which operational scenario is implemented. The Old River near Middle River objective would be exceeded on 3% of days, the same as under the No Action Alternative (though there would be an increase in the total number of days in exceedance). The frequency at which this location would be out of compliance with the EC objective would increase from 7% of days (under the No Action Alternative) to 8% of days. Compared to the No Action Alternative, Scenarios H1–H3 would also result in an increase in the frequency of days out of compliance with the EC objective for San Joaquin River at Jersey Point. Scenario H4 would result in a small increase in days in which this objective would be exceeded but a decrease in the days in which it would be out of compliance.

Following implementation of Scenarios H1–H4, there would be a decrease in the number of days in which the EC objective at Sacramento River at Emmaton/Three Mile Slough near Sacramento River would be exceeded or out of compliance. There would be a decrease or no change in the frequency of days in exceedance or out of compliance at three other locations: S. Fork Mokelumne River at Terminous, San Joaquin River at Vernalis, and San Joaquin River at Brandt Bridge.

Average EC levels would decrease at western Delta compliance locations, except Emmaton under Scenarios H1 and H2, and would increase at the two interior Delta compliance locations and some south Delta compliance locations. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop

selection. For the entire period modeled and the drought period modeled, average EC levels would increase at Emmaton in the western Delta (Scenarios H1 and H2 only). For the entire period modeled, average EC levels would also increase at interior and southern Delta locations; the average EC increase would be 5-15% at interior Delta locations and 2% or less at southern Delta locations, depending on the operations scenario (Chapter 8, *Water Quality*, Appendix 8H, Tables EC-15A through EC-15D). During the drought period modeled, average EC would increase at interior and southern Delta locations. The greatest average EC increase during the drought period modeled would occur in the interior Delta in the San Joaquin River at San Andreas Landing (7–13% depending on the operations scenario); the increase at the other locations would be <1–9% (Chapter 8, *Water Quality*, Appendix 8H, Tables EC-15A through EC-15D). Modeling of drought years estimates EC reaching levels as high as 1.644 dS/m at the Emmaton compliance location under Scenario H1. The comparison to the No Action Alternative reflects changes in EC due only to the different operational components of Scenarios H1-H4 of Alternative 4. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.9, Impact WQ-11 and Appendix 8H, Tables EC-4 and EC-15A through EC-15D.

Relative to Existing Conditions, operation of the water conveyance facility would result in an increase in the number of days when electrical conductivity objectives would be exceeded or out of compliance in the Sacramento River at Emmaton, San Joaquin River at San Andreas Landing, Old River near Middle River, and Old River at Tracy Bridge.

The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 23–25%, depending on the operational scenario, and the percent of days out of compliance would increase from 11% under Existing Conditions to 35–38%, depending on the operational scenario. The San Andreas Landing EC objective would be exceeded on 3–4% of days, compared with 1% under Existing Conditions. The frequency at which this location would be out of compliance with the EC objective would increase from 1% of days (under Existing Conditions) to 5–7% of days, depending on which operational scenario is implemented. The Old River at Tracy Bridge objective would be exceeded on 5–6% of days, compared with 4% of days under Existing Conditions. The frequency at which this location would be out of compliance with the EC objective would increase from 10% of days (under Existing Conditions) to 11–12% of days, depending on which operational scenario is implemented. The Old River near Middle River objective would be exceeded on 3% of days, the same as under Existing Conditions (though there would be an increase in the total number of days in exceedance). The frequency at which this location would be out of compliance with the EC objective would not change compared to Existing Conditions (8% of days out of compliance).

Compared to both Existing Conditions, there would be a decrease in the number of days in which the EC objective in Sacramento River at Emmaton/Three Mile Slough near Sacramento River and the objective in San Joaquin River at Jersey Point would be exceeded or out of compliance following implementation of Scenarios H1–H4. There would be a decrease or no change in the frequency of days in exceedance or out of compliance at three other locations: S. Fork Mokelumne River at Terminous, San Joaquin River at Vernalis, and San Joaquin River at Brandt Bridge.

Average EC levels at the western and southern Delta compliance locations would decrease (except at Emmaton) from 1–36% for the entire period modeled and 2–33% during the drought period modeled (1987–1991) (Chapter 8, *Water Quality*, Appendix 8H, Tables EC-15A through EC-15D).

Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. At Emmaton, there would be an increase in average EC under all operational scenarios, though the increase would be less for scenarios H3 and H4 (0% for entire period; 8% for drought period) than for scenarios H1 and H2 (13–14% for entire period; 12–13% for drought period). There would be increases in average EC at two interior Delta locations under all operational scenarios: the S. Fork Mokelumne River at Terminous average EC would increase 5% for the entire period modeled and 4% during the drought period modeled; and San Joaquin River at San Andreas Landing average EC would increase 0–9% for the entire period modeled and 7–13% during the drought period modeled. On average, EC would increase at San Andreas Landing from March through September under all operations scenarios; Scenarios H1, H2, and H4 also would increase EC at this location in February and Scenarios H1 and H2 would increase EC in October. Average EC in the S. Fork Mokelumne River at Terminous would increase during all months (Chapter 8, *Water Quality*, Appendix 8H, Tables EC-15A through EC-15D). Modeling of drought years estimates EC reaching levels as high as 1.644 dS/m at the Emmaton compliance location. The comparison to Existing Conditions reflects changes in EC due to both Alternative 4 operations (including north Delta intake capacity of 9,000 cfs and numerous other operational components of Scenarios H1–H4) and climate change/sea level rise. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.9, Impact WQ-11 and Appendix 8H, Tables EC-4 and EC-15A through EC-15D.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 46 miles of agricultural delivery canals and drainage ditches, including approximately 19 miles on Staten Island, 11 miles on Byron Tract, and 6 miles on Bouldin Island. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural activities on the affected land. Thus, where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other

uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

In addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP, as set forth in EIR/EIS Appendix 3B, *Environmental Commitments*, a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Potential options for making use of this financial commitment include funding or providing other assistance towards acquiring alternative water supplies or towards modifying existing operations when levels of electrical conductivity at a particular location reduce opportunities to operate existing water supply diversion facilities. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 4.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Conversion of Important Farmland as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

While locations have not been selected, implementation of conservation measures for habitat restoration and channel margin habitat enhancement would likely occupy existing state-recognized Important Farmland, directly precluding agricultural use. Construction activities for the conservation measures associated with this alternative may also result in temporary conversion of Important Farmland.

Alternative 4 would restore approximately 83,800 acres under conservation measures geared toward the restoration of tidal wetland habitat (CM4), seasonally-inundated floodplain (CM5), riparian habitat (CM7), grassland communities (CM8), vernal pool complex habitat (CM9), and nontidal marsh areas (CM10). Additionally, 20 linear miles of channel margin habitat would be enhanced. Under this measure, setback levees could potentially encroach upon Important Farmland. Additionally, earthwork activities associated with restoration activities could remove land from agricultural production. To maintain these areas, access roads and other facilities may also be necessary. Implementation of these restoration activities would occur in phases over the 50-year permit period, as summarized in Table 3-4 in Chapter 3, *Description of the Alternatives*. Additionally, in selecting sites for seasonally inundated floodplain restoration under CM5, compatibility with ongoing agricultural uses would be considered and agricultural production could continue on acquired lands so long as agricultural practices are compatible with the primary goal of restoring habitat for covered fish and wildlife species (see Chapter 3, Section 3.4.5.3.2 of the BDCP for further detail).

Physical construction of facilities associated with other conservation measures may also occupy small areas of Important Farmland. For instance, installation of nonphysical fish barriers may require an access road or storage facility on land under one of the Important Farmland designations. However, the effects of these measures on Important Farmland are anticipated to be minor, particularly when compared with the larger restoration actions described above.

Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of the Conservation Zones designated as Important Farmland, it is anticipated that a substantial area of Important Farmland would be directly converted to habitat under this alternative.

Conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Conservation areas associated with the project would occupy land subject to Williamson Act contracts or in Farmland Security Zones, leading to the potential cancellation of existing contracts and the direct conversion of agricultural land to other uses.

As described above, Alternative 4 would restore approximately 83,800 acres under conservation measures intended to restore various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Under *CM6 Channel Margin Enhancement*, setback levees could potentially encroach on land subject to Williamson Act contracts or in Farmland Security Zones. Associated earthwork activities could also conflict with contract lands. To maintain these areas, access roads and other facilities may also be necessary.

Because locations have not been selected for these activities, the extent of this effect is unknown. However, based on the large proportion of the Conservation Zones that represent land subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that this alternative would convert a substantial area of land subject to Williamson Act contracts or in Farmland Security Zones.

Construction of physical facilities associated with other conservation measures may also occupy small areas of land subject to Williamson Act contracts or in Farmland Security Zones. For example, construction or expansion of a conservation fish hatchery under CM18 could potentially conflict with Williamson Act contracts. Similar effects may arise from conservation measures that would install non-physical fish barriers. However, the effects of these measures on land subject to Williamson Act contracts or in Farmland Security Zones are anticipated to be minor, particularly when compared with the larger restoration actions described above.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes under this alternative, resulting in an adverse effect on the environment. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measure AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use,* Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area. Further evaluation of

these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 4.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. Areas in which crop roots are exposed to a surplus of water could result in root rot, compromising the viability of certain crops, particularly those with deep roots (Refer to Section 14.1, *Environmental Setting/Affected Environment,* for root depths by crop type). Conversely, in areas where the project results in a larger vertical distance between the water table and crop roots, plants with shallow roots may not be able to extract enough water to maintain optimal growth without modifying irrigation or drainage infrastructure. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they would be anticipated to create an adverse effect on agricultural resources if they were to substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses within the study area.

Implementation of CM4 would increase the exchange of tidal water in restoration areas; however, consideration of this measure and its potential effects on electrical conductivity in the Delta has been incorporated in the assessment of CM1 under Impact AG-2.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Implementation of *CM21 Nonproject Diversions*, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. In particular, CM21 would fund programs to modify, remove, or consolidate diversions that serve as supplies of irrigation water within the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Restoration areas implemented under Alternative 4 would result in substantial changes in land use patterns in parts of the study area, which could indirectly affect some farmlands by causing changes to the microclimates surrounding sensitive agricultural crops. For example, large areas of tidal habitat could create a localized climate that would be less supportive of yields of certain crops adjacent to the areas. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass undertaken as part of Alternative 4 would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation. *CM2 Yolo Bypass Fisheries Enhancement*, which this EIR/EIS addresses at a program level, will require the preparation and implementation of a YBFEP. The YBFEP would propose a number of actions, which would include modifications to Fremont Weir to manage timing, frequency, and duration of inundation of the Yolo Bypass. Modifications of Fremont Weir would include installing and operating a gated channel to inundate the floodplain to support covered fish species, primarily from mid-November through April. Opening these gates would result in inundation of the Yolo Bypass. Target inundation footprints would be up to 10,000 acres between November 10 and November 30. Between December 1 and February 28, operations would target up to 17,000 acres of inundation. Between March 1 and May 15, the target inundation area would return to a range of 7,000–10,000 acres. These operations are expected to be typical of, but not necessarily identical to, actual operational guidelines that would be developed in the course of subsequent project-specific design, planning, and environmental documentation.

Although this area currently experiences periodic inundation within the same footprint, if inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Table 14-11 shows typical crop production practices in the Yolo Bypass. After the flow ceases, it may take as many as four weeks for the waters

to recede and for the land to dry sufficiently to start farming. While there is disagreement surrounding the time periods necessary to prepare land and for the Bypass to dry out, for this analysis, a four-week period is used as the amount of time required between the end of water inundation and the point when ground preparation activities can begin. Based on the agricultural practices outlined in Table 14-11, the anticipated dates at which inundation must end to allow planting to be completed are also presented.

As shown in Table 14-11, if the duration of inundation events extends beyond March 1, March 15, April 1, and April 15, the growing season for tomato; safflower; and corn and rice; and Sudan grass could be delayed. This delay may reduce the growing season to the point of changing crop yield and/or quality, or result in fallowing of agricultural land or the growing of less profitable crops on impacted farmlands. Depending on the frequency and duration of inundation events, crop selection may be constrained. However, short of substantially restricting agricultural use of land, these effects would be considered economic, rather than environmental, in nature. Conservation easements or fee-title acquisition would be required for all inundation on agricultural land.

The *Yolo Bypass Flood Date and Flow Volume Agricultural Impact Analysis*, a report created for Yolo County, assesses the agricultural and economic impacts from BDCP-proposed flooding scenarios in the Yolo Bypass, including CM2. The CM2 scenario would only impose water flows through an operable gate at Fremont Weir for an additional 30 days in years when there is natural flooding (see Chapter 3, *Description of Alternatives,* Section 3.6.2, for further description of CM2). Minimal loss of irrigated acres is expected in the CM2 scenario, but losses are anticipated to occur in years when there is natural flooding. The largest losses would be anticipated during years when natural overtopping occurs late into the season. CM2 proposes an additional 30 days of flooding, through the middle of April, which is expected to result in crop yield losses and an increase in fallow acres, as well as agricultural revenue losses.

As farmers delay planting, crop yields decline, which leads to lower revenues and land fallowing. The report identified 9 major crop groups in areas affected by flooding in the Bypass: corn, irrigated pasture, non-irrigated pasture, rice, wild rice, safflower, sunflower, processing tomatoes, and vines (melons). Further discussion of socioeconomic effects of CM2 on agriculture can be found in Chapter 16, *Socioeconomics*, Impact ECON-16 and Impact ECON-18.

Table 14-11. Typical Crop Production Practices in Yolo Bypass

Crop	Ground Preparation	Planting	Harvest	Other	Plant By Date	End Inundation Date[c]
Corn[a]	March–April	April–May	Sept–Oct		June 1	April 1
Pasture[a]				Winter range feeding: Nov-Apr Summer Feeding: May–Oct Breeding: Dec-Feb		
Rice (wild/white) [a]	April–May	April–May	Sept–Nov		June 1	April 1
Safflower[a]	Aug–Oct (during year preceding planting)	Mar–May	Jul–Sept		May 15	March 15
Sudan Grass[b]	April–May	May–July	July–August		June 15	April 15
Tomato[a]	Mar–April	April–May	June–Sept		May 1	March 1

Sources: Crop production practices, all crops except Sudan grass: California Department of Fish and Game and Yolo Basin Foundation 2008.; Sudan grass production practices: U.C. Cooperative Extension 2009.

[a] These data are based on the 2004 Crop Year, which was considered relatively normal year with regard to flooding in the Bypass. There was some mid-winter inundation which receded and did not dramatically impact production.

[b] Data concerning Sudan grass is based on growing cultivation and cycles in South San Joaquin County. Growing conditions and crop cycles in the Yolo Bypass vary from these patterns. Different practices may result.

[c] Table assumes 4 weeks for Bypass to dry out and 4 weeks for ground preparation.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Mitigation Measure AG-1 is available to mitigate this effect.

Additionally, some benefits could result from an increased presence of water. An increase in potential groundwater recharge could raise the groundwater table to within the root zone of some crops (Section 14.1.1.6, *General Crop Production Practices and Characteristics*, discusses of the relationship between crop viability and groundwater table levels). This could also be a beneficial effect in parts of Yolo and Solano Counties that utilize groundwater from the aquifers underneath the Yolo Bypass.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Under the cultivated lands natural community goal and objectives of BDCP *CM3 Natural Communities Protection and Restoration*, the BDCP proponents would acquire and protect approximately 48,100 acres of nonrice cultivated lands and manage them for specific habitat values corollary to agricultural use for species including Swainson's hawk, giant garter snake, greater

sandhill crane, white-tailed kite, and tricolored blackbird. Additionally, 3,500 acres of rice lands or similarly functioning habitat would be maintained annually for giant garter snake in Conservation Zones 4 and/or 5. Because crop selection is dynamic and predominantly influenced by economic forces, the acquisition approach for these goals would allow for a combination of permanent easements, agreements with other agencies, fee-title acquisition, and other methods, to ensure that habitat target acreages are consistently satisfied across the Plan Area. Management activities would maintain existing small patches of riparian woodland and scrub, wetlands, ponds, hedgerows, tree rows, and isolated native or nonnative trees. While these conservation measures would protect agricultural uses on the majority of these lands, specific management actions implemented under *CM11 Natural Communities Enhancement and Management* could reduce crop yields, restrict crop choices, and convert small portions of cultivated lands to nonagricultural uses. Where feasible, tilling would be deferred or some lands left unharvested to increase the amount of forage available to sandhill cranes. Shallow flooding of some lands during fall and winter months may also be adopted to support cranes and other species. While implementation of CM3 would protect agricultural uses on over 48,000 acres of land, management actions under CM11 could directly convert small portions of this land to nonagricultural uses such as grassland edges or woodlots. Management techniques could also result in crop yield reductions following the minimization or cessation of pesticide use on acquired lands, as many agricultural operators are currently able to apply pesticides in a manner that causes such substances to "drift" onto neighboring properties. However, the agricultural use of this land would be preserved and any further restrictions on the continued agricultural use of the land are unlikely to be substantial.

Other conservation measures related to habitat restoration and enhancement could also indirectly affect agricultural production or management practices. For example, restored habitat areas adjacent to agricultural lands could increase crop predation by birds and could introduce invasive species onto agricultural lands, reducing yields and associated production value. A related concern is the introduction of a covered species into a new area, which may require adjustments to agricultural management practices or the initiation of Safe Harbor Agreements. Finally, other "important related actions" identified by the BDCP could further limit pesticide and herbicide discharge in the study area, possibly leading to other reductions in crop yield or increases in operating costs. These effects would be considered primarily economic in nature.

Beneficial effects could result from efforts to control nonnative aquatic vegetation under *CM13 Invasive Aquatic Vegetation Control* and limit the spread of invasive species under *CM20 Recreational Users Invasive Species Program*. If successful, these measures could limit the spread of weeds and pests, while keeping irrigation infrastructure free from aquatic vegetation.

While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes, even though some neighboring operators might no longer be able to conduct operations in a way that causes chemicals to drift onto adjacent properties. Overall, these effects would not be anticipated to result in the substantial restriction of agricultural uses.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these

activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 4.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.10 Alternative 5—Dual Conveyance with Pipeline/Tunnel and Intake 1 (3,000 cfs; Operational Scenario C)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 5 would be similar to those described for Alternative 1A except that Intakes 2, 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 833 acres of Important Farmland to other uses, including 747 acres of Prime Farmland, 11 acres of Farmland of Statewide Importance, 17 acres of Unique Farmland, and 59 acres of Farmland of Local Importance.

Construction of a single-bore tunnel and reduced forebay sizes would be anticipated to result in effects on fewer areas. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 5 would be similar to those described for Alternative 1A except that Intakes 2, 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 4,770 acres of Important Farmland to other uses, including 3,267 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,049 acres of Unique Farmland, and 124 acres of Farmland of Local Importance. Construction of a single-bore tunnel and reduced forebay sizes would be anticipated to result in effects on fewer areas. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 5 would be similar to those described for Alternative 1A except that Intakes 2, 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 632 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Construction of a single-bore tunnel and reduced forebay sizes would be anticipated to result in effects on fewer areas. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 5 would be similar to those described for Alternative 1A except that Intakes 2, 3, 4, and 5 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 2,753 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. Construction of a single-bore tunnel and reduced forebay sizes would be anticipated to result in effects on fewer areas. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 833 acres of Important Farmland and 632 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,770 acres of Important Farmland and 2,753 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. However, temporarily lower groundwater levels related to dewatering for pumping plant construction associated with Intakes 2, 3, 4, and 5 would not apply to this alternative. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 5, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, operation of the water conveyance facility would result in an increase in the number of days EC objectives would be exceeded in the Sacramento River at Emmaton, San Joaquin River at San Andreas Landing and Old River at Tracy Bridge. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 23% under Alternative 5, and the percent of days out of compliance would increase from 11% to 35%. Over the entire period modeled, the San Andreas Landing objective would increase from 1% to 4% of days in exceedance, and from 1% to 7% of days out of compliance with the EC objective. In Old River at Tracy Bridge, the percent of days exceeding the EC objective would increase from 4% conditions to 5% while the percent of days out of compliance would increase by less than 1%.

Average EC levels would decrease at western and southern Delta compliance locations, except at Emmaton in the western Delta, and would increase at the two interior Delta compliance locations. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. At Emmaton, average EC would increase by 3% for the entire period modeled and 10% for the drought period modeled. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 3% and the San Joaquin River at San Andreas Landing average EC would increase 5%. Modeling of drought years estimates EC reaching as high as 1.591 dS/m at the Emmaton compliance location. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.10, Impact WQ-11 and Appendix 8H, Tables EC-5 and EC-16.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 37 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and

irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 5 related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. However, Alternative 5 would restore 25,000 acres of tidal habitat, rather than 65,000 acres.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. However, the extent of conversion would likely be smaller than for other alternatives. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 43,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approach; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to

Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. However the severity of these effects would be reduced when compared to other alternatives, based on the restoration of a smaller area of tidal habitat. Nonetheless, conservation activities could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 5 would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar, but smaller in magnitude, to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities

and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 5 would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 5 would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural

infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.11 Alternative 6A—Isolated Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario D)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects associated with construction of structures under Alternative 6A would be identical to those described for Alternative 1A. This alternative would convert approximately 1,329 acres of Important Farmland to other uses, including 1,126 acres of Prime Farmland, 13 acres of Farmland of Statewide Importance, 48 acres of Unique Farmland, and 143 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 6A would be identical to those described for Alternative 1A. The facilities associated with this alternative could convert approximately 4,984 acres of Important Farmland to project uses, including 3,427 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,054 acres of Unique Farmland, and 173 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important

Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 6A would be identical to those described for Alternative 1A. This alternative could convert approximately 787 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 6A would be identical to those described for Alternative 1A. This alternative could convert approximately 2,857 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 1,329 acres of Important Farmland and 787 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,984 acres of Important Farmland and 2,857 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or

preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 6A, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, operation of the water conveyance facility would generally result in a decrease in the number of days EC objectives for agriculture would be exceeded at interior Delta compliance points. The frequency of days in exceedance or noncompliance with EC objectives in the south Delta would either remain the same or slightly decrease when compared to Existing Conditions. In the Sacramento River at Emmaton, the percent of days the EC objective would be exceeded would increase from 6% under Existing Conditions to 28% under Alternative 6A, and the percent of days out of compliance would increase from 11% under Existing Conditions to 40% under Alternative 6A.

Average EC levels would decrease at western and southern Delta compliance locations and at San Joaquin River at San Andreas Landing in the interior Delta. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 7%. Modeling of drought years estimates EC reaching as high as 1.265 dS/m in the Sacramento River at Emmaton. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.11, Impact WQ-11 and Appendix 8H, Tables EC-6 and EC-17.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 38 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 6A related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Alternative 6A would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 6A would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 6A would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 6A would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to

nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.12 Alternative 6B—Isolated Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario D)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 6B would be identical to those described for Alternative 1B. This alternative would convert approximately 2,144 acres of Important Farmland to other uses, including 1,769 acres of Prime Farmland, 61 acres of Farmland of Statewide Importance, 214 acres of Unique Farmland, and 99 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 6B would be identical to those described for Alternative 1B. The facilities associated with this alternative could convert approximately 18,875 acres of Important Farmland to project uses, including 15,800 acres of Prime Farmland, 530 acres of Farmland of Statewide Importance, 2,031 acres of Unique Farmland, and 513 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 6B would be identical to those described for Alternative 1B. This alternative could convert approximately 1,326 acres of land subject to Williamson Act contracts, including 233 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 6B would be identical to those described for Alternative 1B. This alternative could convert approximately 14,080 acres of land subject to Williamson Act contracts, including 3,788 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 2,144 acres of Important Farmland and 1,326 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 18,875 acres of Important Farmland and 14,080 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to

those identified under Alternative 1B. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal, due to groundwater recharge from this facility. In the southern portion of this alignment, recharge could result in near-surface groundwater levels, which could compromise the viability of agricultural uses on land in these areas. If a lined canal were constructed, canal-related seepage would be minimal.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 6A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance would generally decrease or remain unchanged for agricultural EC compliance locations except for Sacramento River at Emmaton, for which the frequency of exceedance and non-compliance with EC objectives would generally increase. Average EC levels would decrease at western and southern Delta compliance locations and at San Joaquin River at San Andreas Landing in the interior Delta but increase at the S. Fork Mokelumne River at Terminous compliance point. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.11, Impact WQ-11 and Appendix 8H, Tables EC-6 and EC-17.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities would be similar to those described under Alternative 1B. Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 136 miles of agricultural delivery canals and drainage ditches, including approximately 32 miles on Roberts Island, 28 miles on Union Island, 13 miles on New Hope Tract, 11 miles on Terminous Tract, and 10 miles on Rindge Tract. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11

will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 6B related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1B. Alternative 6B would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic

effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 6B would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 6B would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 6B would be similar to those described for Alternative 1B. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one

ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.13 Alternative 6C—Isolated Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario D)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 6C would be identical to those described for Alternative 1C. This alternative would convert approximately 3,170 acres of Important Farmland to other uses, including 2,380 acres of Prime Farmland, 165 acres of Farmland of Statewide Importance, 160 acres of Unique Farmland, and 466 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 6C would be identical to those described for Alternative 1C. The facilities associated with this alternative would convert approximately 13,014 acres of Important Farmland to project uses, including 11,124 acres of Prime Farmland, 291 acres of Farmland of Statewide Importance, 909 acres of Unique Farmland, and 690 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts associated with construction of structures under Alternative 6C would be identical to those described for Alternative

1C. This alternative would convert approximately 1,243 acres of land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts associated with construction of structures under Alternative 6C would be identical to those described for Alternative 1C. This alternative would convert approximately 7,647 acres of land subject to Williamson Act contracts. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities could convert approximately 3,170 acres of Important Farmland and 1,243 acres of land subject to Williamson Act contracts to other uses. Physical structures would also permanently convert approximately 13,014 acres of Important Farmland and 7,647 acres of land subject to Williamson Act contracts to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1C. During long-term operations of the water conveyance proposed under this alternative, increases and decreases in the groundwater level could occur in the vicinity of an unlined canal due to groundwater recharge from this facility. Particularly in the northern portion of the unlined canal, agricultural drainage would be affected, which could compromise the viability of agricultural uses on land in these areas. If a lined canal were constructed, canal-related seepage would be minimal.

Effects on agriculture as a result of changes in salinity

Under this alternative, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4 would be similar to those described under Alternative 6A. BDCP operations could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, the frequency of exceedance and non-compliance would generally decrease or remain unchanged for agricultural EC compliance locations except for Sacrmento River at Emmaton, for which the frequency of exceedance and non-compliance with EC objectives would generally increase. Average EC levels would decrease at western and southern Delta compliance locations and at San Joaquin River at San Andreas Landing in the interior Delta but increase at the S. Fork Mokelumne River at Terminous compliance point. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. However, increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields. However, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.11, Impact WQ-11 and Appendix 8H, Tables EC-6 and EC-17.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities would be similar to those described under Alternative 1C. Temporary construction activities and the permanent footprints associated with physical features constructed as part of this alternative could create conflicts with existing irrigation and drainage facilities throughout the study area. The conveyance alignment constructed under this alternative would cross or interfere with approximately 124 miles of agricultural delivery canals and drainage ditches, including approximately 45 miles on Ryer Island, 37 miles on the Netherlands (north of Ryer Island), 20 miles on Byron Tract, and 12 miles on Merritt Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 6C related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1C. Alternative 6C would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 6C would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 6C would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 6C would be similar to those described for Alternative 1C. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further

evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.14 Alternative 7—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5, and Enhanced Aquatic Conservation (9,000 cfs; Operational Scenario E)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 7 would be similar to those described for Alternative 1A except that Intakes 1 and 4 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 1,105 acres of Important Farmland to other

uses, including 979 acres of Prime Farmland, 13 acres of Farmland of Statewide Importance, 48 acres of Unique Farmland, and 64 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 7 would be similar to those described for Alternative 1A except that Intakes 1 and 4 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 4,883 acres of Important Farmland to other uses, including 3,388 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,054 acres of Unique Farmland, and 111 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 7 would be similar to those described for Alternative 1A except that Intakes 1 and 4 would not be built. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 744 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 7 would be similar to those described for Alternative 1A except that Intakes 1 and 4 would not be built. Construction of facilities under this alternative would necessitate conversion of approximately 2,847 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately

1,105 acres of Important Farmland and 744 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,883 acres of Important Farmland and 2,847 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. However, temporarily lower groundwater levels related to dewatering for pumping plant construction associated with Intakes 1 and 4 would not apply to this alternative. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 7, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions,

Sacramento River at Emmaton and San Joaquin River at San Andreas Landing and Brandt Bridge would experience an increase in the number of days when water would exceed or be out of compliance with electrical conductivity objectives. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 16% under Alternative 7, and the percent of days out of compliance would increase from 11% to 26%. The San Andreas Landing objective would increase from 1% to 3% of days in exceedance, and from 1% to 6% of days out of compliance with the EC objective. At Brandt Bridge, the frequency of exceedance would rise from 3% to 4% and that of non-compliance would increase from 8% to 9%. Additionally, the San Joaquin River at Vernalis exhibits a minor decrease in the frequency of exceedance of EC objectives, while the number of days out of compliance with objectives at this location would increase by 1%. Average EC levels would decrease at western and southern Delta compliance locations and at San Joaquin River at San Andreas Landing. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 6%. Modeling of drought years estimates EC reaching as high as 1.266 dS/m at the Emmaton compliance location. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.14, Impact WQ-11 and Appendix 8H, Tables EC-7 and EC-18.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 38 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible

phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 7 related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. However, effects would be more widely distributed because Alternative 7 would restore 20,000 acres of seasonally-inundated floodplain and enhance 40 miles of channel margin habitat rather than the 10,000 acres that would be restored and 20 miles enhanced under Alternative 1A. Across all habitat types, Alternative 7 would restore approximately 93,800 acres under a number of conservation measures.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. The extent of conversion would likely be larger than for other alternatives. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 93,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 40 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid

a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. However the severity of these effects would be expanded when compared to other alternatives, based on the restoration of a larger area of seasonally-inundated floodplain and channel margin habitat enhancement. Nonetheless, conservation activities could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 7 would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar, but larger in magnitude, to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or

indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 7 would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 7 would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators,

and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.3.15 Alternative 8—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5 and Increased Delta Outflow (9,000 cfs; Operational Scenario F)

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on Important Farmland associated with construction of structures under Alternative 8 would be identical to those described for Alternative 7. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 1,105 acres of Important Farmland to other uses, including 979 acres of Prime Farmland, 13 acres of Farmland of Statewide Importance, 48 acres of Unique Farmland, and 64 acres of Farmland of Local Importance. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Permanent effects on Important Farmland associated with construction of structures under Alternative 8 would be identical to those described for Alternative 7. Construction of facilities under this alternative would necessitate conversion of approximately 4,883 acres of Important Farmland to other uses, including 3,388 acres of Prime Farmland, 330 acres of Farmland of Statewide Importance, 1,054 acres of Unique Farmland, and 111 acres of Farmland of Local Importance. Table

14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary and short-term effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 8 would be identical to those described for Alternative 7. Construction of facilities under this alternative would necessitate temporary or short-term conversion of approximately 744 acres of land subject to Williamson Act contracts, including 77 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Permanent effects on land subject to Williamson Act contracts or in Farmland Security Zones associated with construction of structures under Alternative 8 would be identical to those described for Alternative 7. Construction of facilities under this alternative would necessitate conversion of approximately 2,847 acres of land subject to Williamson Act contracts, including 643 acres in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of RTM (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1, would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities would convert approximately 1,105 acres of Important Farmland and 744 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 4,883 acres of Important Farmland and 2,847 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse RTM (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design,

they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area, as discussed in Chapter 7, *Groundwater*, Impacts GW-1, GW-2, GW-4, and GW-5. These effects would be similar to those identified under Alternative 1A, Impact AG-2. However, temporarily lower groundwater levels related to dewatering for pumping plant construction associated with Intakes 1 and 4 would not apply to this alternative. These effects could restrict or prevent agricultural uses on land in these areas.

Effects on agriculture as a result of changes in salinity

Under Alternative 8, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, there would be an increase number of days when electrical conductivity objectives would be exceeded in the Sacramento River at Emmaton, San Joaquin River at Vernalis and at Brandt Bridge, and in the Old River near Middle River. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions to 16% under Alternative 8, and the percent of days out of compliance would increase from 11% to 28%. During operation of Alternative 8, the frequency of days in exceedance of the Vernalis objective increases less than 1% compared to Existing Conditions, remaining at 3%. The frequency of days out of compliance with this EC objective would increase from 7% to 8%. At Brandt Bridge, the frequency of exceedance would rise from 3% to 4% and that of non-compliance would increase from 8% to 9%. The frequency of days in exceedance of or out of compliance with the Old River objective increases less than 1%, remaining at 3% and 8%, respectively. Average EC levels would decrease at western and southern Delta compliance locations and at San Joaquin River at San Andreas Landing (in the interior Delta). Where salinity levels decrease, higher quality irrigation

water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. Over the entire period modeled, the S. Fork Mokelumne River at Terminous average EC would increase 5%. Modeling of drought years estimates EC reaching as high as 1.317 dS/m at the Emmaton compliance location. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.15, Impact WQ-11 and Appendix 8H, Tables EC-8 and EC-19.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Conflicts with existing irrigation and drainage facilities as a result of constructing the water conveyance facility would be similar to those described under Alternative 1A. The conveyance alignment constructed under this alternative would cross or interfere with approximately 38 miles of agricultural delivery canals and drainage ditches, including approximately 7 miles on Victoria Island, 5 miles on Bacon Island, 4 miles on Byron Tract, and 4 miles on Tyler Island. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas and disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation in localized areas, increased levels of salinity, and disruption of drainage and irrigation facilities. In other areas, effects of this alternative related to water quality could be beneficial. Implementation of Mitigation Measures AG-1, GW-1 GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iv) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue

working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 8 related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Alternative 8 would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or

cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A,

Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 8 would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 8 would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 8 would be similar to those described for Alternative 1A. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

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

This alternative would construct two fish-screened intakes, fourteen operable barriers, two pumping plants and other associated facilities, two culvert siphons, three canal segments, new levees, and new channel connections. Some existing channels would also be enlarged under this alternative. Nearby areas would be altered as work or staging areas or used for the deposition of spoils. Areas used for borrow and then for spoils would also be anticipated to have an effect on agricultural resources. To operate this conveyance facility, the construction of transmission lines, access roads, two bridges, and other associated facilities would also be necessary.

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

Temporary and short-term conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Temporary and short-term construction of water conveyance facilities associated with Alternative 9 would convert existing agricultural land to construction-related uses, directly precluding agricultural use for the duration of construction. This alternative would convert approximately 559 acres of Important Farmland to other uses, including 388 acres of Prime Farmland, 71 acres of Farmland of Statewide Importance, 3 acres of Unique Farmland, and 97 acres of Farmland of Local Importance.

Of these areas of Important Farmland, operable barrier work areas would require the temporary or short-term conversion of nearly 200 acres. These areas would be adjacent to proposed operable barriers including on the Sacramento River at Georgiana Slough, Three Mile Slough, and Delta Cross Channel; on the Mokelumne River near Lost Slough; on Meadows Slough near the Sacramento River; on Snodgrass Slough north of Delta Cross Channel; on the San Joaquin River at head of Old River; on Middle River south of Victoria Canal; at Victoria Canal/North Canal; on Woodward Canal/North Victoria Canal; on Railroad Cut; on Connection Slough; at Frank's Tract; and on Fisherman's Cut. Siphon work areas would convert approximately 125 acres on Coney Island and west Union Island for culvert siphons crossing Old River and West Canal. Work areas associated with proposed canals would require nearly 70 acres south of Clifton Court Forebay and on west Union Island. Other temporary work areas, including those necessary for the construction of access roads, barge facilities, dredging and channel enlargement activities, fish screens, levees, and transmission lines would also be located on farmland within the conveyance alignment. Mapbook Figure M14-9 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of Important Farmland as a result of constructing the proposed water conveyance facility

Physical structures associated with construction of water conveyance facilities would occupy agricultural lands designated as Important Farmland, directly precluding future agricultural use. The facilities associated with this alternative would convert approximately 2,459 acres of Important

Farmland to project uses, including 2,104 acres of Prime Farmland, 307 acres of Farmland of Statewide Importance, 7 acres of Unique Farmland, and 41 acres of Farmland of Local Importance.

Of these areas of Important Farmland, areas dedicated to borrow or spoils would convert approximately 2,000 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest areas identified adjacent to Middle River on Bacon Island, Woodward Island, and Jones Tract and north of Victoria Canal and Victoria Island. As described in Appendix 3B, *Environmental Commitments*, it is anticipated that dredged material would be removed from storage areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Approximately 340 acres would be converted to canals between Victoria Canal and Clifton Court Forebay and between Clifton Court Forebay and the Tracy Fish Facility. Channel enlargement areas, fish screens, operable barriers, and transmission lines would also require conversion of lands to nonagricultural uses. Mapbook Figure M14-9 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with Important Farmland. Table 14-8 displays a summary of temporary and short-term acreage and permanent acreage of Important Farmland that could be converted to non-agricultural uses under implementation of each alternative.

Temporary and short-term conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Temporary or short-term construction activities related to building the physical components of Alternative 9 would directly convert land subject to Williamson Act contracts or in Farmland Security Zones. This alternative would convert approximately 790 acres of land subject to Williamson Act contracts, including 132 acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, operable barrier work areas would require the temporary or short-term conversion of approximately 370 acres, primarily adjacent to Middle River south of Mildred Island. Operable barrier work areas would be located on nearly 130 acres. These areas would be adjacent to proposed barriers throughout the conveyance alignment. Siphon work areas would convert approximately 125 acres on Coney Island and west Union Island for culvert siphons crossing Old River and West Canal. Other temporary work areas, including those necessary for the construction of canals, access roads, barge facilities, dredging and channel enlargement activities, fish screens, levees, and transmission lines would also be located on land subject to Williamson Act contracts or in Farmland Security Zones within the conveyance alignment. Mapbook Figure M14-10 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

Permanent conversion of land subject to Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility

Physical components of Alternative 9 would directly and permanently convert land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses. This alternative would convert approximately 2,347 acres of land subject to Williamson Act contracts, including 919

acres in Farmland Security Zones. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-1.

Of this land subject to Williamson Act contracts or in Farmland Security Zones, areas dedicated to borrow or spoils would convert more than 1,900 acres under this alternative. These areas would be located throughout the conveyance alignment, with some of the largest areas identified adjacent to Middle River on Bacon Island, Woodward Island, and Jones Tract and north of Victoria Canal and Victoria Island. As described in Appendix 3B, *Environmental Commitments*, it is anticipated that dredged material would be removed from storage areas and reused, as appropriate, as bulking material for levee maintenance, as fill material for habitat restoration projects, or other beneficial means of reuse identified for the material. Approximately 240 acres would be converted to canals between Victoria Canal and Clifton Court Forebay and between Clifton Court Forebay and the Tracy Fish Facility. Channel dredging and enlargement areas, fish screens, operable barriers, and transmission lines would also require conversion of lands to nonagricultural uses. Mapbook Figure M14-10 shows all of the construction features (including temporary work areas) associated with this proposed water conveyance facility alignment along with land subject to Williamson Act contracts or in Farmland Security Zones. Table 14-9 displays a summary of temporary and short-term acreage and permanent acreage of land subject to Williamson Act contracts or in Farmland Security Zones that could be converted to non-agricultural uses under implementation of each alternative.

NEPA Effects: The temporary and short-term conversion and permanent conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to non-agricultural uses, as discussed above, would constitute an adverse effect on the physical environment. Disposal and reuse of dredged material (described in Appendix 3B, *Environmental Commitments*), along with Mitigation Measure AG-1 would be available to reduce these effects.

***CEQA Conclusion*:** Construction of physical structures associated with the water conveyance facility proposed under this alternative would occupy Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, directly precluding agricultural use for the duration of construction. Temporary and short-term construction of facilities could convert approximately 559 acres of Important Farmland and 790 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. Physical structures would also permanently convert approximately 2,459 acres of Important Farmland and 2,347 acres of land subject to Williamson Act contracts or in Farmland Security Zones to other uses. These are considered significant impacts on the environment. However, implementation of Mitigation Measure AG-1 along with an environmental commitment to reuse dredged material (described in Appendix 3B, *Environmental Commitments*) would reduce these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship

approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place. For further discussion of potential incompatibilities with land use designations, see Chapter 13, *Land Use*, Impact LU-1.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

Effects on agriculture as a result of changes in groundwater elevation

Construction and operation of water conveyance facilities under Alternative 9 would not be anticipated to substantially affect groundwater levels and recharge in the Delta. While new, small canal sections and channel connections would be operated as part of this alternative, their effects would be minor.

Effects on agriculture as a result of changes in salinity

Under Alternative 9, the operation of new physical facilities combined with hydrodynamic effects of habitat restoration activities under CM2 and CM4, could indirectly affect agriculture by causing changes to the quality of irrigation water in parts of the study area. Relative to Existing Conditions, there would be an increase in the number of days when the San Joaquin River at San Andreas Landing would be out of compliance with electrical conductivity objectives, increasing from 1% to 2% of days. The percent of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% to 17%, and the percent of days out of compliance would increase from 11% to 28%. Additionally, in Three Mile Slough near the Sacramento River, there would be a minor decrease in the frequency of exceedance of EC objectives, while the number of days out of compliance with objectives at this location would increase by less than 1%.

Average EC levels would decrease at western and southern Delta compliance locations, except at Emmaton, and at S. Fork Mokelumne River at Terminous. Where salinity levels decrease, higher quality irrigation water could benefit agricultural activities by reducing potential restrictions related to yields and crop selection. In the Sacramento River at Emmaton, average EC would increase 22% for the entire period modeled and 36% during the drought period modeled. Over the entire period modeled, the average EC in the San Joaquin River at San Andreas Landing would increase 16%. Modeling of drought years estimates EC reaching as high as 1.976 dS/m in the Sacramento River at Emmaton. Increased salinity levels suggest that a number of crops using this irrigation water may not be able to reach full yields, as reported in Table 14-6. In general, agricultural activities would be anticipated to continue on lands using these sources. Complete water quality modeling results are discussed in Chapter 8, *Water Quality*, Section 8.3.3.16, Impact WQ-11 and Appendix 8H, Tables EC-9 and EC-20.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Temporary construction activities like dredging and work areas for constructing levees, canals, siphons, pumping plants, and operable barriers could change the quantity and quality of water available through agricultural delivery canals. The conveyance alignment constructed under this alternative would cross or interfere with approximately 27 miles of agricultural delivery canals and drainage ditches, including approximately 8 miles on Victoria Island, 4 miles on Jones Tract, 4 miles on Coney Island, and 4 miles on Woodward Island. Additionally, approximately 370 delivery canals and drainage ditches lie along the corridors used under this conveyance alignment. Several modifications to drainage facilities would also be necessary under this alternative, in order to separate the water supply corridors from those designated for fish movement. Construction activities requiring excavation or use of land where irrigation canals are currently located could disrupt the delivery of water to crops, which would compromise a key condition for the productive use of the land for agriculture. Similarly, where construction or the long-term placement of conveyance facilities associated with this alternative requires an existing agricultural drainage facility to be disconnected, high groundwater levels could expose crops to soil conditions that would prevent the continuation of most agricultural activities on the affected land. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, continued agricultural use of the land could be jeopardized.

NEPA Effects: Considered together, construction and operation of the water conveyance facility under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1 and WQ-11 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Water conveyance facility construction and operation could create a significant adverse impact on agriculture by converting substantial amounts of Important Farmland to other uses through disruption of drainage and irrigation facilities. Effects of this alternative related to water quality could be adverse or beneficial, depending on the location. Implementation of Mitigation Measures AG-1 and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-

environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects of Alternative 9 related to the conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones associated with these conservation measures would be similar to those described for Alternative 1A. Potential variations could result from areas in which physical features associated with this alternative conflict with potential restoration areas thereby necessitating implementation elsewhere. Alternative 9 would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced.

NEPA Effects: Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes, resulting in an adverse effect. While conflicts with or cancellation of Williamson Act contracts would not—by itself—constitute an adverse effect on the quality of the human environment, the related conversion of the underlying agricultural resource would result in such an effect. Mitigation Measures AG-1 would be available to lessen the severity of these potential effects. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses. For further discussion of potential incompatibilities with land use policies, see Chapter 13, *Land Use*, Impact LU-4.

***CEQA Conclusion*:** This alternative would restore approximately 83,800 acres under conservation measures geared toward the restoration of various natural communities. Additionally, 20 linear miles of channel margin habitat would be enhanced. Implementation of restoration activities and

other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a significant impact on agricultural resources in the study area.

Further evaluation of these impacts would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measure AG-1 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects on agriculture as a result of changes in groundwater elevation

Implementation of these conservation measures could indirectly affect agriculture by causing changes to the elevation of groundwater in the study area, as described under Alternative 1A, Impact AG-4 and in Chapter 7, *Groundwater*, Impact GW-6. Increased frequency of inundation associated with proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration would result in increased groundwater recharge, which could result in groundwater level rises and soil saturation on adjacent lands. While the geographic incidence and potential severity of these effects are unknown and would depend on existing localized groundwater levels in the vicinity of sites chosen for restoration, they could substantially restrict agricultural uses.

Effects on agriculture as a result of changes in salinity

Effects related to salinity under Alternative 9 would be similar to those described for Alternative 1A, Impact AG-4. As discussed in Chapter 8, *Water Quality*, under Impact WQ-12, implementation of these conservation measures would not introduce new sources of electrical conductivity into the

study area. Therefore, as they relate to salinity of irrigation water, these measures would not be anticipated to restrict agricultural uses in the study area.

Effects on agriculture as a result of changes in microclimates and localized growing conditions

Effects on agriculture as a result of changes to microclimates introduced by the implementation of conservation measures would be similar to those described under Alternative 1A, Impact AG-4. Under this alternative, the restoration of large areas of tidal habitat could create a localized climate that would be less supportive of crop yields adjacent to areas chosen for habitat restoration. However, this effect is speculative and its potential severity would depend on site-specific conditions.

Effects on agriculture as a result of disruptions to agricultural infrastructure

Effects related to disruption of infrastructure would be similar to those described under Alternative 1A, Impact AG-4. Implementation of CM21, Nonproject Diversions, along with construction activities and the permanent footprints associated with land acquired for habitat restoration, could directly or indirectly disrupt existing agricultural irrigation and drainage facilities throughout the study area. Where irrigation or drainage infrastructure is disconnected from the farmland it serves, agricultural uses could be substantially restricted. However, the location and severity of this effect would depend on site-specific conditions.

Effects on agriculture as a result of increased frequency of inundation events

Modified activities in the Yolo Bypass under Alternative 9 would be identical to those described in Alternative 1A, Impact AG-4, and would indirectly affect agricultural practices by increasing the frequency, duration, and magnitude of floodplain inundation in the Yolo Bypass. If inundation continues later in the spring, this could result in a delay in ground preparation and planting operations for crops within the Yolo Bypass. Additionally, the increased presence of water over a longer duration could result in a change to crop yields and production, due to a variety of factors beyond delay in planting operations.

The new inundation schedule could substantially prevent agricultural use of these lands. The amount of agricultural land potentially affected by these and related activities (up to 17,000 acres) suggests the potential for an adverse effect on agricultural resources; however, the extent of these effects is unknown at this point and will be analyzed in forthcoming documents for the YBFEP, which would be completed under CM2. Additionally, Mitigation Measure AG-1 is available to mitigate this effect.

Changes to agricultural practices and protection of agricultural land as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

Effects related to changes in agricultural practices and protection levels under Alternative 9 would be similar to those described for Alternative 1A. Potential changes could result from areas chosen for protection based on the physical alignment of facilities under this alternative. The cultivated lands natural community strategy under CM3 would acquire agricultural land and manage it for specific habitat values corollary to agricultural use for covered species. While these effects would convert small areas of land to nonagricultural use and could change agricultural practices or yields across a large area, conservation measures would also support the continued use of land for agricultural purposes. Overall, this effect would not be anticipated to substantially restrict agricultural use.

NEPA Effects: Considered together, implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. However, implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these adverse effects.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under this alternative could create a significant impact on agriculture by converting substantial amounts of Important Farmland to other uses through changes to groundwater elevation and seepage, disruption of drainage and irrigation facilities, or increased inundation. Further evaluation of these effects would depend on additional information relating to the location of these activities and other detailed information. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of these impacts by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.3.4 Cumulative Analysis

This cumulative impact analysis considers projects that could affect agricultural resources and, where relevant, in the same time frame as an action alternative, result in a cumulative impact. Agricultural resources are expected to change as a result of past, present, and reasonably foreseeable future projects related to population growth and changes in economic activity in the study area (for further discussion of these changes, see Chapter 16, *Socioeconomics,* and Chapter 30, *Growth Inducement and Other Indirect Effects*). It is expected that some changes related to agriculture, including conversion of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, would take place, even though it is assumed that

reasonably foreseeable future projects would include typical design and construction practices to avoid or minimize potential impacts.

When the effects of any of the BDCP alternatives are considered in combination with the effects of initiatives listed in Table 14-12, the cumulative effects on agriculture would be adverse. The specific programs, projects, and policies are identified below for each impact category based on the potential to contribute to a BDCP impact that could be deemed cumulatively considerable. The potential for cumulative impacts on agriculture is described for effects related to the construction of water conveyance facilities and effects stemming from the long-term implementation of CM2–22.

The following list includes projects considered for this cumulative effects section; for a complete list of such projects, consult Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*.

Table 14-12. Effects on Agriculture from the Plans, Policies, and Programs Considered for Cumulative Analysis

Agency	Program/ Project	Status	Description of Program/Project	Effects on Agriculture
Department of Water Resources	North Delta Flood Control and Ecosystem Restoration Project	Final EIR completed in 2010	Project implements flood control and ecosystem restoration benefits in the north Delta	Project includes changes to land uses from restoration of floodplain areas and levee protection elements
Freeport Regional Water Authority and Bureau of Reclamation	Freeport Regional Water Project	Project was completed late 2010. Estimated completion of water treatment plant in 2012	Project includes an intake/pumping plant near Freeport on the Sacramento River and a conveyance structure to transport water through Sacramento County to the Folsom South Canal	Project resulted in permanent conversion of approximately 50–70 acres of farmland to nonagricultural uses. Approximately 35–45 acres of farmland and 415 acres of land subject to Williamson Act contracts were temporarily affected
Reclamation District 2093	Staten Island Wildlife-Friendly Farming Demonstration	Ongoing program	Habitat restoration project allowing longer flooding duration on agricultural lands	Longer inundation period over 2,500 – 5,000 acres of corn
California Department of Fish and Wildlife	Fremont Landing Conservation Bank	Program under development. Mitigated Negative Declaration issued in 2009		Could convert active farmland to nonagricultural use
California Department of Fish and Wildlife	Restoring Ecosystem Integrity in the Northwest Delta	Ongoing program	Acquisition of conservation easements on habitat and agricultural lands	Currently acquiring agricultural easement on 292 acres

Agency	Program/ Project	Status	Description of Program/Project	Effects on Agriculture
Bureau of Reclamation	Delta-Mendota Canal/California Aqueduct Intertie	Project completed in 2012	The purpose of the intertie is to better coordinate water delivery operations between the California Aqueduct (state) and the Delta-Mendota Canal (federal) and to provide better pumping capacity for the Jones Pumping Plant. New project facilities include a pipeline and pumping plant	Under the preferred alternative, approximately 2 acres of grazing land has been permanently converted to developed land
California Department of Water Resources	South Delta Temporary Barriers Project	Ongoing project	Project to increase water levels and improve circulation patterns and water quality while improving operational flexibility of the State Water Project	Barriers improve water quality for agricultural uses
Bureau of Reclamation and San Luis & Delta Mendota Water Authority	Grassland Bypass Project, 2010-2019, and Agricultural Drainage Selenium Management Program	Program under development. Final EIS/EIR in 2009	Reduce effects from agricultural drainage	Affects regulatory compliance for agricultural operators
Central Valley Regional Water Quality Board	Irrigated Lands Regulatory Program	Ongoing program	Program to prevent agricultural discharges from impairing waters	Affects regulatory compliance for agricultural operators

The above list of related projects evaluated for cumulative impacts includes a number of projects that would convert agricultural lands to nonagricultural uses and otherwise affect agricultural activities in the study area. The proposed BDCP, in conjunction with other projects that affect agricultural use, would convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to nonagricultural uses, while also creating indirect effects on agriculture. Agricultural conversion could occur through urban development in the study area, habitat restoration efforts, water supply projects, and water quality programs. The actual amount of land and that may be converted by other projects is not known. Considering two major projects in the vicinity of the BDCP alternatives, Mountain House and River Islands development, approximately 7,241 acres of agricultural land would be converted to developed uses. Additionally, the Delta Wetlands Project would convert Bacon Island and Webb Tract into reservoirs while using Bouldin Island and Holland Tract for agriculture and wildlife habitat. This project would also be anticipated to convert land to nonagricultural uses; however, associated mitigation may also be provided in the form of easements on 5,500 acres of agricultural land in San Joaquin County (Stockton Recordnet 2013).

14.3.4.1 Cumulative Effects of the No Action Alternative

Under the No Action Alternative, agricultural production would continue largely as it has under Existing Conditions. This alternative includes continued implementation of SWP/CVP operations, maintenance, enforcement, and protection programs by federal, state, and local agencies and non-profit groups, as well as projects that are permitted or assumed to be constructed by 2060. This includes implementation of the 2008 and 2009 Biological Opinions issued by NMFS and USFWS, which establish certain RPAs requiring habitat restoration that may result in conversion of agricultural land to nonagricultural uses (National Marine Fisheries Service 2009, U.S. Fish and Wildlife Service 2008). The effects of climate change that would occur with or without the BDCP are also part of the No Action Alternative. A complete list and description of programs, plans, and other assumptions considered under the No Action Alternative is provided in Chapter 3, *Description of Alternatives*, Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*.

Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland and of Land Subject to Williamson Act Contracts or in Farmland Security Zones

A selection of the programs, plans, and projects included under the No Action Alternative that are relevant to the discussion of agricultural resources are summarized in Table 14-7, and a selection of those relevant for consideration of cumulative effects are summarized in Table 14-12. Because the amount of Important Farmland that could be converted to nonagricultural uses under the No Action Alternative is substantial in the context of the study area, these plans, policies, and programs would be deemed to have cumulative adverse effects upon agricultural resources. If species and habitat conservation requires the conversion of farmland, it would necessitate its own environmental review process to determine the potential for adverse effects on agriculture.

Other Effects on Agriculture

As described in Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions,* SWP/CVP operations identified as continuing actions under the No Action Alternative include repair, maintenance, or protection of imperiled infrastructure such as levees, and may also include actions for water quality management, habitat and species protection, or flood management. While these continuing actions could result in indirect cumulative effects on agriculture depending on the type of construction needed for repairs, or adjustments to potential irrigation water and drainage needed for water quality and flood management, these effects would be temporary in nature and would not be anticipated to result in the conversion of Important Farmland, land subject to Williamson Act contracts or in Farmland Security Zones, or otherwise substantially restrict agricultural uses.

Water Quality Effects

The potential cumulative effects of the No Action Alternative on agriculture due to changes in salinity were evaluated by comparing the No Action water quality analysis for salinity to those for Existing Conditions. Relative to Existing Conditions, the No Action Alternative would result in a fewer number of days when Bay-Delta WQCP compliance locations in the western, interior, and southern Delta would exceed EC objectives or be out of compliance with the EC objectives, with the exception of the Sacramento River at Emmaton.

Future of Agriculture in the Delta

The future of agricultural activities in the study area is uncertain. Over time, subsidence places greater stress on levees, and it will continue to increase the already high costs of continued levee maintenance and repair. Should the breach of a levee surrounding a Delta island devoted to agriculture occur, it is possible that the island might be permanently lost to agricultural production. Seismic risks and the effects of a changing climate also represent uncertainty with respect to the future of agricultural production in the study area. The No Action Alternative assumes that levee failures would be repaired under ongoing programs and does not include changes in land use to accommodate climate change or cumulative adverse impacts associated with climate change. These issues are discussed further in Appendix 3E, *Potential Seismic And Climate Change Risks to SWP/CVP Water Supplies,* and Chapter 29, *Climate Change*. While similar risks would occur under implementation of the action alternatives, these risks may be reduced by BDCP-related levee improvements along with those projects identified for the purposes of flood protection in Table 14-12.

Continuing activities related to operation of SWP and CVP facilities, changes in water quality, and other indirect effects are not changes in the existing environment that would result in the conversion of substantial amounts of Important Farmland to nonagricultural use. However, because Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones in the study area would be converted to nonagricultural uses under existing plans and programs, the No Action Alternative would have direct and adverse cumulative effects upon agricultural resources in the study area.

14.3.4.2 Cumulative Effects of the Action Alternatives

Impact AG-1: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Constructing the Proposed Water Conveyance Facility

NEPA Effects: Construction and ongoing operations associated with each BDCP alternative would convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to nonagricultural uses. Temporary and short-term impacts on Important Farmland would range from 559 to 3,170 acres while permanent impacts would fall between 2,459 and 18,874 acres, depending on the BDCP alternative selected. Land subject to Williamson Act contracts or in Farmland Security Zones affected by temporary and short-term construction activities would range from 632 to 1,877 acres while those at risk of permanent conversion would be between 2,347 and 14,125 acres. Other projects that would potentially convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones are listed in Table 14-12. Implementing these projects in combination with any of Alternatives 1A through 9 would result in cumulative adverse effects. Mitigation Measure AG-1 would be available to reduce those effects created by BDCP-related activities.

***CEQA Conclusion*:** Construction and ongoing operations associated with each BDCP alternative would convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones to nonagricultural uses. Other projects that would potentially convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 would result in a significant cumulative impact and the incremental contribution to this impact of

any of BDCP Alternatives 1A through 9 would be cumulatively considerable. Mitigation Measure AG-1 will reduce the severity of impacts created by BDCP-related activities by implementing activities such as siting project footprints to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of project facilities are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-2: Other Effects on Agriculture as a Result of Constructing and Operating the Proposed Water Conveyance Facility

NEPA Effects: Considered together, construction and operation of the water conveyance facility under any of BDCP Alternatives 1A through 9 could create indirect but adverse effects on agriculture by converting substantial amounts of Important Farmland to other uses through localized changes in groundwater levels and/or disruption of drainage and irrigation facilities. Effects of the alternatives related to water quality could be adverse or beneficial, depending on the location. Other projects that would potentially carry similar effects are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 could result in cumulative adverse effects. However, implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 would reduce the severity of these adverse effects created by BDCP-related activities.

***CEQA Conclusion*:** Water conveyance facility construction and operation could convert substantial amounts of Important Farmland to other uses through localized changes in groundwater levels and/or disruption of drainage and irrigation facilities. In other areas, effects of the alternatives related to water quality could be adverse or beneficial, depending on the location. Other projects that would potentially carry similar effects are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 could result in a significant cumulative impact and the incremental contribution to this impact of any of BDCP Alternatives 1A through 9 would be cumulatively considerable. Implementation of Mitigation Measures AG-1, GW-1, GW-5, and WQ-11 will reduce the severity of these impacts by implementing activities such as siting project footprints to encourage continued agricultural production; monitoring changes in groundwater levels during construction; offsetting water supply losses attributable to construction dewatering

activities; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; identifying, evaluating, developing, and implementing feasible phased actions to reduce EC levels; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these cumulatively considerable impacts remain significant and unavoidable after implementation of these measures because (i) replacement water supplies associated with losses attributable to construction dewatering activities may not meet the preexisting demands or planned land use demands of the affected party, (ii) seepage minimization may be infeasible in some instances, (iii) the feasibility and effectiveness of phased actions to reduce EC levels is uncertain, (iv) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and/or (v) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

As described under Alternative 1A, Impact AG-2, above, in addition to and to supplement Mitigation Measure WQ-11, the BDCP proponents have incorporated into the BDCP a separate, non-environmental commitment to address the potential increased water treatment costs that could result from electrical conductivity effects on agricultural water purveyor operations. Please refer to Appendix 3B, *Environmental Commitments*, for the full list of potential actions that could be taken pursuant to this commitment in order to reduce the water quality treatment costs associated with water quality effects relating to chloride, electrical conductivity, and bromide.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering

Please see Mitigation Measure GW-1 under Impact GW-1 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater.*

Mitigation Measure WQ-11: Avoid, Minimize, or Offset, as Feasible, Reduced Water Quality Conditions

Please see Mitigation Measure WQ-11 under Impact WQ-11 in the discussion of Alternative 1A in Chapter 8, *Water Quality*.

Impact AG-3: Temporary Conversion, Short-Term Conversion, and Permanent Conversion of Important Farmland or of Land Subject to Williamson Act Contracts or in Farmland Security Zones as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

NEPA Effects: Implementation of these conservation measures under any of BDCP Alternatives 1A through 9 would restore tidal wetland habitat, seasonally-inundated floodplain, riparian habitat, grassland communities, vernal pool complex habitat, and nontidal marsh areas. Because locations have not been selected for these activities, the extent of this effect is unknown and a definitive conclusion cannot be reached. However, based on the large proportion of land in the conservation zones designated as Important Farmland and/or subject to Williamson Act contracts or in Farmland Security Zones, it is anticipated that a substantial area of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones would be directly converted to habitat purposes. Other projects that would potentially convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 would result in cumulative adverse effects. Mitigation Measure AG-1 would be available to reduce those effects created by BDCP-related activities. Also, under the provisions of Government Code §51223, it may be feasible to rescind Williamson Act contracts for agricultural use, and enter into open space contracts under the Williamson Act, or open space easements pursuant to the Open Space Easement Act. To the extent this mechanism is used, it would eliminate the Williamson Act conflicts otherwise resulting from changes from agriculture to restoration and mitigation uses.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under BDCP alternatives would restore tidal wetland habitat, seasonally-inundated floodplain, riparian habitat, grassland communities, vernal pool complex habitat, and nontidal marsh areas. Implementation of restoration activities and other conservation measures could result in conversion of a substantial amount of Important Farmland and conflict with land subject to Williamson Act contracts or in Farmland Security Zones, resulting in a potentially significant impact on agricultural resources in the study area. Other projects that would potentially convert Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 could result in a significant cumulative impact and the incremental contribution to this impact of any of BDCP Alternatives 1A through 9 could be cumulatively considerable. Mitigation Measure AG-1 will reduce the severity of impacts created by BDCP-related activities by implementing activities such as siting features to encourage continued agricultural production; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these cumulative impacts remain significant and unavoidable after implementation of this measure because (i) even after effects from the footprints of conservation measures are minimized through design, they would continue to require the conversion of substantial amounts of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on providing, at a minimum, a neutral agricultural economic effect on affected lands in the

Delta as a result of the BDCP, taking into consideration the desire of individual Delta farmers to continue working on their land, the long-term viability of regional agricultural economies, the economic health of local governments and special districts, and the Delta as an evolving place.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Impact AG-4: Other Effects on Agriculture as a Result of Implementing the Proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21

NEPA Effects: Implementation of these conservation measures under any of BDCP Alternatives 1A through 9 could convert substantial amounts of Important Farmland to other uses through changes in groundwater levels, disruption of drainage and irrigation facilities, changes in inundation frequency, and changes to agricultural practices. Other projects that would potentially carry similar effects are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 could result in cumulative adverse effects. However, implementation of Mitigation Measures AG-1 and GW-5 would reduce the severity of these adverse effects created by BDCP-related activities.

***CEQA Conclusion*:** Implementation of Conservation Measures 2–11, 13, 15, 16, 20, and 21 under any of BDCP Alternatives 1A through 9 could convert substantial amounts of Important Farmland to other uses through changes in groundwater levels, disruption of drainage and irrigation facilities, changes in inundation frequency, and changes to agricultural practices. Other projects that would potentially carry similar effects are listed in Table 14-12. Other projects that would potentially carry similar effects are listed in Table 14-12. Implementing these projects in combination with any of BDCP Alternatives 1A through 9 could result in a significant cumulative impact and the incremental contribution to this impact of any of BDCP Alternatives 1A through 9 would be cumulatively considerable. Implementation of Mitigation Measures AG-1 and GW-5 will reduce the severity of impacts created by BDCP-related activities by implementing activities such as siting features to encourage continued agricultural production; monitoring seepage effects; relocating or replacing agricultural infrastructure in support of continued agricultural activities; engaging counties, owners/operators, and other stakeholders in developing optional agricultural stewardship approaches; and/or preserving agricultural land through off-site easements or other agricultural land conservation interests. However, these impacts remain significant and unavoidable after implementation of these measures because (i) seepage minimization may be infeasible in some instances, (ii) conservation or preservation by means of acquiring agricultural land conservation interests, even at one-to-one ratio, may not avoid a net loss of Important Farmland and (iii) the proposed optional agricultural stewardship approach does not focus principally on physical effects, but rather, focuses on supporting the Delta as an evolving place by encouraging existing owners and operators to continue working on the land while maintaining the long-term viability of regional agricultural economies and the economic health of local governments and special districts in the Delta.

Mitigation Measure AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Please see Mitigation Measure AG-1 under Impact AG-1 in the discussion of Alternative 1A.

Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Please see Mitigation Measure GW-5 under Impact GW-5 in the discussion of Alternative 1A in Chapter 7, *Groundwater*.

14.4 References

14.4.1 Printed References

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